Standard Operating Procedures
For Field Data Collection

The Government of Nepal
Ministry of Forests and Environment
Forest Research and Training Centre
Ecosystem and Forest Types Mapping Program
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1. Introduction

1.1 Purpose of the document

This Standard Operating Procedure (SOP) for Field Data Collection is prepared to provide technical guidance for collecting field data for the ecosystem and forest types mapping of Nepal. This document exclusively covers the procedure for establishing sample plots, and measurement of all parameters as per the sample plot data collection forms. The forms are designed to collect data specifically related to a) signatures for image classification to map forest, grassland, wetland and agriculture cover type and the corresponding ecosystems, b) their characterization, and c) their vulnerability assessment. This SOP aims to ensure that the field crews apply a consistent method and accurately collect the field data. In the unusual situation not covered in this document, the field crew will seek guidance from the Technical Advisor (TA) and EMP Coordinator.

1.2 Field Crew for data collection

Five Forest and Grassland (F&GL) Crews, a Wetland Crew and an Agriculture Crew will be involved in the field data collection although F&GL crews will also collect data related to wetlands and agriculture.

1.2.1 Field Crew Composition

Each F&GL crew involves a technical team consisting of a Field Crew Leader (FCL) (forestry), a Forestry Technician (FT), and a Botanist/ Taxonomist (B/T). In addition, a Local Resource Person (LRP) and/or a Local Assistant (LA) will be involved in the field to assist the technical team. A forest official from the local forest office will be invited in the team if required and available.

The wetland crew involves a Wetland Specialist as the field crew leader, a botanist/taxonomist, a local forestry or other relevant official, and a local resource person/local assistant.

The agriculture crew involves an Agroecologist as the field crew leader, a local agriculture official, and a local resource person/local assistant.

1.2.2 Responsibilities of the Field Crew

It requires that the field crews are fully aware of the significance of their work on Nepal's ecosystem mapping, and they have a clear understanding of their responsibilities to collect consistent and accurate field data. They require to adopt good professional standard and practice to contribute to this milestone work. While in the field, each crew member will adhere to the following points:

Strictly follow this guideline for communication, coordination, safety, and collection, reporting, and storage of the field data.
Remain respectful all the time to the government staff, political leaders, non-government employees, local people, and other crew members.
Make sure that the campsite is cleaned (not leaving behind any rubbish). The rubbish should be collected and disposed appropriately. DO NOT BURN THE RUBBISH.

1.2.3 Responsibilities of the Field Crew Leader (FCL)

Understand the fieldwork briefing from TA and RS/GIS Specialist on the detail of the fieldwork, sample/reference point locations and the duration of the field.

Plan the fieldwork; get the 'Travel Order' forms signed for all crew members; and collect field forms, maps, equipment and logistic items.
Collect the signed letter of support from EMU/FRTC to the concerned DFO/Provincial Ministry/Local Government and other stakeholders.
Contact and coordinate with the local forest/agriculture offices, municipalities, communities and other stakeholders, and request their assistance in the fieldwork.
Organize a meeting with the DFO/Provincial Ministry/Local Government/other stakeholders and inform about the fieldwork.
Organize an LRP/LA to accompany the field crew and assist in the fieldwork.
Lead the field crew throughout the fieldwork, ensuring the professional conduct and good practice.
If the equipment is faulty, not working or broken during the fieldwork, report to TA to organize a replacement.
Ensure that the SOP is being accurately followed throughout the fieldwork to collect and record field data as per the Data Collection Forms, and store field data safely.
Plan the work division for crew members and instruct accordingly.
Record any deviation in the measurement procedure in the SOP and report to TA.
Take photographs of field activities, sample plots, and relevant attributes along the route from one plot to other in the field for reporting and documentation.
Communicate with the TA/EMP Coordinator informing the progress on the fieldwork and seek guidance when necessary.
Coordinate and communicate with other FCLs to assure consistency in field data collection.
Take care of all safety instructions in the field.
Organize a field crew meeting after fieldwork to sum up daily activities.
Organize field data entry to the appropriate device/application as instructed by the TA/EMP Coordinator.

1.2.4 Responsibilities of Forestry Technician (FT) (F&GL field crew)

Assist the FCL to organize equipment and logistic items for the fieldtrip and get the 'Travel Order' form signed.
Assist the FCL to take measurements and fill in data collection forms.
Collect other data and information as instructed by FCL.

1.2.5 Responsibilities of Botanist/Taxonomist (B/T) (F&GL and wetland field crews)

Understand the fieldwork briefing from TA and RS/GIS Specialist on the detail of the fieldwork, sample/reference point locations and the duration of the field.
Assist the FCL to organize equipment and logistic items for the fieldtrip and get the 'Travel Order' form signed.
Participate in the DFO/Provincial Ministry/Local Government/other stakeholder meeting to inform about the fieldwork.
Assist the FCL throughout the field trip, ensuring professional conduct and good practice.
Identify plant species and their scientific names.
Collect appropriate samples of unknown tree/shrub/herb/grass species and identify them from the plant samples at the National Herbarium at Godavari, Lalitpur.
Collect data and fill in the relevant field data collection forms, as instructed by FCL, with support from LRP.
Assist the FCL/FT to collect, record and enter other field data.

1.2.6 Responsibilities of Local Staff

Accompany the field team and assist the field team in locating sample/reference points.
Help to organize Local Resource Person (LRP) and Local Assistant.
Assist in the field data collection in the role assigned by the FCL.

1.2.7 Responsibilities of Local Resource Person (LRP)

Assist the field crew to locate the plots and finding accommodation.
Help to identify the plant species.
Help to collect the socio-economic data/information.
Assist field crew as required in the field.
(While selecting an LRP, the FCL should consider that s/he is a key informant regarding relevant information required, such as plant identification)

1.2.8 Responsibilities of Local Assistant (LA)

Accompany and assist the field crew as required.

1.3 Occupational Health and Safety (OH&S)

While in the field, the field crews will adhere to the following points:

Work in a safe environment and remain vigilant of your safety and other team members.
Check the nearest mobile reception point to the field plot in case of emergency for communication.
Always carry a spare tyre, fuel and First Aid Kit.
If you are on regular medication, make sure you have packed medicines for the fieldwork duration.
While camping, assess the risk of fire danger before firing. If a field crew uses fire, ensure that the fire is completely extinguished before leaving the site.
In case of emergency, handle the situation appropriately and professionally, and inform the TA/EMP Coordinator for additional support.

2. Preparatory activities for field data collection

2.1 Understanding sampling design

Field crews require to be aware of the sampling designs for data collection in the respective components. The sampling designs in forest and grassland, wetlands, and agriculture components are as follows.

2.1.1 Forest and grassland

Different sampling designs have been adopted for the Tarai and Chure, and the rest of the physiographic regions. Since a large data set for forest is available in the case of Tarai and Chure regions (from FRA), the sampling is planned to capture data related to grasslands, and the forest types that are poorly represented by the FRA data (e.g. some riverine forests and plantations). Therefore, reference points for grasslands have been identified using NLCMS map, whereas riverine forests will be surveyed following the major river buffers. However, samples will also be selected purposively using secondary information (e.g. literature) and discussion with local stakeholders (e.g. DFOs, NPs, WRs).

For the Middle Mountains and upper regions, a multi-stage systematic sampling design has been adopted. At the first stage, South-North strips in each km (starting from the West) were laid throughout the country. At the second stage, a strip was randomly selected from among the first 50 strips (in the West) and then every 50th strip was selected. This maintained a total of 16 strips throughout the country. At the third stage, reference points were assigned on the land cover map (FRTC's NLCMS map, excluding glacier, snow cover and rocks and bare soil) at each 2 km along the selected strips, and those falling in the Tarai and Chure physiographic regions were omitted (Figure 1).

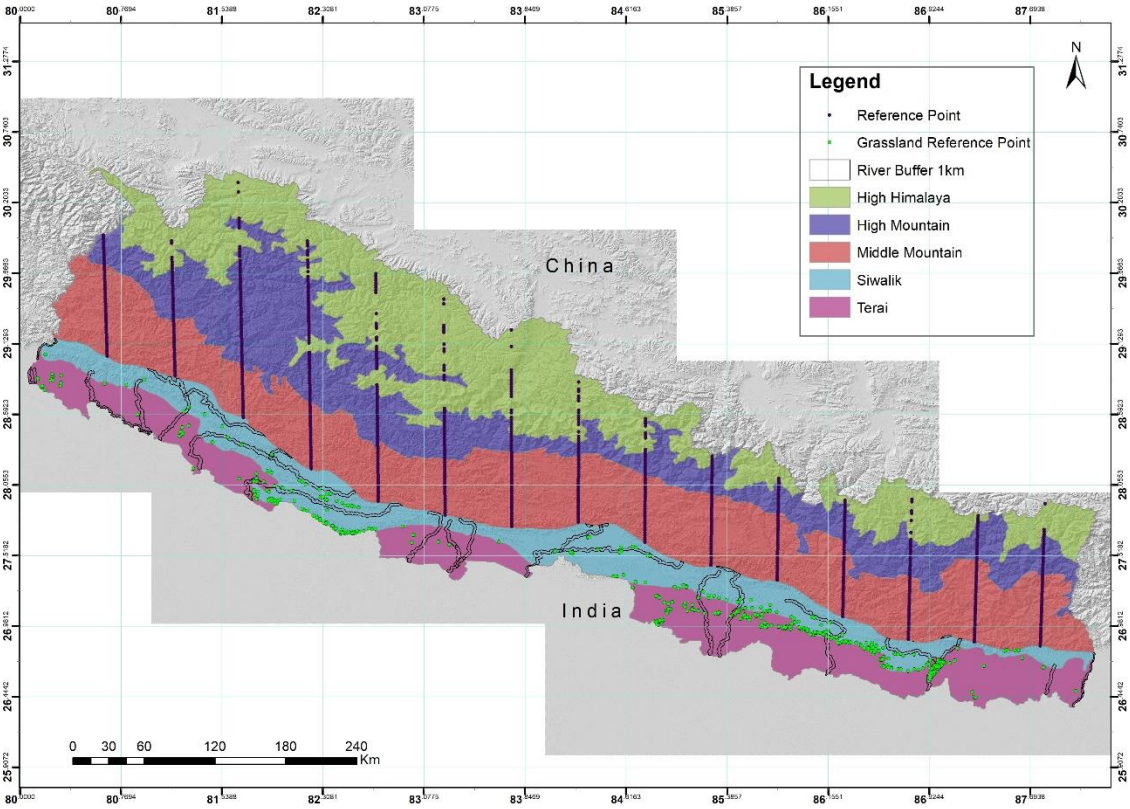


Figure 1: Sampling design for forest and grassland data collection

Note: Strip 1 (the westernmost) is missing from the map as it ends within the Tarai/Chure physiographic region.

From each systematic reference point as identified above (Figure 1), forest, grassland, wetlands, and agriculture samples will be assessed. The details on how to identify samples and locate sample point from the reference point will be dealt with later in this document.

2.1.2 Wetlands

The wetland samples that will be assessed by the F&GL field crews will be dealt with later in this document. The sampling design for the assessment of wetlands (validation samples) by a dedicated wetland crew will be developed once the draft wetland type map is prepared.

2.1.3 Agriculture

The agriculture samples that will be assessed by the F&GL field crews will be dealt with later in this document. For data collection by a dedicated agriculture field crew, seven north-south road stretches distributed from east to west have been designed (Figure 8). The stretches have been drawn following river courses and major road corridors, considering the need to reach settlements for data collection and its efficiency.

The 5 km (East)*5 km (North) gridded sample points have been overlaid on the agriculture cover mask (cropland) from the NLCMS map (FRTC, 2021) in the 10 Km buffer area of the seven road stretches expecting that this will cover variations in the agroecological zones (AEZ). Such systematic sample points have been identified up to 3,500 m elevation. Above this elevation, where the agriculture is sparse, and in the areas where such systematic sampling may not be efficient (for example, Humla and Dolpa), sample points will be identified purposively.

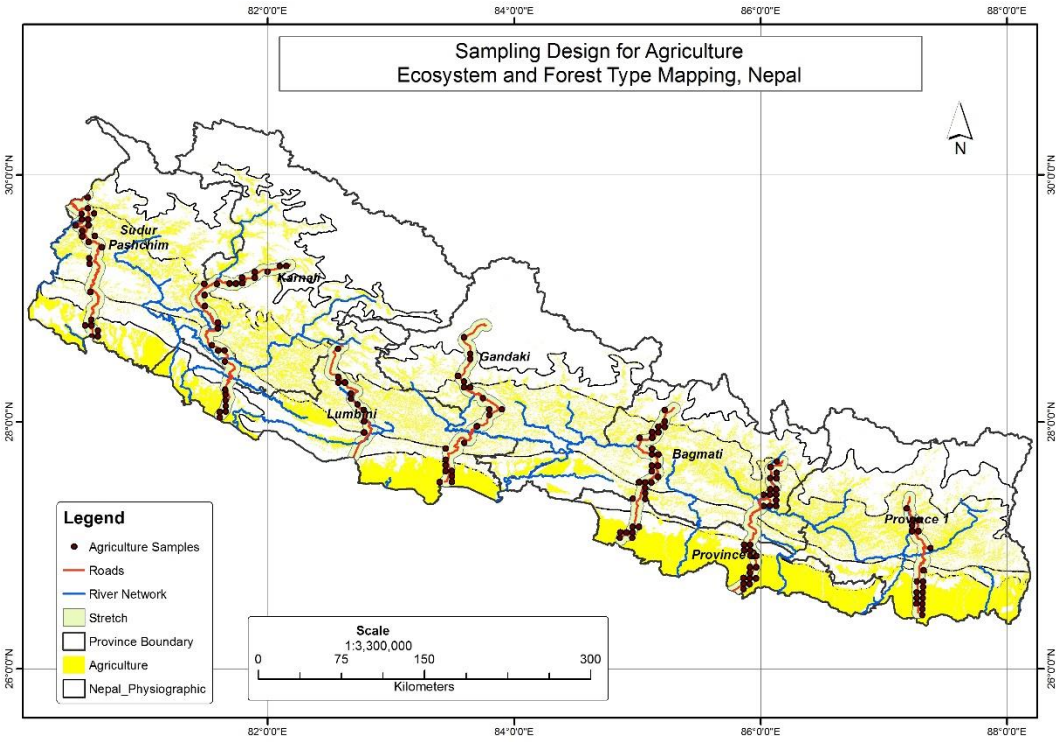


Figure 2: Sampling design for agriculture data collection

The systematic sample points as identified above (Figure 2) will be treated as reference points from which different agriculture samples around it will be assessed.

2.2 Understanding data requirements

Field crews need to be aware of the data requirements in terms of their uses or purposes for the EFTMP. In general, the data from each sample need to serve the following purposes.

Defining a cover type (i.e. forest type, grassland type, wetland type, crop/cropping pattern type) so that it can be used as a signature for image classification for cover type and the corresponding ecosystem type mapping.
Characterization of a land cover type and ecosystem type (i.e. data that can be used to prepare an explanatory note for each cover and ecosystem type)
Assessment of ecosystem vulnerability

Details of variables to be collected from each sample is dealt with in the field data collection forms.

2.3 Fieldwork plan

The fieldwork plan includes the following steps:

TA/EMP Coordinator and RS/GIS Specialist will prepare a fieldwork plan for each field crew as per the sampling design and explain to each field crew before their departure for the fieldwork.
EMP Coordinator will organize an appropriate vehicle for the fieldwork.
The TA/EMP Coordinator will approve the field crew's 'Travel Order' form.
The EMP Coordinator will prepare a letter to the local stakeholders (such as DFOs, PA Authorities, Local Governments) requesting support to the field crew during the fieldwork.

2.4 Logistics and field equipment

Logistics and safety items

SN	Equipment/Item
1	Vehicle
2	First Aid Kit
3	Appropriate personal clothing and boot
4	Camping gear
5	Emergency contacts

Field Equipment

SN	Equipment/Item	Remarks
1	Field work plan (with GPS-located list of sample points)	All crews
2	Topo map	All crews
3	Google map/earth (digital, on mobile)	All crews
4	Standard Operating Procedures (SOP)	All crews
5	Data collection forms – forest (sample, sub-sample), grassland (sample, sub-sample),	F&GL crews - all forms, Wetlands and Agriculture crews - respective forms

	wetlands, agriculture, community consultation, photo records	
6	GPS (with batteries)	All crews
7	Linear Tape (5m, 20m)	All crews
8	Diameter tape	F&GL and Wetlands crews
9	Suunto Clinometer	All crews
10	Relascope	F&GL crews
11	Camera (with charger and USB cable)	All crews
12	Metal ruler	All crews
13	Species Identification Manual/Species Code Book	All crews
14	Clipboard, Pencils, sharpener, eraser, stapler, staples	All crews
15	pH meter (with necessary accessories)	All crews
16	Branch cutter/pruning scissors	F&GL and Wetlands crews
17	Knife (hansiya)	All crews
18	Waterproof bag for field forms	All crews
19	Herbarium press and accessories	F&GL and Wetlands crews

2.5 Tasks at the district

The field crew will visit the relevant offices (e.g. DFO for F&GL and wetland crews, Agriculture Knowledge Centre for agriculture crew) and the Municipality where fieldwork is planned and perform the following tasks:

Submit the letter from the EMP Coordinator requesting support to the field crew.
Brief on the fieldwork plan and the sites for the samples.
Acquire feedback on the locality, accessibility, route and assistance from local staff (e.g. in the Sub-Division Forest Office, Ward Office).
Discuss forest/agriculture/wetland types found in the district and identify/locate if there are any specific types that may not have been represented by the systematic sample plots so that those can be selected as purposive samples.
Organize Local Resource Person (LRP) and/or Local Assistant (LA) from the village/city close to the sample plot.

2.6 Preparatory tasks on the fieldwork day

Daily checklist

SN	Task	Responsible Person
1	Discuss the plan of the day	FCL, FT, B/T and team members
2	Check the equipment	FCL, B/T, FT
3	Calibrate GPS	FCL
4	Organize food and Water	Team
5	First Aid	FCL, B/T, FT

2.7 Identifying samples and locating sample points

Navigate to (or close to) a given reference point (first point of the day) using the topo map (hard copy), high resolution imagery (digital) and the GPS loaded with the waypoint, and with the help of the LRP and/or LA. Identify a point from where a relatively large landscape can be viewed if it is not so from the given reference point.
Identify various land covers and their types around it, such as a *Castanopsis-Schima* forest, a *Shorea robusta* forest, a shrubland of a non-identified type (all of these may be found there in a forest patch or neighboring areas), a grassland type, a river, a lake/pond, a maize-millet field, a rice field etc.
CONSIDER A SPECIFIC LAND COVER TYPE AS A SAMPLE. Even, if parts of a forest of the same type are visualized as distinct cover types due to difference in density and other variables (e.g. disease, burning), assess one as a sample and all others as sub-samples (for signature). Also consider taking multiple samples of the same forest type from different aspects.
In the case of forest, grassland, and agriculture, locate a sample point in each sample as identified above in such a way that it gives a 'pure' signature of that cover type. For this, go preferably around the middle of that cover type, but at least 50m inside it from its border with other cover types, and fix the sample point ensuring that the point represents the sample cover type. AVOID BIAS FOR EASINESS.

In the case of wetlands, consider a whole cover type (e.g. a lake) or its section (e.g. river) as a sample for assessment rather than fixing a point.

Once data are collected from all samples around the first reference point, drive or walk toward the second reference point. If any new land cover type (i.e. other than those assessed around the first reference point) is found along the route, consider it as a sample.

Also, take a sub-sample of F&GL types at about every 500m even in case the F&GL type is repeated.

Locate the second reference point and repeat the similar process to identify samples around it.

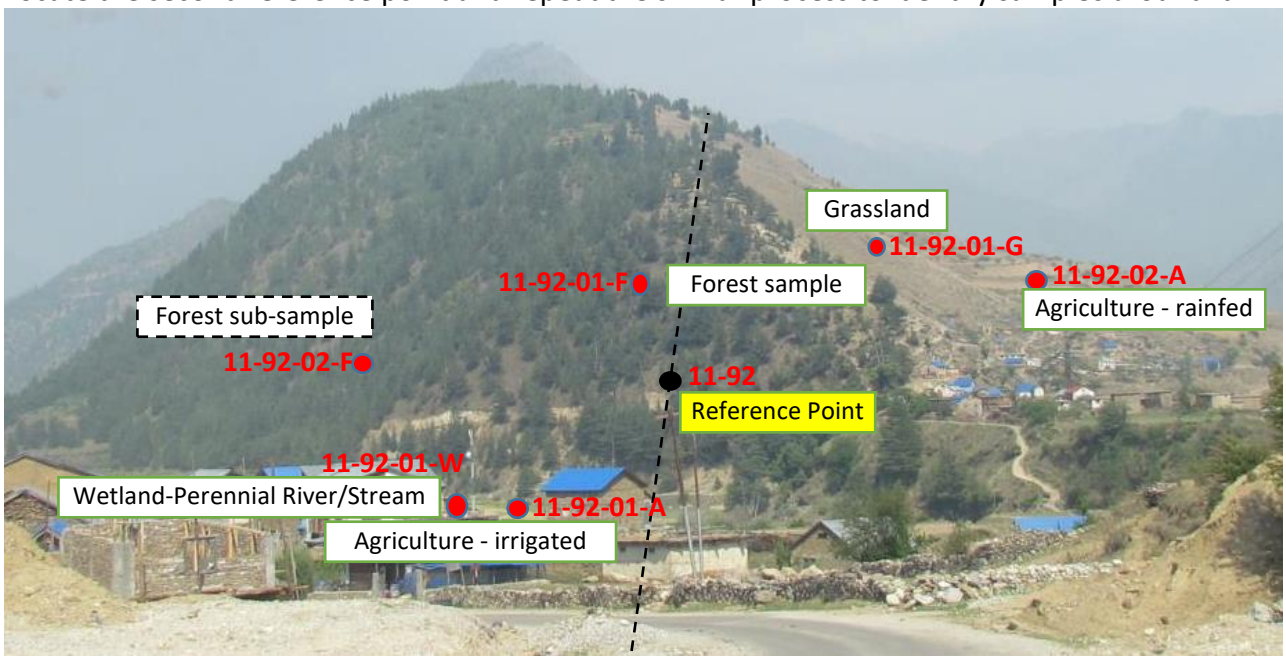


Figure 3: Locating sample points around a reference point

Note: In the photograph, the whole forested slope looks to have the same forest type (e.g. a *Pinus wallichiana* forest). The reference point lies in the forest but close to a road or at the margin with other land cover type, therefore, the first sample point has been fixed at a point (at least 50m inside from its border in all sides) which generally represents the sample stand. However, since the sample point represents a moderately sparse forest, a sub-sample has also been taken for a dense stand of the same type.

3. Data collection from forest samples

Forest Sample Form 1: Site description

1.1 Reference Point Information

RP Code

Reference Point (RP) codes are the codes given for systematic reference points. These codes are determined based on the transect (strip) number (from West to East) and reference point number along the strip (from North to South); for example, 03-015 (in which, 03=transect number, 015=reference point number). The list of reference points with their codes are provided by the EMU.

The RP Code of a reference point is written for all samples around this reference point and that along the route to the next reference point.

Simply write "PUR" for a purposive sample that is taken without reference to systematic transect.

UTM zone

The UTM zone is either 44 or 45. The GPS shows the correct UTM zone in the display. For a general reference, west of Nepal is UTM zone 44 and Eastern part of Nepal is UTM zone 45. The border line lies at the more or less central part of the country crossing South to North direction (Nawalparasi district).

Coordinates (Easting, Northing)

The pre-determined coordinates of reference points are stored in the GPS device that determines the geographic coordinates of easting and northing in the UTM zone (44 or 45) projection system. The coordinates of the reference points are pre-filled in the office.

Easting in meters according to the UTM zone (44 or 45), precision in meter.

Northing in meters according to the UTM zone (44 or 45), precision in meter.

Address of Sample Forest

District code

Code number of the district, where the sample forest is located (1-77) (Annex I).

Name of Palika, Ward

Full name of the local level, and ward number which the sample point belongs to.

Date

Date of the data collection according to Gregorian calendar in the form of 'day/month/year', i.e. *dd/mm/yyyy (26/04/2021)*.

Data collectors

Full names (last name, first name) of data collectors, i.e. Field Crew Leader, Botanist etc.

1.2 Sample Point Information

Sample Point Code

A unique code is written for each sample point as the "RP code - serial number of forest sample/sub-sample from one reference point to the next - abbreviation for Forest /Grassland/Wetland/ Agriculture". For example, 03-015-01-F (for the first forest sample around RP 03-015), 03-015-03-F (for the third forest sample/sub-sample). It starts with 03-016-01 for the samples around RP 03-016 and along the route to RP 03-017.

Simply write "PUR" for a purposive sample that is taken without reference to systematic transect.

The same sample point code is written in all forms (pages) related to a sample point.

Geographic information of the sample point

After accessing to the sample point, the GPS is kept for averaging. Then the readings are recorded in the relevant spaces, i.e. **UTM Zone, Easting, Northing, and Elevation**.

GPS coordinates (Easting, Northing) is written in all forms (pages) related to a sample point.

Aspect

Direction of the main gradient of the slope, measured in degrees (001-360). It is determined from the sample point to the direction of the main gradient (downhill) using a compass. For flat land (slope=0), write 0.

Slope

Average gradient of the plot, in per cent (%), measured using hypsometer. It is determined by averaging two readings from the sample point – uphill and downhill.

Name of forest

Specific name of the forest (as explained by the local people) where the sample point is located (e.g. Gairikhola forest, Mathillo ban, Rani ban etc.).

Nearby Village/City

The name of the village or city close to the area where the sample is located.

1.3 Sample Forest Information

Forest Type

Based on vegetation composition and other relevant variables, identify the forest type of the sample forest stand from among the given forest and grassland typology (Annex II), and record the SN (serial number) and the name of typology (e.g. 10 - *Pinus roxburghii* Forest). If the forest stand does not fit to any of the given typology, give an appropriate typology based on vegetation composition (e.g. a *Vitex* dominated shrubland, a marginal shrubland dominated by *Rubus species*).

Adjoining Land Cover

Based on observation of land covers surrounding the sample forest stand, assign the following codes (and description, e.g. specific forest type). If more than one land cover type is present, write all of them in different boxes given, starting from the most dominant one.

Code	Land Cover	Specific type
1	Forest	One from forest and grassland typology
2	Other Wooded Land	One from forest and grassland typology
3	Grassland	One from forest and grassland typology
4	Cropland	Irrigated/rainfed, crop type/pattern
5	Wetland	One from wetland typology
6	Built-up Area	City/village
7	Bare Rock	
8	Other (specify)	

Distance to road

Estimated distance from the border of the sample forest stand to the nearest motorable road, coded as follows:

Code	Distance
0	Road crossing the stand
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

Distance to settlement

Estimated distance from the border of the sample forest stand to the nearest human settlement, coded as follows:

Code	Distance
0	Settlement within the forest
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

1.4 Land feature of the Sample Forest

Soil Texture

Clear the 30cm*30cm area at the sample point, i.e. remove all vegetation and litters. Dig a 30cm-deep pit, take a mixture of the soil from the whole depth, apply feel method as follows to identify soil texture. Note that for feeling, the soil sample must be in a moist to frail wet state and gravel and other constituents > 2 mm must be removed.

Soil Texture Determination by feel method

1. Take about 25 g of soil in the palm, add water and moisten it and try to form ball, if ball not formed, the sample is Sand (S)

If ball is formed,

2. Place ball of soil between the thumb and the forefinger, squeeze it upward and form a ribbon, if ribbon not formed, the sample is Loamy Sand (LS)

If ribbon is formed, then determine the size of the ribbon into either a short (<2.5 cm), medium (2.5 to 5 cm) or long (>5 cm); Place a pinch of the soil ribbon on the palm of one hand and add water to make it wet and gently rub it with the fore-finger of another hand to feel the grittiness or smoothness, finally observed the result as given below:

Feel	**Ribbon Size (cm)**		
	<2.5	**2.5 – 5.0**	**> 5.0**
Gritty	Sandy Loam (SL)	Sandy Clay Loam (SCL)	Sandy Clay (SC)
Smooth	Silt Loam (SiL)	Silty Clay Loam (SiCL)	Silty Clay (SiC)
Neither gritty nor smooth	Loam (L)	Clay Loam (CL)	Clay (C)

Based on above information, assign one of the following codes:

Code	**Soil Texture**	**Code**	**Soil Texture**
B	Boulders. Grain size > 200 mm	**SiL**	Silt Loam
RS	Rocky sand. Sand mixed with stones (60 – 200 mm)	**SiCL**	Silty Clay Loam
S	Sand	**SiC**	Silty Clay
SL	Sandy Loam	**L**	Loam
LS	Loamy Sand	**CL**	Clay Loam
SCL	Sandy Clay Loam	**C**	Clay
SC	Sandy Clay		

Soil color

Take a mixture of the soil from the 30cm-deep pit (avoiding organic layer), and assign the appropriate code using the Munsell color chart.

Organic layer thickness

Measure the thickness of organic layer in the pit and write it with 1cm accuracy.

Roots

Observe the roots in the pit and assign the appropriate code.

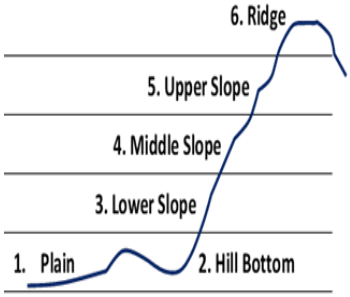
Code	**Roots**	**Description**
0	**Absent**	No roots observed
1	**Sparse fine roots**	A few fine roots observed
2	**Sparse coarse roots**	A few coarser (bigger) roots observed
3	**Dense fine roots**	Many fine roots observed
4	**Dense coarse roots**	Many coarser (bigger) roots observed

Soil pH

Take a mixture of soil from the whole depth of the pit (avoiding organic layer) and keep some in beaker. Put distilled water twice the weight of soil and firmly mix them. Use the pH Meter and record the pH value. HANDLE THE INSTRUMENT CAREFULLY, IT IS VERY SENSITIVE.

Macro-topography

Tick the appropriate option as shown in the figure.



Site Specificity

Based on observation of the sample forest stand, identify site specificity and write one of the following codes.

Code	Site specificity
1	Water-logged
2	Fresh flood plain
3	Old flood plain
4	Rocky terrain
5	(Rehabilitated) landslide
6	Other (specify)

Remarks on feature/history of the site/vegetation

Write if any remarkable features are observed/known, e.g. all trees are inclined; most trees are epiphyte-burdened; it was a pure pine forest before two decades but now in transition toward broadleaved.

1.5 General stand characteristics

Management regime

Record the following codes for management regime of the forest:

Code	Management regime
0	Not determined
1	Private Forest/Land
2	Government-managed Forest
3	Protected Area (NP, WR, HR)
4	Buffer Zone managed by government
5	Buffer Zone Community Forest
6	Conservation Area

Code	Management Regime
7	Community Forest
8	Religious Forest
9	Collaborative Forest
10	Leasehold Forest
11	Public Land Forest
12	Forest Protection Area
13	Other (specify)

Forest Management Activities

Use the following codes for forest management activities observed in the sample stand (e.g. 1, 2, 4).

Code	Description
0	No activities
1	Protection (e.g., fencing)
2	Weeding/cleaning
3	Shrub clearing
4	Dead/lying tree collection
5	Selection felling
6	Shelterwood/Clear felling
7	Fireline construction
8	Other (specify)

Forest origin

Based on observation of the sample stand and discussion with LRP, forest origin is recorded with the following codes.

Code	Origin type	Description
1	Primary forest	A naturally regenerated forest of native species where there are no clearly visible indications of human activities.
2	Other naturally regenerated forest	A naturally regenerated forest where there are clearly visible indications of human activities.
3	Planted forest	A forest predominantly composed of tress established through planting or deliberate seeding (constituting more than 50% of the growing stock at maturity). This also includes coppice from trees that were originally planted or seeded.
4	Enrichment plantation	A natural forest supplemented by planting seedlings to enhance its stocking.

Forest Development stage

Based on observation of the sample stand, its development stage is coded as follows:

Code	Description
1	Seedling/sapling forest
2	Young growth forest
3	Mature forest
4	Old growth forest

Forest Condition

Based on observation of the sample stand, the forest condition is coded as follows. Consider forest health and vitality and potential ecosystem services (tangible and intangible products and services) to judge the condition.

Code	Description
1	Very good
2	Good
3	Moderate
4	Poor/degraded

Vertical Structure

Based on observation of the sample stand, the vertical structure of the forest is recorded as follows:

Code	Description
0	Shrubland

1	Single-storeyed forest
2	Double-storeyed forest
3	Multi-storeyed forest

Forest Sample Form 2: Basal area and tree characteristics

Tallying trees with relascope (SN, Species Code, Local Name, Botanical Name, Count of Trees, No. of Trees)

Using relascope, basal area of each species is recorded starting (the first species) from serial number (SN) 1. For this, FCL starts tallying trees with Relascope (usually starting from the North or a unique tree) and FT carries out recording. FCL loudly pronounces the name of the species that is "IN" (at breast height – 1.3m) and the FT repeats the species name and records it in the "species code/Local name/ Botanical Name" and "count of trees (tally)" columns. It is better to write "local name" only during tallying through Relascope and fill "Species Code" and "Botanical Name" later using Species Identification Manual. Once tallying trees is completed, the tallies are summed up and figures are assigned in the "No. of trees" column. Basal area can be calculated multiplying the "No. of trees" by the BAF.

Using relascope

Use the smaller notch (1.3cm wide) of the given relascope.
Keep the string straight while sighting; the ring of the string should be close to your eye.
Just rotate but not move from the sample point.
Choose a unique tree (unique species, biggest tree, leaned tree etc.) for the first tree marker.
Make a rule for the first tree (e.g. always count the first one), avoid double counting.
Count full tally (IN) as 1 and half tally (borderline or exactly coincided) as 0.5, and avoid counting of non-tallied trees. Use tallying symbol as given below; you can use certain sign (such as point) for half tally.

𝍸 𝍸 || . // = 9.5

For leaning tree, rotate the relascope so that its axis coincides with the axis of the bole.
In dense stand, if trees' breast heights are covered with shrubs/bushes, take special care to take their measurements. One way may be that if the bole at height above breast height is "IN", that at breast height is "IN". Sometimes, bushes need to be cleared.
Swing left or right to look for hidden trees.
Take slope of the plot area for slope correction.

Note on species identification

Write the species' local name (all names if more than one) asking with the LRP, and botanical name using the Species Identification Manual.

Herbarium should be collected for unidentified species from the same tree or other trees around the sample point. For specimen, the sample point code and running specimen number (starting from 1 on each sample) must be recorded and attached to the specimen. In the data sheet, the species is coded as 01, 02..., where 01 or 02 indicates the running specimen number and this code should be written in the species name column. If a photograph is taken, the photo number should also be written in brackets after the unknown species code, e.g. 01 (23). If the local name is known it should be written in the data sheet (but in this case also, specimen and/or photo number should be mentioned).

Average Quality class

Tree quality is based on the present or prospective form, roughness and soundness of a tree. For a tree with exploitable diameter, observation is based on its present condition. For smaller trees the quality class should be assessed based on their expected ability to reach exploitable size. Based on observation of all tallied trees of a species, average tree quality classes should be recorded using the following codes:

Code	Quality class	Description
1	**High quality sound tree**	A tree with good form and now or prospectively having a length of at least 6 m in sound saw logs.
2	**Sound tree**	A sound tree not qualified in the class 1. The tree must have now or prospectively at least one 3 m section of saw log or two 1.8 m or longer saw log sections.
3	**Cull tree**	A tree having poor form, roughness, injury or decay stem and that does not (now or in the future) yield logs of merchantable quality (all trees not included in class 1 and 2).

Average Crown class

Crown class is determined by tree height, and depends on the size and condition of the crown of the tree and its position in relation to other trees in the forest stand. Based on observation of individual tallied trees of a species, the following crown classes are coded as follows.

Code	Crown class	Description
1	**Dominant**	A tree with a larger crown that the average size in or above the level of the surrounding canopy and receiving full light from above and more than one side.
2	**Co-dominant**	A tree with a medium-sized crown in the level of the general canopy and receiving full light from above and at least on side.
3	**Intermediate**	A tree with a smaller crown than the average, reaching the general level of the canopy but not above it and receiving some direct light from above but little if any from the side.
4	**Suppressed**	A tree with a crown that is smaller than what is normal to a tree of this age and size. The tree is receiving little or no direct sunlight and showing signs of retarded growth resulting from the competition of dominant trees.

5	**Understory**	A tree with a crown that is below the level of the general canopy layer. Receiving little or no direct sunlight, but not showing signs of suppression or retarded growth. Such trees may be tolerant to shade. Or saplings not yet seriously affected by the competition of other vegetation.

DBH Classes

Number of tallied trees of each species falling in the following DBH classes are recorded in columns 1, 2, 3 and 4, respectively.

Box	DBH Class
1	DBH: <12.5 cm
2	DBH: 12.5 – 25 cm
3	DBH: 25 – 50 cm
4	DBH: >50 cm

Largest DBH

Based on observation of tallied trees, identify the largest tree of each species and measure the diameter at breast height (1.3m) using D-tape. Record it at one decimal, e.g. 34.3. Remove/avoid obstacles like epiphytic lichens, climbers, mosses, hanging barks, orchids, etc. before measuring the DBH. Pay special attention not to measure DBH at any abnormal points of the stem, e.g. nodes, swelling point, buttress, etc.

Height of the tallest tree

Based on observation of tallied trees, identify the tallest tree of each species and measure its height (in meter) using Vertex and write it with one decimal (e.g. 14.6).

Phenology

It denotes the periodic biological events of a tree primarily regulated by climate and seasonal changes. It is coded as follows:

Code	Stage
0	Normal
1	Sprouting/leaf development
2	Flowering
3	Fruiting
4	Leaf fall

Remarks

Write any information about a particular species that is useful in terms of signature or characterization of the forest type, such as lopping, top dying etc.

List of tree species not tallied

Record all tree species (name/code) around 20 m (estimated) from the sample point that have not been tallied in the Relascope survey. Local names can be written while recording but they should be coded later.

Photographs around the sample point

Take photographs of the sample stand (showing ground details, view of stems, crown view/stand landscape etc.) and record the file name/numbers with their descriptions if needed.

Forest Sample Form 3: General Information on Forest Stand

3.1 Vertical strata

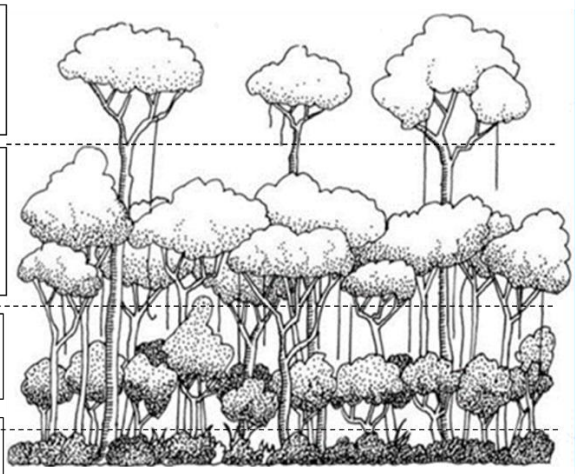
A forest may have one or more distinct layers as follows.

1. Emergent layer: the layer above the general canopy with a small number of large trees

2. Canopy layer: the layer formed by the majority of large trees

3. Understorey layer: the layer between the canopy and the forest floor (may be one or more)

4. Forest floor: the layer formed by small plant forms at the forest floor



Based on observation of the sample forest stand, write lists of tree and shrub species (species name and code) in each of the emergent, canopy and understorey layers. Tick appropriate option in the case of forest floor layer.

If a forest stand has only layer (other than forest floor), consider it as a canopy layer. In shrublands, shrub species may form a canopy layer.

3.2 Forest Disturbances

Code, Disturbance Type

Various types of disturbances as listed in the table below may be observed in the sample forest. Based on observation of the sample forest stand (around 20m from the sample point), write the codes and disturbance types (as many as observed) in the appropriate columns.

Code	Disturbance type	Code	Disturbance type	Code	Disturbance type
1	Grazing	7	Sapling/pole cutting	13	Grass cutting
2	Forest fire	8	Shrub cutting	14	Invasive species
3	Cultivation	9	Lopping	15	Soil erosion (rills/gullies)
4	House/shed construction	10	Litter collection	16	Landslide and flood
5	Road construction	11	Fruit/seed collection	17	Disease/insect attack

6	Tree cutting	12	Recreation	18	Others (specify)

Intensity (of disturbance)

Based on observation around 20m of the sample point, assign the intensity of disturbance with the following codes.

Code	Description
0	Not visible
1	Slightly visible (<10% of plot area)
2	Moderately visible (10-50% of the plot area)
3	Highly visible (>50% of the plot area)

3.3 Presence of Wild Fauna

List the wild fauna known to be present in the sample forest and assign the following codes for their abundance and source of information.

Abundance	
Code	**Description**
1	Highly abundant
2	Moderately abundant
3	Rare

Source of Information	
Code	**Description**
1	Direct observation of fauna
2	Direct observation of signs
3	Local resource person/local community
4	Other (specify)

Also, indicate endangered or endemic fauna found in the sample forest, if any.

3.4 Key threats to ecosystem

Based on observation of disturbances and discussion with LRP/local community, write the main three threats to the ecosystem of the sample forest.

Management prescription

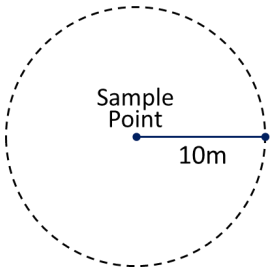
Based on observation of disturbances and discussion with LRP/local community, write what you generally prescribe for the sustainable management of the ecosystem of the sample forest.

Forest Sample Form 4: Herbaceous Vegetation

4.1 Herbs/grass/pteridophytes

The list of herbs, grasses and pteridophytes occurring around 10m from the sample point are recorded with their species codes, local names and botanical names.

Their type (herb, grass or pteridophyte) is recorded in the H/G/P column.

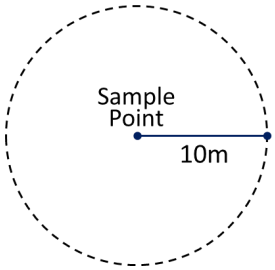


The cover % of each species is estimated through careful observation, and recorded. The cover % is rounded to 5 if it is more than 10%.

4.2 Ground Cover

Based on observation around 10m from the sample point, the ground cover percentage of each cover type given in the data sheet is estimated. The cover % is rounded to 5 if it is more than 10%. The total should be 100 per cent.

4.3 Epiphytes, parasites, climbers, lichens, mosses, and bryophytes



Information related to epiphytes, parasites, climbers, lichens, mosses, and bryophytes, including their host species, are recorded from 10m around the sample point. Their species codes, local names, and botanical names are recorded with their host species (codes and local or botanical names) in the relevant columns. Their **abundances** are estimated and recorded with the following codes.

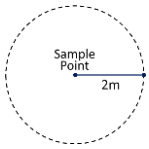
Code	Description
1	Very high – covering more than 2/3rd of area on stem and main branches
2	High – covering between 1/3rd and 2/3rd of area on stem and main branches
3	Moderate – covering less than 1/3rd of area on stem and main branches
4	Low – a few individuals present sporadically

Write whether the species is a climber (C), epiphyte (E), pteridophyte (P), Lichen (L), Moss (M) or Bryophyte (B) in the relevant column.

Forest Sample Form 5: Seedlings/saplings, shrubs, bamboos

5.1 Seedlings and saplings

Seedling and sapling are assessed from a circular plot with a radius of 2m from the sample point. The following attributes of each species, with their Species Codes, Local Names and Botanical Names, are collected and recorded in the relevant columns.



Number (No.)/Frequency

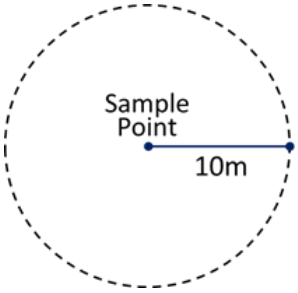
Number of seedlings and saplings of a species.

Mean height

Mean height of seedlings and saplings is estimated by measuring a few representative individuals with the measuring pole and recorded in meters with one decimal. If there is only one seedling/sapling for a species, the height of that seedling/sapling is recorded.

5.2 Shrubs and Bamboos

Crown cover percentage (the horizontal projection of the crowns) of each species of shrub and bamboo is estimated based on observation around 10m from the sample point.



Mean heights of shrubs and bamboos are estimated by measuring a few representative individuals with the measuring pole (or vertex) and recorded in meters with one decimal.

Data collection from Forest Sub-samples

There are two forms (Form 1 and Form 2) to be used for data collection from forest sub-samples. These forms include parts of variables from the forest sample forms; the data will be collected using the similar methods and procedures.

4. Data collection from grassland samples/sub-samples

Most of the variables in the grassland-related data collection forms are similar to that of forest-related forms. Those information are taken and filled in using the similar methods and procedures as given in the forest sample/sub-sample forms. Methods and procedures to be used for assessing grassland-specific variables are presented below.

Grassland Type (Sample Form 1, Sub-sample Form)

Write the name of a grassland type from among the forest and grassland typology (Annex II) against the **"Given typology"** (e.g. 65 - Temperate Grassland, 69 - *Kobresia pygmaea* Mats). Against the **"Suggested typology"**, write the same name if it is based on species composition, such as *Kobresia pygmaea* Mats.

However, if the **"Given typology"** is not based on species composition, such as 65-Temperate Grassland, give an appropriate name to the sample grassland type based on species composition and write it against the **"Suggested typology".** More than one names of the type (based on species composition and/or other parameters) may also be proposed.

Grassland Management Activities (Sample Form 1)

Use the following codes for grassland management activities observed in the sample stand (e.g., 1,3, 4).

Code	Description
0	No activities
1	Protection (e.g., fencing)
2	Controlled grazing
3	Controlled fire
4	Weeding/cleaning
5	Grass cutting
6	Other (specify)

Grassland Structure (Sample Form 1, Sub-sample form)

Based on observation of the sample grassland, write one of the following codes.

Code	Structure	Description
1	**Tall Grassland**	Grassland dominated by grasses taller than 1m
2	**Medium Grassland**	Grassland dominated by 0.3-1m tall grasses
3	**Short Grassland**	Grassland dominated by less than 0.3m tall grasses, many creeping or matted grasses
4	**Forbs**	Herbaceous communities in which Graminoids make up less than 10% of the cover
5	**Other**	Specify if there is other than above types

Grassland Condition (Sample Form 1, Sub-sample form)

Based on observation of the grassland sample, the grassland condition is coded as follows. Consider grassland's health and vitality and potential ecosystem services (tangible and intangible products and services) to judge the condition.

Code	Description
1	Very good
2	Good
3	Moderate
4	Poor/degraded

Livestock grazed (Sample Form 1)

Write the local/common names of livestock breeds that are grazed in the sample grassland (e.g. Jhopa, Yak, Sheep).

Livestock for which grass is harvested (Sample Form 1)

Write the local/common names of livestock breeds for which grasses from the sample grassland is harvested (e.g. buffalo, cow).

Tree and shrub assessment (Sample Form 2)

Based on observation around 20m from the sample point and beyond, record tree/shrub/bamboo species (codes/names). In case of trees, write the code of **average development stage** of each species as follows.

Code	Development stage
1	Seedling/sapling
2	Young growth
3	Mature
4	Over mature

Grassland Disturbances (Sample Form 2)

Various types of disturbances as listed in the table below may be observed in the sample grassland. Based on observation of the sample grassland (around 20m from the sample point), write the codes and disturbance types (as many as observed) in the appropriate columns.

Code	Disturbance type	Code	Disturbance type	Code	Disturbance type
1	Grazing	6	Tree/shrub cutting	11	Landslide and flood
2	Uncontrolled fire	7	Recreation	12	Hailstone and thunder
3	Cultivation	8	Grass harvesting	13	Insect infestation
4	House/shed construction	9	Invasive plant species	14	Disease infestation
5	Road construction	10	Soil erosion (rills/gullies)	15	Others (specify) …..

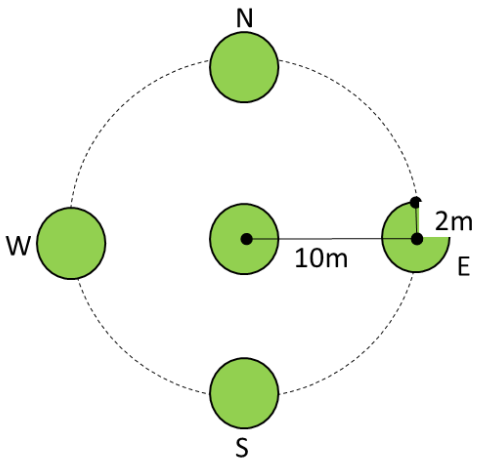
Write one of the following codes for the intensity of disturbance based on observation around 20m of the sample point.

Code	Description
0	Not visible
1	Slightly visible (<10% of plot area)
2	Moderately visible (10-50% of the plot area)
3	Highly visible (>50% of the plot area)

Vegetation assessment from sub-plots (Sample Form 3)

Grasses and other herbaceous vegetation are assessed from five circular sub-plots with 2m radius established at the sample point and four cardinal directions, as shown in the following figure.

Since soil sample is taken from the sample point (so a soil pit needs to be dug), carry out vegetation assessment in the central sub-plot at the beginning of the fieldwork. Assessment of other sub-plots can be carried out at any time later but always work clockwise starting from the Northern sub-plot as given in the data collection form.



Visually estimate cover % of each species in each sub-plot and write it in the appropriate columns. Dividing the sub-plot into four quarters with a rope may be a good strategy for visual estimation of the cover %. The sum of the cover % may or may not be 100 depending on whether the land is fully covered by herbaceous vegetation or not.

Count of seedlings/saplings of trees/shrubs will go hand in hand with the assessment of grasses/herbaceous plants from the sub-plots.

Average height (Sample Form 3)

Average height of each species is estimated by measuring a few representative individuals with the measuring pole/ruler and recorded in meters with one decimal.

Palatability (Sample Form 3)

Based on information from LRP/Local Assistant, write the code of palatability of each species (preference by local livestock) as follows.

Code	Description
0	Not palatable (not eaten at all)
1	Fairly palatable (eaten by some and not by others, or eaten only during scarcity of fodders)
2	Highly palatable (preferably eaten)

List of vegetation (Sub-sample Form)

Based on observation around 20m from the sample point, dominant (most, second-most, third-most) and associated species of grasses and other herbaceous plants as well as tree/shrub/bamboo (if any) are identified and recorded in the appropriate columns. The cover % of each of them is visually estimated.

5. Data collection from wetland samples

Three forms have been designed to collect data regarding wetlands. General description, including geographic information, of the wetland sample is collected using Form 1, whereas Form 2 is used to collect general characteristics of the sample wetland. Form 3 is used to collect information related to specific wetland types.

Standard procedures for data collection using these three forms are described below.

Wetland Sample Form 1: Site Description

Many variables in this form are similar to that of a forest sample, which can be collected/recorded following the similar methods/procedures. Methods/procedures for collecting and recording other variables and different approaches needed for the same variables in the case of wetland sample are described below.

Geographic information (Northing, Easting, Elevation)

Geographic information (GPS data) is ideally to be taken from around the middle of the sample. However, for practical reasons (i.e. it is difficult to go at the middle of a lake/river), it is taken from a point on the bank of the wetlands.

Aspect

Aspect, in case of a wetland, means the direction of the main gradient (measured in 0-360 degrees) of the land surface on which the wetland is located (e.g., in case of stagnant water bodies in the hilly region). In case of flowing water in the hills (stream, river), it is generally the direction toward which the water flows.

Slope

Slope, in case of a wetland, means the uphill slope (measured in %) of the wetlands. In case of flowing water bodies, such as river and streams, measure the slope of the hills from one of the banks which is steeper.

Wetland Type

Identify a type of the sample wetland from among the wetlands typology given below, and record the SN (serial number) and the name of typology (e.g. 6 - Permanent Lake).

SN	Type	Definition
1	Perennial River and Stream	A natural flowing body of surface water, usually freshwater through a deep and wide channel, with a constant stream over the parts of its streambed of 3rd and 4th orders throughout the year; e.g., Koshi, Karnali, Kankai, Rapti. Its channel width is 20 m at minimum.
2	Creek	A natural flowing body of surface water, usually the freshwater through a relatively shallow and narrow channel, with a constant stream of 1st and 2nd orders throughout the year; this includes small streams, i.e. with width less than 20 m.
3.	Waterfall	An area where water flows over a vertical drop or a series of steep drops along the course of a river/stream; e.g., Hyatrung (Terhathum), Satashidham (Jhapa), Rupse chhahara (Myagdi)
4	Seasonal River and Stream	A flowing body of water with its flow limited to the certain seasons or when there has been a lot of rain; e.g. many rivers and streams in the Chure and Bhavar regions.
5	Riverine Floodplain	Flat areas of the river valleys that become flooded by the waters of a river when its flow exceeds the drainage capacity of its channel, usually containing a distinct river channel and a plain stretching to terraces which limit the flood.
6	Permanent Lake	A natural, permanent, stagnant water body with a minimum average depth of 6 meters and water coverage area above 8 ha; e.g., Fewa (Pokhara), Rara (Mugu), Phoksundo (Dolpa).

SN	Type	Definition
7	Permanent Pond	A natural, permanent, stagnant water body with water coverage area of less than 8 ha and a minimum average depth of 2.5 meter or even less, also called shallow lake; e.g., Gufapokhari (Terhathum), Gonaha Tal (Bardiya).
8	Seasonal Floodplain Lake	A natural, stagnant water body usually in the flood plains of large rivers, having an average depth of more than 2.5 meters, that is periodically flooded due to the over and outward flow of water from the river; for example, one of the lakes in river channel of Buddi Tal Complex (Rupandehi), outside the west embankment of the Koshi river.
9	Swamp	A perennial wetlands with a poor drainage and mineral as well as organic soils, and with more than 30% of the aerial coverage (by vegetation crown) by trees, shrubs, persistent emergent, emergent mosses or lichens, usually found in the adjoining areas of the river and lakes; e.g Salbari and Jamunkhadi (Jhapa), Betana and Betini (Morang), Zakhoriya and Jhilmila (Kanchanpur), Rajarani Tal and Dhampalghadi Simsar (Morang).
10	Marsh	A permanent or seasonal shallow wetlands that receives water from rain and watershed, surface water and groundwater, and is characterized by the wet, spongy, poorly drained peaty soil, dominated by the growth of bog mosses, Sphagnum and emergent species like reeds, cattails and thatcher adapting to nutrient poor and acidic environment [Also called bog] or peaty soil and alkaline environment with dominated grasses, sedges, and reeds [also called fen]; e.g., Gunde and Maidi (Pokhara), Ghol (Royal Chitwan National Park), Upper area of Talltaliya (Sunsari)
11	Saline wetlands	The area in the plains of salt creek and rock creek, characterized by higher concentration of salt (0.5 to 30 parts per thousand) and low-growing vegetation, with most plants barely emerging above the water line or are knee-high at most; e.g. Tetang (Upper Mustang)
12	Hot Spring	A water spring produced by the geo-thermally heated groundwater that ranges in flow rate from 'seeps' to creek and rivers; e.g., Tatopani (Kavrepalanchok), Singa Tatopani (Myagdi), Tatopani (Jumla).
13	Glacial Lake	A body of water with origins from the glacier activities by filling the water in the depression created by the glaciers above 3000 m; e.g. Imja Tsho, Tsho Rolpa, Gokyo lake system
14	Reservoir	A reservoir is the constructed large storage space to contain water to meet water shortage for human uses and for the generation of power; e.g., Sundari Jal (Kathmandu), Jagadishpur Reservoir (Kapilvastu), Gaidahawa Reservoir (Rupandehi), Indra Sarobar (Makawanpur), Marsyangdi Reservoir (Tanahun).
15	Urban Wetlands	The constructed stagnant water bodies in and around urban settlements, especially for the recreational and cultural purposes; e.g., Rani Tal (Nepalgunj), Water park (Jhapa).
16	Inundated Paddy Field	A paddy field is considered wetlands when the field is wet in all seasons, either naturally or through irrigation; e.g., paddy field around Tulsi-di-hawa (Kapilvastu), paddy field in east and west banks of the Koshi river.
17	Canals and Drainage Channel	A water body flowing through a shallow and narrow channel constructed for irrigation purpose; e.g. Babai irrigation canal.
18	Irrigation and Aquaculture Pond	A stagnant water body, constructed for irrigation and aquaculture; e.g., fishponds and irrigation ponds in the Tarai.

Adjoining Land Cover

Based on observation of land covers surrounding the wetlands, assign the following codes. If more than one land cover type is present, write all of them in different boxes given, starting from the most dominant one.

Code	Land Cover	Specific type
1	Forest	One from forest and grassland typology
2	Other Wooded Land	One from forest and grassland typology
3	Grassland	One from forest and grassland typology
4	Cropland	Irrigated/rainfed, crop type/pattern

5	Wetland (of other type)	One from wetland typology
6	Built-up Area	City/village
7	Bare Rock	
8	Other (specify)	

Distance to road

Estimated distance from the bank/border of the sample wetlands to the nearest motorable road, coded as follows:

Code	Distance
0	Road along the bank/border
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

Distance to settlement

Estimated distance from the bank/border of the sample wetlands to the nearest human settlement, coded as follows:

Code	Distance
0	Located within the settlement
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

Soil Texture, Soil pH, Organic matter thickness

These variables are assessed from the immediate shoreline of the wetland (using similar methods described earlier). Consider taking a representative sample or multiple samples and averaging.

Water pH

Take half-a-beaker of water from the central flowing location as far as possible, and measure the pH value using a pH meter.

Wetland quality/level of pollution

Based on observation, judge the wetland quality in terms of the level of pollution at a scale of 1 to 5 as follows.

Code	Wetland Quality/Level of Pollution
1	Very clean
2	Fairly clean
3	Moderate
4	Fairly polluted
5	Very polluted

Major stressors/threats

Identify major stressors that are negatively affecting the sample wetland and assign the following codes. Describe them in terms of what exactly they are and their intensity/severity etc. Also, write **management prescriptions**.

Code	Stressors
1	Invasive alien species
2	Solid waste discharge
3	Industrial waste discharge
4	Development infrastructure
5	Excessive resource extraction
6	Landslide/sedimentation
7	Others (specify) …

Management regime

Record the following codes based on where the sample wetland is located.

Code	Management regime
0	Not determined
1	Private Forest/Land
2	Government-managed forest
3	Protected Area (NP, WR, HR)
4	Buffer Zone managed by government
5	Buffer Zone Community Forest
6	Conservation Area

Code	Management Regime
7	Community Forest
8	Religious Forest
9	Collaborative Forest
10	Leasehold Forest
11	Public Land Forest
12	Forest Protection Area
13	Other (Specify)

Management Authority

Based on displayed information and discussion with local stakeholders, assign the following codes for the Management Authority of the sample wetland.

Code	Description
0	Not determined
1	Government
2	Local Management Committee
3	Private Sector/Individual
4	Other (specify)

Wetland Management Activities

Use the following codes for wetland management activities observed in the sample wetland (e.g. 1, 2, 4).

Code	Description
0	No activities
1	Removal of invasive species
2	Sediment clearing
3	Plantation
4	Fencing

5	Pollution control measures
6	Other (specify)

Conservation Status

Based on observation of displayed information and discussion with LRP, assign the following codes for the conservation status of the wetland.

Code	Conservation category
0	No conservation status
1	Ramsar site
2	Important Birds Area (IBA)

Ecosystem Services being derived

Wetlands are important not only in terms of biodiversity and ecosystem stabilization but also for the multiple uses of its resources for humankind. Based on observation and discussion with local stakeholders, one or more of the following codes are used for the services a wetland is providing.

Code	Service
0	Not known
1	Drinking water
2	Irrigation
3	Agriculture (on itself)
4	Pollution control (Oxidation tank)
5	Hydropower
6	Recreational

Code	Service
7	Aesthetic
8	Cultural
9	Educational
10	Timber/Fuelwood/Fodder
11	Fishery
12	Medicine
13	Other (Specify)

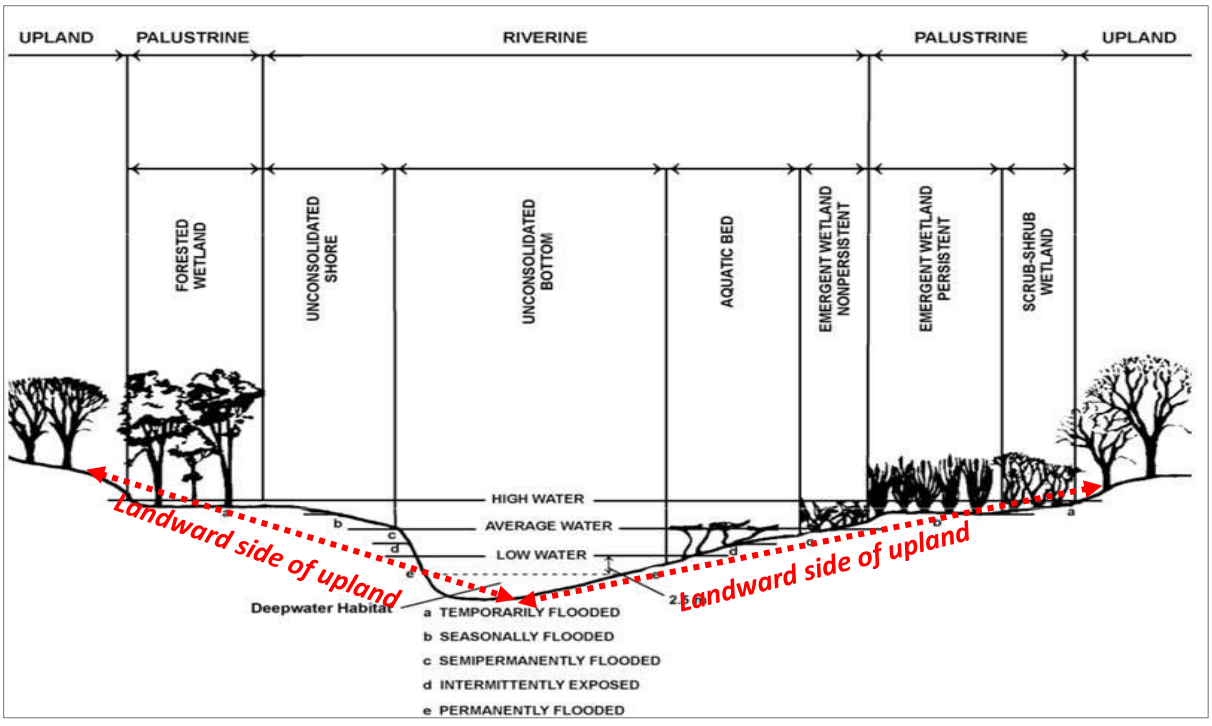
Wetland Sample Form 2: General Wetland Characteristics

2.1 Modifier's feature

Vegetation modifiers at shoreline

The following Table describes four key domains of vegetation at the substrate (bed and shoreline) of wetlands that define the structure of wetlands based on the vegetation. Also refer to the figure below.

Vegetation Categories	Description
Moss-Lichen Wetland (Riverine)	*Areas where mosses or lichens cover at least 30% of substrates other than rock and where emergents, shrubs, or trees alone or in combination cover less than 30%. Water regimes include seasonally flooded, seasonally flooded-saturated, continuously saturated and seasonally saturated.*
Emergent Wetland (Palustrine)	*Emergent plants (erect, rooted, herbaceous hydrophytes, excluding mosses and lichens) the tallest life form with at least 30% areal coverage usually dominated by perennial plants.*
Scrub-Shrub Wetland (Swamp)	*Woody plants less than 6 m (20 ft) tall the dominant life form i.e., the tallest life form with at least 30% areal coverage. The "shrub" life form actually includes true shrubs, young specimens of tree species that have not yet reached 6 m in height, and woody plants (including tree species) that stunted because of adverse environmental conditions.*
Forested Wetland (Swamp)	*Trees, the dominant life form i.e., the tallest life form with at least 30% areal coverage. Trees, defined as woody plants at least 6 m (20 ft) in height.*



Distinct Features and Wetlands habitats in the Riverine Wetlands

Based on observation around the shoreline of the wetlands, with reference to the information given in the above Table, the following specific codes will be assigned:

Code	Vegetation modifier	
01	Moss-Lichen	Moss
02		Lichen
03		Moss-Lichen
04	Emergent	Persistent

05		Non-persistent
06	Shrub-Scrub	Broad-leaved deciduous
07		Conifer deciduous
08		Broadleaved evergreen
09		Conifer evergreen
10		Dead
11	Forested	Broad-leaved deciduous
12		Conifer deciduous
13		Broadleaved evergreen
14		Conifer evergreen
15		Dead

For example, in case of sampling site in Chatara for the Koshi River, the bed is not clear in terms of vegetation, but the shoreline is evidenced with dominant life form of woody plants with less than 6 m height covering 40% of areal coverage, mostly the Broad-Leaved and Deciduous. It infers that the perennial riverine wetlands of Koshi River has '**Swamp**', so the crew members will codify this as '**6**' and mention the percentage as '**40**'. This infers that the Koshi River at Chatara area is swamped with broad-leaved-deciduous forest with a crown cover of 40%.

Listing key five species in different categories

Based on observation in the wetlands, write five key species of each of the trees and shrubs, deeply rooted emergent species, free floated hydrophytes and emergent hydrophytes categories in the appropriate boxes.

2.2 Structural features

Shoreline Type

The shoreline is a place like strip where a large body of water meets the land and marks the boundary between land and water. It is the upper reaches of the wash of the waves during the season of a year of the highest wash of the waves, usually with edge vegetation, or upper limit of debris left by wash of waves. Shoreline type can be classified as follows.

Shoreline of Wetlands and Their Assessment Criteria

Shoreline Type		
Rocky Shore	**Definition:** Wetland habitats characterized by bedrock, stones, or boulders, which singly or in combination have an aerial cover of 75% or more, and an aerial vegetation coverage less than 30%.	
	Bedrock	Bedrock covering 75% or more of the surface and <30 areal coverage of macrophytes.
	Rubble	<75% areal cover of bedrock, but stones and boulders alone or in combination with bedrock cover 75% or more. Areal coverage of macrophytes <30%.
Unconsolidated Shore	**Definition:** All wetland habitats having three characteristics: (1) unconsolidated substrates with less than 75% areal cover of stones, boulders, or bedrock; (2) <30% areal cover of vegetation other than pioneer plants; and (3) any of the following water regimes: irregularly exposed, regularly flooded, irregularly flooded, seasonally flooded, seasonally flooded-saturated, temporarily flooded, and intermittently flooded. Erosion and deposition by waves and currents produce a number of landforms such as beaches, bars, and flats	
	Cobble- Gravel	Particles smaller than stones predominantly cobbles and gravel. Shell fragments, sand, and silt often fill the spaces between the larger particles.

		Stones and boulders found scattered. In areas of strong wave these shores take the form of beaches or bars, but occasionally extensive flats.
	Sand	Particles smaller than stones predominantly sand, although finer or coarser sediments may intermix.
	Mud	Particles smaller than stones predominantly silt and clay, although coarser sediments or organic material may intermix. Anaerobic conditions often exist below the surface. Mud Shores have a higher organic content than cobble-gravel or sand shores.
	Organic	Material smaller than stones predominantly organic; No minimum depth requirement.
	Vegetated	Exposed for a sufficient period colonized by pioneer plants that usually killed by rising water levels. Many of the pioneer species weedy mesophytes or xerophytes. At least 30% cover of pioneer plants required.

Crew members will assess shoreline in a stretch between the outer margins of water course to the water-wave mark in the upland at high tide during the peak period of rain, and assign the following codes.

Code	Shoreline type	
0	Modified shoreline (constructed)	
1	Rocky shore	Bedrock
2		Rubble
3		Cobble-Gravel
4	Unconsolidated shore	Sand
5		Mud
6		Organic
7		Vegetation (Pioneer)

For example, in case of sampling site in Chatara for the Koshi River, the shoreline is likely to be the unconsolidated one with soil particles smaller than stones predominantly the sand intermixed with finer and coarser sediments, so the crew members will codify this as code '4', with remarks on how it looks like.

Bed Type

Bed is the path where wetlands run or where wetlands once ran; the bottom earthen part of wetlands which is other than shoreline. In other words, the wetlands bed refers to the area between the shorelines of wetlands ordinarily covered by water. Such bed is quite evident in the lotic wetlands. There exist variations in wetland beds as follows.

Different Types of Bed of Wetlands and Their Distinct Features

Bed Type		
Aquatic Bed	*Wetlands and deepwater habitats where plants that grow principally on or below the surface of the water (i.e., surface plants or submergents) are the uppermost life form layer with at least 30% areal coverage.*	
	Algal	Algae have the greatest areal coverage and are widespread and diverse, where they occupy substrates characterized by a wide range of sediment depths and textures.
	Aquatic Moss	Mosses are far less common than algae or vascular plants, and occur primarily in the riverine, flooded and lacustrine system
	Rooted Vascular.	It includes a large array of species that grow primarily below water. They have been referred to by others as temperate grass flats, eelgrass beds and turtlegrass beds etc. The greatest number of species occurs in shallow, clear tropical or subtropical waters of moderate current strength.

	Floating Vascular	Vascular plants that float freely on or below the water surface and such beds occur mainly in the lacustrine, palustrine, and riverine systems.
Stream Bed	*All wetlands within the riverine system completely dewatered at low water level, the tide. Water regimes restricted to irregularly exposed, regularly flooded, irregularly flooded; seasonally flooded; temporarily flooded; intermittently flooded etc.*	
	Bedrock	Substrate covering 75% or more of the stream channel, and common in the riverine system in high mountain or in glaciated areas.
	Rubble	Characterized by stones, boulders, and bedrock that, combined, cover 75% or more of the channel; however, bedrock alone covers less than 75%, and are most common in mountainous areas.
	Cobble-Gravel	At least 25% of the substrate covered by unconsolidated particles smaller than stones; cobbles or gravel predominates. Common in riffle areas or channels of braided streams.
Unconsolidated Bed	*Sand*	Sand-sized particles predominate among the particles smaller than stones, often contains bars and beaches interspersed with mud streambed or interspersed with cobble-gravel streambed in areas of fast flow or heavy sediment load.
	Mud	Particles smaller than stones chiefly silt or clay, and are common in arid areas
	Organic	Characterized by channels formed in peat or muck, and common in the small creeks with organic soils.
	Vegetated	Bed colonized by pioneer plants usually killed by rising water levels. Many of the pioneer species are weedy mesophytes or xerophytes. At least 30 percent cover of pioneer plants required.

Based on observation of wetland bed, with reference to above descriptions of different bed types, the following codes will be assigned.

Code	Bed type	
01	Aquatic bed	Algal
02		Aquatic Moss
03		Rooted Vascular
04		Floating Vascular
05	Stream bed	Bedrock
06		Rubble
07		Cobble-gravel
08	Unconsolidated bed	Sand
09		Mud
10		Organic
11		Vegetation (Pioneer)

For example, in case of sampling site in Chatara for the Koshi River, the bed type could be '**Sand**' as sand-sized particles predominate among the particles smaller than stones, often contains bars and beaches interspersed with mud streambed or interspersed with cobble-gravel streambed in areas of fast flow or heavy sediment load, so the crew members will codify the bed type as '08', with remarks on how it looks like, such as "… *up and down stretches river margin not regular, often vegetated as mix of hydrophytes in marshy places and mesophytes in upland areas* …".

Bottom Type

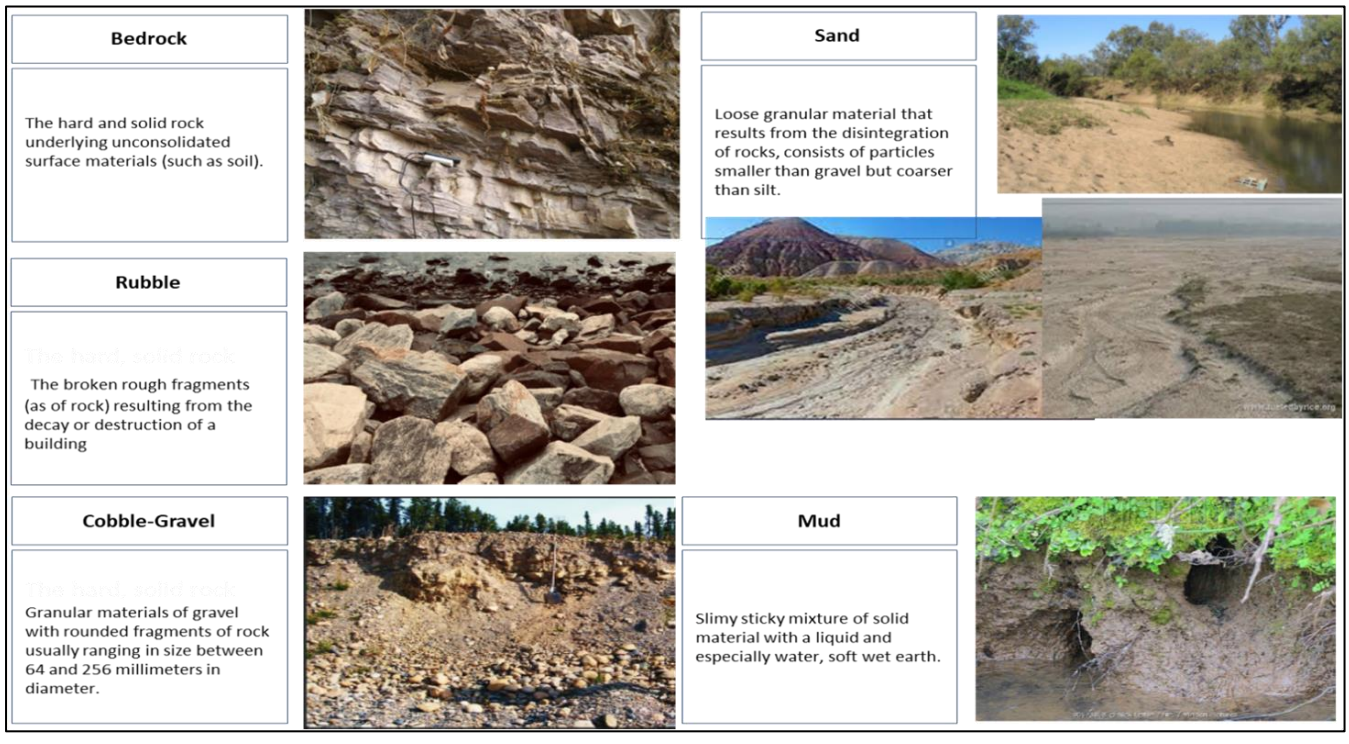
A bottom is a channel occupied by wetlands. This is a depression forming the ground always under a body of water. The following Table describes the features of different types of bottom in the wetlands.

Different Types of Bottom of Wetlands and Their Distinct Features

Bottom Type		
Rock- Bottom	*All wetlands and deepwater habitats with substrates having an areal cover of stones, boulders, or bedrock 75 percent or greater and vegetative cover of less than 30%*	
	Bedrock	Bottoms in which bedrock covers 75%or more of the surface
	Rubble	Bottoms with < 75% areal cover of bedrock, but stones and boulders alone, or in combination with bedrock, cover 75% or more of the surface.
	Cobble- Gravel	Unconsolidated particles smaller than stones predominantly cobbles and gravel, although finer sediments may be intermixed
Unconsolidated Bottom	*All wetlands and deepwater habitats with at least 25 percent cover of particles smaller than stones and a vegetative cover less than 30%*	
	Sand	Unconsolidated particles smaller than stones predominantly sand, although finer or coarser sediments may be intermixed.
	Mud	Unconsolidated particles smaller than stones predominantly silt and clay, although coarser sediments or organic material may be intermixed. Organisms living in mud must be able to adapt to low oxygen concentrations.
	Organic	Unconsolidated material smaller than stones predominantly organic; there is no minimum depth requirement. The organic material is dead plant tissue in varying stages of decomposition.

Crew members will assess bottom type and assign one of the following codes referring to the most evident criteria as given in the above Table. Examples are given in the figure below.

Code	**Bottom type**	
1	Rocky bottom	Bedrock
2		Rubble
3		Cobble-gravel
4	Unconsolidated bottom	Sand
5		Mud
6		Organic



2.3 Wildlife Biodiversity

Based on observation (direct and indirect) and discussion with LRP, write the names of wildlife in different categories in appropriate boxes. Write remarks, including if any species is endemic to that particular wetland or in the surrounding area. Also indicate if any species sharply decreasing or increasing in the last few years/decades.

Wetland Sample Form 3: Wetland Specific Information

This Form is used to collect information related to specific wetland types. 18 wetland types have been grouped into four groups. Identify the group in which the wetland type under investigation falls, tick it and fill in the information in appropriate boxes. No need to go through other groups. For example, for a "permanent pond", fill in the boxes in 3.2 only.

3.1 Perennial River and Stream (PRS), Creek (CRK), Seasonal River and Stream (SRS), Waterfall

Origin

Origin of a river, stream or creek refers to the source from where it is originated. Based on observation and discussion with LRP, assign one of the following codes.

Code	Origin
1	Snow-fed Region
2	Mahabharat Region
3	Chure Region
4	Tarai Region

Mouth

Mouth of a river, stream or creek refers to the ultimate destination where it terminates. Based on observation and discussion with LRP, assign one of the following codes.

Code	Description
1	The sample river/stream/creek terminates in a river/stream of a higher order
2	The sample river/stream/creek terminates in a lake/pond

Gradient

Gradient of a river/stream/creek refers to its slope. Using a hypsometer, it is measured upwards and downwards from the sampling point, and recorded in %. Since it is difficult to identify eye height at the observed location upward and downward, observation in sitting position could be a good strategy.

Channel Width

Based on observation across different cross sections of a river, stream or creek upwards and downwards from a sampling location, its width is estimated to determine whether the average width is below or above 20m, and ticked the appropriate box. Consider the general course of water flow; avoid underestimation (e.g. observed water channel may be too narrow in winter) and over-estimation (e.g. observed water channel may be too large during flooding).

Channel Shape/Type

Based on observation of a river, stream or creek upwards and downwards from a sampling location, one of the following codes is assigned for its shape.

Code	Channel Shape
1	Straight
2	Meander
3	Braided

3.2 Permanent Lake (PL), Permanent Pond (PP), Seasonal Floodplain Lake (SFL), Glacial Lake (GL), Swamp (SMP), Marsh (MRS) &

3.3 Water Reservoir (WTR), Urban Wetlands, Irrigation and Aquaculture Ponds (IAP)

Outlook

Outlook of wetlands is its physical form when observed from upside, i.e, from the height. This kind of morphometry of the wetlands is helpful typifying wetlands if it is natural or artificial. In general, modified and constructed wetlands have engineered structure, mostly the rectangular one.

Crew members will visually assess the shape of wetlands from the upland and assign one of the following codes.

Code	Outlook
1	Irregular
2	Circular
3	Quadrangular
4	Linear

Formation

Based on observation and discussion with LRP, one of the following codes is assigned for how the wetland was formed.

Code	Channel Shape
1	Natural
2	Semi-natural (added artificial structures for conservation of natural wetlands)
3	Artificial

Inlets and Outlets

Inlets bring in/feed water to the wetlands and outlets allow the flow of the excess water. Both are key to a healthy wetland for hydrological and nutrient balances. The inlets and outlets features are visible in lacustrine, palustrine and constructed wetlands. Based on observation and discussion with LRP and community, one of the following codes are assigned for inlets and outlets.

Code	No. of inlets
0	No inlets
1	One inlet
2	Two inlets
3	More than two inlets

Code	No. of outlets
0	No outlets
1	One outlet
2	Two outlets
3	More than two outlets

Depth

Depth is the measurement of deepness of water level in wetlands. In this case, the highest depth is considered. Crew members will generalize measurement of depth asking LRP or communities if they have measured the depth of their wetlands any time before. Normally, communities do conventional measurement of depth of wetlands in their own way, and express the depth like' knee level deep' or 'as deep as 5 nodes of bamboo pipe'. Based on these expressions, crew members shall generalize the depth of wetlands, record it with one of the following codes. DO NOT SWIM OR USE BOAT FOR DEPTH MEASUREMENT.

Code	Depth
1	More than 6 meters
2	Between 2.5 and 6 meters
3	Less than 2.5 meters
4	Only wet but no visible water layer

Water Reservoir Type

A reservoir is the constructed large storage space to contain water to meet water shortage for human uses and for the generation of power. Based on observation of ground feature of the reservoir, reviewing information features and discussion with local stakeholders, one of following codes is assigned for the reservoir type.

Code	Water Reservoir Type	Description
1	Bank-side type	This type of reservoir pumps or siphons water from a river usually formed partly by excavation and partly by building a complete encircling bund or embankment (e.g. Jagadishpur reservoir).
2	Dammed-valley type	This type of reservoir is located at a narrow part of a valley, where valley sides act as natural walls (e.g. Marsyangdi reservoir).

Construction History

Based on discussion with relevant informant, LRP or other credible information sources, the number of years (i.e. how many years ago the wetland was constructed) is written.

3.4-Inundated Paddy Field (IPF), Hot Spring, Saline Wetlands, Canal and Drainage Channel (CDC), Riverine Flood Plains

Field crew will collect and record detailed information related to the above wetlands based on field circumstances.

6. Data collection from agriculture samples

Some variables in the agriculture sample form are similar to that of a forest sample, which can be collected/recorded following the similar methods/procedures. Methods/procedures for collecting and recording other variables are described below.

Land type

Based on observation of the sample agricultural land, one of the following codes will be recorded.

Code	Land type	Description
1	***Khet***	*Khet* is a levelled terraced land with bund for retaining water in the land. Most of the Khet are irrigated. Generally, one of the important features of Khet is cultivation of rice at least in one season. However, the levelled terraces with bund for retaining water in higher altitude (as in Mustang, Limi, Khumjung etc.) are categorized as Khet, though rice is not cultivated.
2	**Terraced *Bari***	This is a terraced land, but is not necessarily levelled and does not have bund. Although some of the Bari land are irrigated with non-conventional means (such as piped irrigation, sprinkler), most of the Bari have rainfed farming system. Major crops grown in Bari are maize, millet, wheat, barley, potato, and beans etc.
3	***Pakho Bari***	These lands are more undulating; they are not terraced and are more sloping. Millets, maize, wheat, potatoes are grown in Pakho bari.

Irrigation

Based on observation and discussion with LRP/local people, one of the following codes will be recorded.

Code	Irrigation type	Description
1	All season irrigation	The land is irrigated in all seasons.
2	Rainy season irrigation	The land is irrigated only in rainy season, i.e. through seasonal creeks/streams.
3	Rainfed	The land is rainfed.

Current activity

Based on observation, one of the following codes will be recorded.

Code	Activity on land
0	Abandoned (for more than a year)
2	Fallow (temporarily uncultivated)
3	Cultivated

Adjoining Land Cover

Based on observation of land covers surrounding the sample agriculture land, the following codes will be recorded. If more than one land cover type is present, write all of them in different boxes given, starting from the most dominant one.

Code	Land Cover	Specific type
1	Forest	One from forest and grassland typology
2	Other Wooded Land	One from forest and grassland typology
3	Grassland	One from forest and grassland typology
4	Cropland (of other type)	Irrigated/rainfed, crop type/pattern
5	Wetland	One from wetland typology

6	Built-up Area	City/village
7	Bare Rock	
8	Other (specify)	

Distance to road

Estimated distance from the border of the sample agriculture land to the nearest motorable road, coded as follows:

Code	Distance
0	Road crossing the sample land
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

Distance to settlement

Estimated distance from the border of the sample agriculture land to the nearest human settlement, coded as follows:

Code	Distance
0	Settlement within the sample agriculture land
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

Existing main crop

Based on observation of the sample agriculture land, write one of the following crop codes for the main crop.

Crop codes

Cereal crops

Code	Crop	Nepali name
01	Paddy	Dhaan
02	Maize	Makai
03	Wheat	Gahun
04	Finger millet	Kodo
05	Buckwheat	Phapar
06	Barley	Jou
07	Naked Barley	Uwa
08	Fox tail millet	Kaguno
09	Proso Millet	Chino
10	Sorghum	Junelo
11	Amaranth	Latte, Marse

Pulses/legumes

20	Blackgram	Maash
21	Redgram	Rahar
22	Greengram	Mung
23	Rice bean	Masyang
24	Lentil	Musuro

Cash crops

Code	Crop	Nepali name
30	Potato	Aalu
31	Sugarcane	Ukhu
32	Hemp	Jut
33	Tea	Chiya
34	Coffee	Kaphi
35	Cardamom	Alainchi
36	Arecanut	Supari
37	Ginger	Aduwa
38	Turmeric	Besar

Fruits

40	Banana	Kera
41	Mango	Aanp
42	Litchi	Litchi
43	Papaya	Mewa
44	Citrus	Suntala jati
45	Apple	Syau

25	Beans	Simi
26	Pea	Kerau
27	Cowpea	Bodi
28	Horsegram	Gahat
29	Soybean	Bhatmaas

Vegetables

60	Summer vegetables
61	Winter vegetables

Oilseeds

50	Rapeseed	Tori
51	Sesame	Til
52	Niger	Philunge

Others

70	Forage crops
80	Warm water fishery
81	Cold water fishery
90	Abandoned lands
91	Fallow lands
92	Other crops

Growth Stage (of the main crop)

Based on observation of the sample agriculture land, write one of the following codes for the growth stage of the main crop.

Code	Growth Stage
1	Seedling
2	Vegetative
3	Flowering
4	Ripening

Existing mixed or inter-crops

Based on observation of the sample agriculture land, write one or more crop codes (as given in the 'main crop' section above) for the crops that are mixed or inter-cropped with the main crop.

Crop sequence (rainy/winter/summer)

Based on observation and discussion with LRP/local people, write crop sequence of the main crop starting from rainy season through winter to summer, e.g. Rice-Wheat-Rice, Rice-Fallow-Maize.

Trees and Shrubs

Based on observation around the sample point and beyond on the sample agriculture land, list tree and shrub species. Also, assign their **density** coded as follows through visual judgement.

Code	Density
1	A few individuals
2	Sparse
3	Dense

7. Community consultation

A community consultation (or a focus group discussion) will be carried out in an area representing a distinct natural and social setting, if not at around every reference point. This may take place in an informal manner at a Municiaplity Office, Sub-Divisional Forest Office, village tea shop, chautaro, or where the crew take lunch or dinner. However, local farmers will be the ideal participants.

A checklist has been prepared for the consultation. It aims to collect information on forest, grassland, wetlands and agriculture that are not possible to collect through field observation alone. The checklist is generally self-explanatory but codes for different variables may be needed, some of which are available in the respective sections (i.e. forest, grassland, wetlands, and agriculture). The explanations of some variables and codes that are not available in the previous sections are given below.

7.1 Information on location

Information on the reference point/location will be recorded as that in the case of forest sample plot form.

7.2 Socioeconomic information

Ethnic groups

Ethnic groups, in order of dominance, are listed in specific terms (e.g., Gurung, Magar, Brahmin, Chhetri, Surel, Jirel etc.).

Accessibility

Write one of the following codes for accessibility to the village/city.

Code	Accessibility
0	No road access
1	Seasonal access with earthen road
2	All-season access with earthen road
3	All-season access with black-topped road

Agriculture land types (order of dominance)

Write 1, 2, 3 for the most dominant, second most dominant, and least dominant land types, respectively, around the village/city. Write 0 for a land type that is not available.

7.3 Information on forest and grassland

For codes and relevant information on 'management regime' and 'management activities', refer to **Forest and Grassland section**.

Ecosystem Services

Based on discussion with LRP/local community and observation, list the given product codes with specific examples that are being derived from the sample forest.

Code	Ecosystem services	Description/examples
00	Nothing	
01	Fuel	*Main species used for fuel*
02	Forage	Tree fodder, grass collection, grazing
03	Timber	*Main species used for timber*
04	Food	Bamboo shoot (tama, tusa), Kafal fruit, Fern (Niuro)
05	Medicine	*Name of species*
06	Resin	*Name of species*

07	Clean water	In case there is a remarkable natural water sources below the forest
08	Recreation	The forest is being used for recreation locally
09	Tourism	Tourism activities are undergoing, with income for locals
10	Cultural	The forest is a cultural heritage (e.g. a religious forest)
11	Other	

7.4 Information on wetlands

For codes and relevant information on 'management authority', 'management activities', and 'ecosystem services', refer to **Wetlands section**.

7.5 Information on agriculture

Dominant farming system

Write one of the following codes for the dominant farming system around the village/city.

Code	Farming systems
1	Cereal production dominated mixed farming
2	Cash crop production dominated mixed farming
3	Fruit production dominated mixed farming
4	Vegetable production dominated mixed farming
5	Livestock production dominated mixed farming
6	Other (specify)

Causes of land abandonment

Write one or more (in order of priority) of the following codes for the causes of agriculture land abandonment around the village/city.

Code	Causes of agricultural land abandonment
1	Wildlife damage
2	Water scarcity
3	Unproductive land
4	Labor shortage (temporary migration)
5	Permanent migration
6	Other (specify)

7.6 Vulnerability to agriculture system

Level of risk (of threats to agriculture)

Write one of the following codes for the level of risk from each threat given.

Code	Level of risk
0	Non-existent
1	Minimum
2	Moderate
3	Maximum

7.7 Wildlife depredation

Extent of damage (from wildlife)

Write one of the following codes for the estimated extent of damage from wildlife.

Code	Extent of damage	Description
1	Mild	Yield decreased by <5% due to wildlife damage
2	Medium	Yield decreased by 5-20% due to wildlife damage
3	Severe	Yield decreased by >20% due to wildlife damage

8. Instructions for photography

During the field survey, digital photographs are taken to be used for various purposes, including verification of sample location and variables, identification of unidentified species, and report writing. Consider the following regarding photography in the field.

What to take a photo of?	Where to take a photo from?	How to take a photo?	What to record?
Forest or grassland sample (different views, e.g. ground view, crown view, canopy view, middle view etc.) Individual plant and their parts (root, stem, leaf front, leaf back, fruit/seed/cone etc.) Wildlife, nest …. That showing significant ecosystem services, e.g. flowing water from a forest, habitat of a particular species Wetland- landscape, shoreline features, key points of pollution etc. Agriculture - landscape, crop type/cropping pattern, plant, fruits, seeds etc. Society – people, houses, sheds, herds of livestock, culture…. Crew working in the forest	Sample point and around it Along the walking trail Ridge and river valley The opposite slope Village/city where the crew stay Anywhere ….	Close up Wide range Use white or black cloth or paper to take a photo of a specimen Use size reference as required (e.g. ruler for leaf)	File name and number (e.g. for photos around sample point, Sample point code-photo serial no.) Latitude, Longitude, elevation Date, time Photographer Brief description

Notes:

1. You do not need to take photos of any parts or a whole individual plant of a species repeatedly from every sample.
2. Take short video clips too.
3. Do not take people's photographs without their consents.

Use the following form (with examples) to record photographs other than those taken from the sample point. A form (multiple pages as required) can be used throughout a field trip.

SN	Description	Location from where photo was taken					Date	File name/number	Remarks
		UTM Zone	Easting	Northing	Elevation (m)	Address			
1	*Degraded Shorea robusta forest*	*44*	*0745746*	*3074412*	*967*	*Shreedanda, Tinau-03, Rupandehi*	*04/08/2021*	*39,40,41*	*Forest on North-east aspect*
2	*Agriculture lands-rice field*	*44*	*0745335*	*3091409*	*380*	*Arthunga, Tansen-14, Palpa,*	*12/08/2021*	*77,78*	*Photo - Jhadewa Phant*

Annex I: Codes of districts in Nepal

Code	District	Code	District
1	Achham	40	Mahottari
2	Arghakhanchi	41	Makwanpur
3	Baglung	42	Manang
4	Baitadi	43	Morang
5	Bajhang	44	Mugu
6	Bajura	45	Mustang
7	Banke	46	Myagdi
8	Bara	47	Nawalparasi
9	Bardiya	48	Nuwakot
10	Bhaktapur	49	Okhaldhunga
11	Bhojpur	50	Palpa
12	Chitwan	51	Panchthar
13	Dadeldhura	52	Parbat
14	Dailekh	53	Parsa
15	Dang deokhuri	54	Pyuthan
16	Darchula	55	Ramechhap
17	Dhading	56	Rasuwa
18	Dhankuta	57	Rautahat
19	Dhanusa	58	Rolpa
20	Dolakha	59	Rukum
21	Dolpa	60	Rupandehi
22	Doti	61	Salyan
23	Gorkha	62	Sankhuwasabha
24	Gulmi	63	Saptari
25	Humla	64	Sarlahi
26	Ilam	65	Sindhuli
27	Jajarkot	66	Sundhupalchok
28	Jhapa	67	Siraha
29	Jumla	68	Solukhumbu
30	Kailali	69	Sunsari
31	Kalikot	70	Surkhet
32	Kanchanpur	71	Syangja
33	Kapilvastu	72	Tanahu
34	Kaski	73	Taplejung
35	Kathmandu	74	Terhathum
36	Kavrepalanchok	75	Udayapur
37	Khotang	76	Nawalpur (Nawalparasi - Susta East)
38	Lalitpur	77	Rukum East
39	Lamjung		

Annex II: Forest and Grassland Typology of Nepal

SN	Vegetation Type	Operational definition	Elevation (m)
Forest types			
1	*Tectona grandis* Forest	A plantation forest predominated by *Tectona grandis,* found in the tropical zone [such as Chiliya (Rupandehi) Tamagadhi (Bara), Sagarnath (Sarlahi) and Ratuwamai (Jhapa)]	Below 300
2	*Eucalyptus* Forest	A plantation forest predominated by *Eucalyptus species,* found in the tropical zone [such as Ratuwamai and Sagarnath area)	Below 300
3	Tropical Mixed Broadleaved Forest	A tropical mixed broadleaved forest having common species like *Shorea robusta, Terminalia species, Butea frondosa, Anogeissus latifolia, Adina cordifolia, Aegle marmelos, Lannea grandis, Duabanga grandiflora, Dilenia pentagyna, and Lagerstroemia parviflora*, but without predominance of a particular species (no single species having equal to or above 60% of the total basal area)	Below 1000
4	Tropical Evergreen Riverine Forest	A tropical mixed evergreen forest having common species like *Michelia champaca, Eugenia jambolana, Phoebe lanceolata, Mangifera sylvatica, Diospyros species, Machillus villosa, Acer oblongum, Bassia buryraceae, Acer oblungum, Xylosma longifolium, Ormosia glauca,* with some deciduous trees like *Cedrela toona, Albizzia species, Acrocarpus fraxinifolius, Garuga pinnata and Duabanga sonneratioides,* found along water courses in the Tarai, Bhabar, Dun valleys and Churia hills. *Castanopsis tribuloides, C. indica, Quercus glauca* can occur above 2000 ft.	Below 1000
5	*Shorea robusta* Forest	A tropical deciduous broadleaved forest predominated by *Shorea robusta* (with its basal area equal to or above 60%).	Below 1200
6	*Dalbergia sissoo-Senegalia catechu* Forest	A tropical deciduous broadleaved forest co-dominated by *Acacia catechu* and *Dalbergia sissoo* (both combinedly having equal or over 60% of the total basal area), found in the riverine habitats, specifically on the relatively new floodplains along the large rivers	Below 1200
7	*Terminalia* Forest	A tropical to subtropical deciduous broadleaved forest pre-dominated by *Terminalia species*, i.e. *T. tomentosa, T. chebula, T. belerica, T. myriocarpa*) (with its basal area equal to or above 60%), common associates being *Eugenia jambolana, Lagerstroemia parviflora, Dillenia pentagyna, Adina cordifolia and Cedrela toona, common in the Churia and Duns.*	Below 1200
8	*Anogeissus latifolia* Forest	A tropical to subtropical deciduous broadleaved forest pre-dominated by *Anogeissus latifolia*	
9	Tropical Deciduous Riverine Forest	A tropical deciduous mixed broadleaved forest having common species like *Bombax ceiba, Holoptelea integrifolia, Schleichera trijuga, Ehretia laevis, Trewia nudiflora* and *Garuga pinnata*, found on the old river terraces.	Below 1400
10	*Pinus roxburghii* Forest	A subtropical evergreen conifer forest predominated by *Pinus roxburghii* (with its basal area equal to or above 60%), found mostly on the south-facing slopes.	500-2000
11	*Albizia julibrissin-Toona ciliata* Forest	A tropical to subtropical, partly deciduous and dominantly evergreen broadleaved forest co-dominated by *Albizia jilibrissin* and *Toona ciliata* (both combinedly having equal to or above 60% of the total basal area), found in the riverine habitats in the eastern and central regions	600-1700
12	Subtropical Mixed Broadleaved Forest	A subtropical evergreen broadleaved forest having common species like *Eugenia tetragona, E. ramosissima, Ostodes paniculata, Drimycarpus racemosus, Lithocarpus spicata, Acer thomsonii, A. oblungum, Machilus species, Castanopsis indica, C. tribuloides, Phoebe lanceolata, Cryptocarya amygdalina, Cinnamomum species, Turpinia nepalensis, Bassia butyraceae, Helicia erratica, Macaranga pustulata, Alnus nepalensis, Erythrina suberosa, Cedrela toona, Albizzia lebbek, A.*	900-1700

		chinensis, Schima wallichii, Leucosceptrum canum, Eurya acuminata, Talauma hodgsonii, Symplocos spicata, Laportea sinuata, Miliusa macrocarpa, Mahonia napaulensis, Caseria graveolens, Amoora decandra, found east of the Tamur valley	
13	*Castanopsis-Schima Forest* (13A - *Castanopsis* Forest, 13B - *Schima* Forest, if pure of individual species)	A subtropical evergreen broadleaved forest co-dominated by *Castanopsis species* and *Schima wallichii* (both combinedly having equal to or above 60% of the total basal area). [Pure forests of Castanopsis or Schima will be considered if any of them predominates the forest]	1000-2000
14	*Pinus roxburghii-Shorea robusta* Forest	A subtropical mixed broadleaved-conifer forest co-dominated by *Shorea robusta* (broadleaved) and *Pinus roxburghii* (conifer) (each having 33-60% of the total basal area), found specifically in the Churia region.	
15	*Pinus roxburghii*-Mixed Broadleaved Forest	A subtropical mixed broadleaved-conifer forest dominated by *Pinus roxburghii* (*Pinus roxburghii* having 33-60% of the total basal area), common associates being *Quercus incana, Q. lanata, Rhododendron arboreum, Lyonia ovalifolia* (in the west), *Schima wallichii* (in the central and eastern region), *Engelhardtia spicata* and *Erythrina stricta.*	1000-2000
16	*Olea* Forest	A subtropical evergreen broadleaved forest predominated by *Olea species* (with its basal area equal to or above 60%), found in the dry valley bottoms and lower slopes in the Bheri valley	1000-2100
17	*Alnus* Forest (17A - *Alnus nepalensis* forest, 17B- *Alnus nitida* forest)	A subtropical deciduous broadleaved forest predominated by *Alnus species* (with its basal area equal to or above 60%), found along streams and moist mudflows (*Alnus nitida* in Mugu Karnali and *Alnus nepalensis* elsewhere)	1000-2450
18	*Quercus incana* Forest	A subtropical evergreen broadleaved forest predominated by *Quercus incana* (with its basal area equal to or above 60%), found specifically west of the Karnali river	1200-2400
19	*Rhododendron arboreum* Forest	A temperate evergreen broadleaved forest predominated by *Rhododendron arboreum* (with its basal area equal to or above 60%), commonly found as a single-storeyed, mono-specific, even-aged and closed forest, mostly on southern exposure.	1200-4000
20	*Quercus lanata* Forest	A subtropical evergreen broadleaved forest predominated by *Quercus lanata* (with its basal area above 60%), found in the central and eastern mountains	1500-2400
21	*Quercus incana - Quercus lanata* Forest	A mixed evergreen forest co-dominated by Quercus incana and Q. lanata (each having 33-60% of the total basal area)	1650-2400
22	*Pinus patula* Forest	A plantation forest dominated by *Pinus patula*, found in the subtropical and temperate zones (specifically in Kavre Palanchok and Sindhupalchok districts)	1500-2500
23	Warm Temperate Mixed Broadleaved Forest	A temperate mixed, mostly evergreen, broadleaved forest having common species like *Machilus duthiei, M. odoratissima, M. sericea, Phoebe lanceolata, P. pollida, Cinnamomum tamala, Actinodaphne reticulata, Lindera bifaria, L. neesiana, Litsea oblonga, L. citrata, Neolitsea umbrosa, N. lanuginosa , Michelia kisopa, Lithocarpus spicata, Quercus glauca, Castanopsis tribuloides, Betula alnoides, Alnus nepalensis, Dalbergia hircina, Albizzia mollis, Acer oblongum, Cedrela toona, Juglans regia, Ehretia macrophylla, Engelhardtia spicata, Schima wallichii, Michelia doltsopa, Cucklandia populnea, Carpinus viminea, Acer thomsonii.* **The second canopy consists of** *Lindera pulcherrima, Neolitsea umbrosa, Dodecadenia grandiflora, Eriobotrya elliptica, Sapium insigne, Daphnephyllum himalayense, Macaranga denticulata, M. pustulata, Myrsine*	1500-2200

		semiserrata, Symplocos theaefolia, S, ramosissima, Prunus undulata, Rhododendron arboreum, Sarauja napaulensis etc.	
24	*Quercus lamellosa* Forest	A temperate evergreen broadleaved forest predominated by *Quercus lamellosa* (with its basal area above 60%), found in the eastern mountains	1600-2800
25	*Pinus wallichiana* Forest	A temperate to subalpine evergreen conifer forest, predominated by *Pinus wallichiana* (with its basal area above 60%), found mostly on sunny slopes	1600-3600
26	*Pinus wallichiana-Quercus Species* Forest	A mixed broadleaved-conifer forest co-dominated by *Pinus wallichiana* and *Quercus species*.	
27	*Juglans regia* Forest	A temperate deciduous broadleaved forest predominated by *Juglans regia* (with its basal area above 60%), found on moist sites, specifically in Jagadulla Municipality, Dolpa district	1800-2800
28	*Cedrus deodara* Forest	A temperate evergreen conifer forest predominated by *Cedrus deodara* (with its basal area above 60%), found on rocky slopes of inner valleys in western mountains	1800-3000
29	*Acer-Aesculus* Forest	A temperate deciduous broadleaved forest co-dominated by *Acer species* and *Aesculus indica* (both combinedly having equal to or above 60% of the total basal area), found on shady slopes along streams in the western mountains	1800-3100
30	*Quercus floribunda* Forest	A subalpine deciduous broadleaved forest predominated by *Quercus floribunda* (with its basal area above 60%), found on shady slopes	1900-2900
31	*Hippophae salicifolia* Forest	A temperate to subalpine deciduous broadleaved forest predominated by *Hippophae salicifolia* (with its basal area above 60%), found mainly on river gravels of the rain-shadowed inner valleys	2000-3400
32	*Pinus wallichiana-Abies species* Forest	A mixed conifer forest co-dominated by *Pinus wallichiana* and *Abies species*	
33	*Abies pindrow* Forest	A temperate to subalpine evergreen conifer forest predominated by *Abies pindrow* (with its basal area above 60%), found in the western mountains	2000-3500
34	*Abies-Quercus-Tsuga* Forest	A mixed broadleaved-conifer forest having *Abies species, Quercus species* and *Tsuga dumosa*.	
35	*Abies-Quercus-Rhododendron* Forest	A mixed broadleaved-conifer forest having *Abies species, Quercus species* and *Rhododendron species*.	
36	*Tsuga dumosa* Forest	A temperate evergreen conifer forest predominated by *Tsuga dumosa* (with its basal area above 60%), found generally on the southern slope in the west and northern slopes of the inner valleys in the eastern region	2100-3000
37	*Picea smithiana Forest*	A temperate evergreen conifer forest predominated by *Picea smithiana* (with its basal area above 60%), found on the shady slopes in the central and western mountains	2100-3600
38	*Populus ciliata* Forest	A temperate to subalpine deciduous broadleaved forest predominated by *Populus ciliata* (with its basal area above 60%), found in the riverine habitats of the inner valleys west of the Trishuli river	2100-3600
39	*Quercus semecarpifolia* Forest	A temperate evergreen broadleaved forest predominated by *Quercus semecarpifolia* (with its basal area above 60%), found mostly on southern slopes	2200-3500
40	*Quercus semecarpifolia-Rhododendron species* Forest	A mixed forest co-dominated by *Quercus semecarpifolia* and *Rhododendron species*	

41	*Lithocarpus pachyphylla* Forest	A temperate evergreen broadleaved forest predominated by *Lithocarpus pachyphylla* (with its basal area above 60%), found on the south-facing slope in the eastern mountains	2400-2900
42	*Acer-Magnolia* Forest	An upper temperate deciduous broadleaved forest co-dominated by *Acer species* and *Magnolia campbelli* (each having 33-60% of the total basal area), found on steep humid slopes in the eastern mountains	2500-3000
43	Cool Temperate Mixed Broadleaved Forest	A mixed forest if not co-dominated by *Acer* and *Magnolia species* or *Acer* and *Rhododendron species* between 2500 and 3000 m.	
44	*Cupressus torulosa* Forest	A temperate evergreen conifer forest predominated by *Cupressus torulosa* (with its basal area above 60%), found in western mountains	2500-3200
45	*Acer-Rhododendron* Forest	An upper temperate mixed broadleaved forest co-dominated by *Acer species* and *Rhododendron arboreum* (each having 33-60% of the total basal area), found in the eastern region, specifically in the Arun and Tamor valleys	2600-3000
46	*Rhododendron hodgsonii* Forest	A subalpine evergreen broadleaved forest predominated by *Rhododendron hodgsonii* (with its basal area above 60%), found as a low to dwarf, gnarled, single-storeyed forest rich in bryophytes or lichen epiphytes on the wet slopes in the eastern region	3000-4000
47	*Abies pindrow-Abies spectabilis* Forest	A mixed forest *co-dominated by Abies pindrow* and *Abies spectabilis.*	
48	*Abies spectabilis* Forest	A subalpine evergreen conifer forest predominated by *Abies spectabilis* (with its basal area above 60%)	3000-4200
49	*Juniperus recurva* Forest	A subalpine evergreen conifer forest predominated by *Juniperus recurva* (with its basal area above 60%), found on the south-facing rocky cliffs	3000-4300
50	*Abies densa* forest	A subalpine evergreen conifer forest predominated by *Abies densa* (with its basal area above 60%), found particularly in Tamor valley	3000-4350
51	*Larix* Forest (51A - *Larix himalica* forest; 51B - *Larix griffithiana* forest)	A subalpine deciduous conifer forest predominated by *Larix species* (with its basal area above 60%), found on rocky slopes of deep valleys in the eastern mountains (*Larix himalica* in Shiar Khola, Langtang, upper Trisuli, and *Larix griffithiana* from Rolwaling to the southeastern inner valleys)	3000-4100
52	*Juniperus indica* Forest	A subalpine evergreen conifer forest predominated by *Juniperus indica* (with its basal area above 60%), found on the rocky slopes of inner valleys	3000-4500
53	*Betula-Rhododendron* Forest	A mixed forest co-dominated by *Betula utilis* and *Rhododendron species*	
54	*Betula utilis* Forest	A subalpine deciduous broadleaved forest predominated by *Betula utilis* (with its basal area above 60%), found around tree line	3600-4200
Shrubland types			
55	*Caragana sukiensis Scrub*	A temperate to subalpine shrubby vegetation formation dominated by *Caragana sukiensis* (with its crown coverage above 60% of the total vegetation cover), found on southern exposures of the inner valleys west of Langtang (largest stand in the upper Langtang Valley)	2400-3700
56	*Caragana gerardiana Scrub*	A temperate to subalpine spiny cushion vegetation formation dominated by *Caragana gerardiana* (with its crown coverage above 60% of the total vegetation cover), found on gravel terraces in the lower range of the Trans-Himalayan region	2600-3900
57	*Hippophae tibetana Scrub*	A subalpine to alpine shrubby vegetation dominated by *Hippophae tibetana* (with its crown coverage above 60% of the total vegetation cover), found in the riverine habitats of the Trans-Himalayan region	3500-5000

58	*Rhododendron Scrub*	An alpine vegetation dominated by *Rhododendron species* in their shrubby and dwarf forms (with its crown coverage above 60% of the total vegetation cover), found on moist slopes	3700-4400
59	*Juniperus Scrub*	An alpine vegetation dominated by *Juniperus species* in their dwarf forms (with its crown coverage above 60% of the total vegetation cover), found on dry slopes	3700-5000
60	*Caragana versicolor Scrub*	A subalpine to alpine spiny cushion vegetation formation dominated by *Caragana versicolor* (with its crown coverage above 60% of the total vegetation cover), found on the sandy and silt-rich mineral soils of gentle slopes in the upper range of the Trans-Himalayan region	4400-5000
Grassland types			
61	Tropical Savannah	A tropical grassland dominated by *Saccharum-Phragmatis* association, in which trees such as *Bombax ceiba, Albizia chinensis* and *Trewia nudiflora* are often present, found on the old, consolidated flood plains (For example, in parts of Koshi Tappu, Shuklaphanta, and Chitwan National Park)	Below 300
62	Tropical Riverine Grasslands	A tropical tall dense grassland dominated by *Saccharum spontaneum, Narenga porphyrocoma* and *Themeda arundinacea,* found on the recent flood plains (seasonally flooded area) along the large rivers in the Tarai, Bhabar and Duns. *Phragmites karka, Narenga porphyrocoma* and *Arundo donax* prevail in year-round waterlogged sites.	Below 400
63	Tropical Hill Grasslands	Grasslands found in Churia hills (specific types to be identified through field survey)	400-1000
64	Subtropical Grasslands	Grasslands found in sub-tropical region (specific types to be identified through field survey)	1000-2000
65	Temperate Grasslands	Grasslands found in temperate region (specific types to be identified through field survey)	2000-3000
66	Pioneer plant successions in glacial forelands	The recently exposed fluvo-glacial sands, gravels and boulders colonized by alpine vegetation, such as carpets of mosses (*Bryum* spp), Lichens (*Gyalidea scutellaris*, *Stereocaulon* spp), Rosettes of *Epilobium* spp, *Senecio albopurpureus*, carpets of *Stellaria decumbens,* and the creeping mat-forming dwarf shrubs of *Myricaria species* and *Oxyria digyna*	3520-4000
67	*Kobresia nepalensis* Grasslands	An alpine land covered by *Kobresia nepalensis*, found on humid southern exposure, specifically in the eastern region	3600-5000
68	Upper Alpine Grasslands	A high alpine herbaceous vegetation formation dominated by grass species like *Carex species, Calamogrostis species, Agrotis micantha* and *Festuca leptogonum*, found mostly on the south faces of the main Himalaya	4500-5000
69	*Kobresia pygmaea* Grasslands	A high alpine land covered by smooth mats of *Kobresia pygmaea* (the smallest of the High Asian Cyperaceae), forming a uniform lawn with up to 95% plant cover, found on the moraine slopes in the headwaters of the inner valleys and the rolling hills in the arid zone	4700-5100

Annex III: Data Collection Forms

Government of Nepal
GoN/Ministry of Forests and Environment
Forest Research and Training Centre
Ecosystem and Forest Types Mapping Program

Forest Sample Form 1: Site Description

1.1-Reference Point (RP) Information

Given Reference Point (RP) - Map Data			
RP Code	UTM Zone	Easting	Northing

Address		
District code	Name of Palika	Ward

Data Collection	
Date	Data collectors

1.2-Sample Point Information

Sample Point Code	Geographic Information (GPS data)			
	UTM Zone	Easting	Northing	Elevation (m)

Aspect (^{0})	Slope (%)	Name of Forest	Nearby village/city

1.3-Sample Forest Information

Forest Type

Adjoining land cover/specific type			

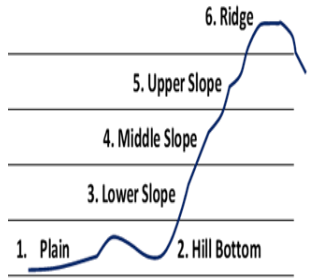
Distance to	
Road	Settlement

1.4-Land Feature of Sample Forest

Soil Characteristics	Texture	Color	Organic layer thickness	Roots	Soil pH

Site specificity		Remarks on feature/history of the site/vegetation:

Macro-topography (tick)



1.5. General Stand Characteristics

Management Regime	Management activities	Forest Origin	Forest Development Stage	Forest Condition	Vertical Structure	Remarks

Forest Sample Form 2: Basal area and tree characteristics

Sample Point Code	Easting	Northing

Basal area factor (BAF) of relascope:

2.1-Tree characteristics

SN	Species Code	Local Name	Botanical Name	Count of trees (tally)	No. of trees	Average Quality Class	Average Crown Class	No. of trees in DBH classes				Largest DBH (cm)	Ht. of tallest tree (m)	Phenology	Remarks
								1	2	3	4				
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															

List of tree species not tallied (around 20m from the sample point):

2.2- Photographs around the sample point

File Name/Number	Description

Forest Sample Form 3: General information on forest stand

Sample Point Code	Easting	Northing

3.1-Vertical strata (based on observation of the sample forest stand around the sample point and beyond)

Strata	Height (m)	Names of species for trees/shrubs (with codes in bracket)									
1-Emergent layer (tree)											
2-Canopy layer (tree)											
3-Understory layer 1 (tree/shrub)											
4-Understory layer 2 (shrub)											
5-Forest floor (herbaceous)		*Tick*	**Dominant vegetation:**	*1.Herbs*	*2. Grasses*	*3. Pteridophytes*		**Density:**	*1. Dense*	*2. Medium*	*3. Open*

3.2-Forest Disturbances

Code	Disturbance type	Intensity

3.3-Presense of Wild Fauna

SN	Name of wild fauna	Abundance	Source of information

Any endangered/endemic fauna? :

3.4-Key threats to this ecosystem

1-

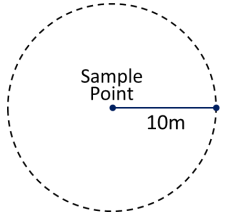
2-

3-

Management prescription:

Forest Sample Form 4: Herbaceous vegetation

Sample Point Code	Easting	Northing



4.1-Herbs/Grasses/Pteridophytes (H/G/P)

SN	H/G/P	Species Code	Local Name	Botanical Name	Cover %
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					

4.2-Ground Cover

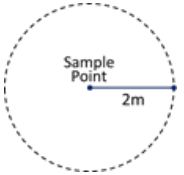
Cover type	%	Remarks
Open (soil/rock)		
Litter (leaf/wood)		
Woody material (tree/shrub stems)		
Herbs/grasses		
Other…		
Total	**100**	

4.3-Climbers/Epiphytes/Parasites/Lichens/Mosses/Bryophytes (C/E/P/L/M/B)

SN	Climber/Epiphyte/Parasite/Lichen/Moss/Bryophyte					Host Species	
	(C/E/P/L/M/B)	Species Code	Local Name	Botanical Name	Abundance	Species Code	Species Name (Code)
1							
2							
3							
4							
5							
6							
7							

Forest Sample Form 5: Seedlings/Sapling, Shrubs, Bamboos

Sample Point Code	Easting	Northing



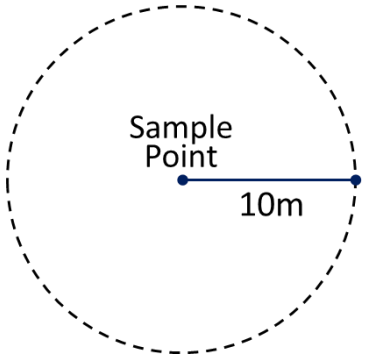
5.1-Seedlings and Saplings

SN	Species Code	Local Name	Botanical Name	Seedling		Sapling		Remarks
				No.	Mean Ht. (m)	No.	Mean Ht. (m)	
1								
2								
3								
4								
5								
6								
7								
8								
9								

Seedling: <1.3m height; **Sapling**: >1.3m height & <5cm DBH

5.2-Shrubs and Bamboos (S/B)

SN	S/B	Species Code	Local Name	Botanical Name	Crown Cover %	Mean Ht. (m)	Remarks
1							
2							
3							
4							
5							
6							
7							



Government of Nepal
Ministry of Forests and Environment
Forest Research and Training Centre
Ecosystem and Forest Types Mapping Program

Forest Sub-sample Form 1: Basal Area

1.1-General Information

Sample Point Code	UTM Zone	Easting	Northing	Forest Typology	Elevation (m)	Aspect (^{0})	Slope (%)	District Code	Date	Data collectors

1.2-Basal area

SN	Species Code	Local/Common Name	Botanical Name	Count of trees (tally)	No. of trees	Remarks
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

1.3-List of tree species not tallied (around 20m from the sample point):

1.4-Remarks on forest stand:

Forest Sub-sample Form 2: Species Occurrence

Sample Point Code	Easting	Northing

2.1-Species occurrence in different strata (based on observation of the sample forest stand around the sample point and beyond)

Strata	Height (m)	Names of species for trees/shrubs (with codes in bracket)									
1-Emergent layer (tree)											
2-Canopy layer (tree)											
3-Understory layer 1 (tree/shrub)											
4-Understory layer 2 (shrub)											
5-Forest floor (herbaceous)		***Tick***	**Dominant vegetation:**	*1.Herbs*	*2. Grasses*	*3. Pteridophytes*		**Density:**	*1. Dense*	*2. Medium*	*3. Open*

Remarks (e.g. list if any bamboos and remarkable herbs are present):

2.2-Photographs

File Name/Number	Description

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Grassland Sample Form 1: Site Description

1.1-Reference Point (RP) Information

Given Reference Point (RP) - Map Data			
RP Code	UTM Zone	Easting	Northing

Address		
District code	Name of Palika	Ward

Data Collection	
Date	Data collectors

1.2-Sample Point Information

Sample Point Code	Geographic Information (GPS data)			
	UTM Zone	Easting	Northing	Elevation (m)

Aspect (^{0})	Slope (%)	Name of Grassland	Nearby village/city

1.3-Sample Grassland Information

Grassland Type	
Given typology:	
Suggested typology:	

Adjoining land cover/specific cover type			

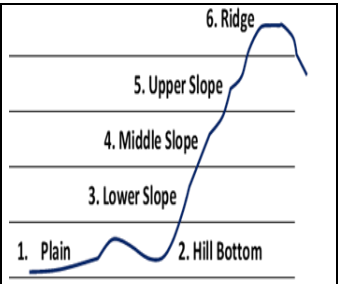
Distance to	
Road	Settlement

1.4-Land Feature of Sample Grassland

Macro-topography (tick)

Soil Characteristics	Texture	Color	Organic layer thickness	Roots	Soil pH

Site specificity		Remarks on feature/history of the site/vegetation:



1.5. General Characteristics of the Sample Grassland

Management Regime	Management Activities	Grassland Structure	Grassland Condition	Livestock grazed	Livestock for which grass is harvested	Remarks

Grassland Sample Form 2: General Information

Sample Point Code	Easting	Northing

2.1-Trees and shrubs on the sample grassland (based on observation around the sample point and beyond)

Trees				Shrubs and bamboos		
SN	Species Code/Name	Ave. dev. stage	Remarks	SN	Species Code/Name	Remarks
1				1		
2				2		
3				3		
4				4		
5				5		

2.2-Grassland Disturbances

Code	Disturbance type	Intensity

2.3-Presense of Wild Fauna

SN	Name of wild fauna	Abundance	Source of information

Any endangered/endemic fauna? :

2.4-Key threats to this ecosystem

1-

2-

3-

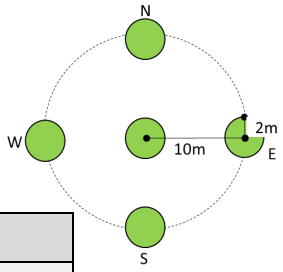
Management prescription:

2.5-Photographs of the sample grassland

File Name/Number	Remarks

Grassland Sample Form 3: Vegetation assessment from sub-plots

Sample Point Code	Easting	Northing



3.1-Grasses and other herbaceous vegetation (Grass - G, Herb - H, Pteridophyte - P, other …)

SN	G/H/P/ …	Species Code	Local Name	Botanical Name	Average Height (m)	Palatability	Cover % (in sub-plots)				
							Centre	North	East	South	West
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											

3.2-Seedlings and Saplings of Tree and Shrub Species

SN	Species Code	Local Name	Botanical Name	Number of seedling, saplings (in sub-plots)					Remarks
				Centre	North	East	South	West	
1									
2									
3									
4									

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Grassland Sub-sample Form

1-General Information

Sample Point Code	UTM Zone	Easting	Northing

Elevation (m)	Aspect (^{0})	Slope (%)	District Code

Date	Data collectors

2-General grassland characteristics (estimates based on observation around the sample point and beyond)

Grassland typology as given	Suggested Grassland typology		Grassland Structure	Grassland Condition	Site Specificity	Livestock grazed	Livestock for which grass is harvested	Remarks

3-List of vegetation (observed around 20m from the sample point)

Species Dominance	Grasses and herbs					Tree/shrub/bamboo (Species code/Name)
	Species Code	Local Name	Botanical Name	Ave. Ht. (m)	Cover %	
Most dominant species						
2nd dominant species						
3rd dominant species						
Other associates (Species code/Name)						

4-Photographs

File name/numbers	Remarks

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Wetland Sample Form 1: Site Description

1.1-Reference Point (RP) Information

Given Reference Point (RP) - Map Data			
RP Code	UTM Zone	Easting	Northing

Address		
District code	Name of Palika	Ward

Data Collection	
Date	Data collectors

1.2-Sample Point Information

Sample Point Code	Geographic Information (GPS data)			
	UTM Zone	Easting	Northing	Elevation (m)

Aspect (^{0})	Slope (%)	Name of Wetland	Nearby village/city

1.3-Sample Wetland Information

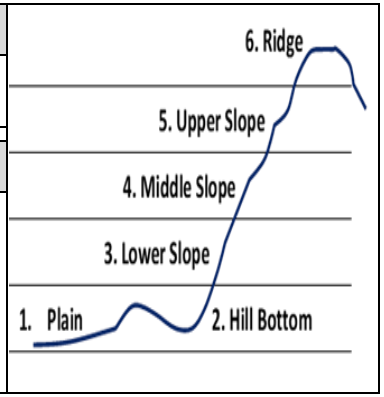
Wetland Type	Adjoining land cover				Distance to Road	Distance to Settlement

1.4-General physical features

Soil Texture	Soil pH	Organic matter thickness	Water pH	Wetland quality/level of pollution (with remarks, if any)

Major stressors/threats (with description)				Management Prescription

Macro-topography (tick)



1.5. Information related to management

Management Regime	Management Authority	Management activities	Conservation Status	Services being derived	Remarks

Wetland Sample Form 2: General Wetland Characteristics

Sample Point Code	Northing	Easting

2.1-Modifiers' features

Vegetation modifiers at shoreline (Dominance in % through visual judgement)		Key five species in each category			
		Trees and Shrubs	Deep-rooted emergent species	Free-floated hydrophytes	Sub-emergent hydrophytes
Code	%				

2.2-Structural features

Shoreline Type		Bed Type		Bottom Type	
	Remarks:		Remarks:		Remarks:

2.3-Wildlife biodiversity

Mammals	Herpetofauna	Birds	Pieces (Fish)	Remarks (eg. If any endemism?)

Wetland Sample Form 3: Wetland Specific Information

Sample Point Code	Northing	Easting

3.1-Perennial River and Stream (PRS), Creek (CRK), Seasonal River and Stream (SRS), Waterfall

Origin	Mouth	Gradient (%)	Channel Width (circle)		Channel shape/type	Remarks (e.g. floodplain information, height if waterfall, …)
			<20m	>20m		

3.2-Permanent Lake (PL), Permanent Pond (PP), Seasonal Floodplain Lake (SFL), and Glacial Lake (GL), Swamp (SMP), Marsh (MRS)

Outlook	Formation	No. of Inlet	No. of Outlet	Depth	Remarks

3.3-Water Reservoir (WTR), Urban Wetlands, and Irrigation and Aquaculture Ponds (IAP)

Outlook	Formation	WTR Type	No. of Inlet	No. of Outlet	Depth	Construction History (Years)	Remarks

3.4-Inundated Paddy Field (IPF), Hot Spring, Saline Wetlands, Canal and Drainage Channel (CDC), Riverine Flood Plains

Remarks on different features:

3.5-Photographs (wetland landscape, shoreline, ……)

File Name/Number	Description

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Forest Research and Training Centre
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Agriculture Sample Form

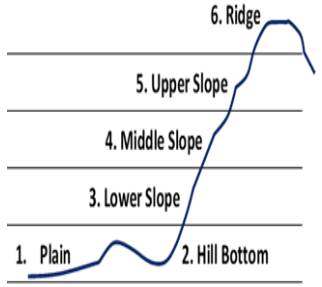
1-Sample Point Information

Sample Point Code	Geographic Information (GPS data)				Aspect (^{0})	Slope (%)	District Code	Palika, Ward	Date	Data collectors
	UTM Zone	Easting	Northing	Elevation (m)						

2-General Information on the Sample Agriculture Land

Land type	Irrigation	Current Activity	Adjoining land cover/specific type				Distance to	
							Road	Settlement

Macro-topography



3-Crop cover and soil information

Existing main crop		Existing mixed or inter-crops (Codes)	Crop sequence (rainy/winter/summer)	Soil Texture	Soil Color	Soil pH
Code	Growth stage					

4-Trees and shrubs

SN	Species (Code)	Density	SN	Species (Code)	Density	SN	Species (Code)	Density
1			4			7		
2			5			8		
3			6			9		

5-Remarks

6-Photographs

File Name/Number	Remarks

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Checklist for consultation with local communities

1-Location

Reference Point Code	UTM Zone	Easting	Northing	District Code	Palika	Ward	No. of participants(M/F)		Date	Data collectors

2-Socio-economic information

Ethnic groups (with order of dominance)				Accessibility	Distance to Marketing Centre		Agriculture land type (order of dominance)		
First	Second	Third	Others		Walk (hour)	Road (km)	Khet	Terraced Bari	Pakho Bari

3-Information on forests and grasslands around the location

Forest and Grassland Type	1.	2.	3.	4.
Management Regime				
History of Management				
Management Activities				
Ecosystem Services (with examples)				

NTFPs/medicinal and aromatic plants				
Trend of forest Condition (better/same/worse)				
History of Natural Change				
Wildlife (with trend - increasing/same/ decreasing)				
Key threats				
Management Needs/ideas				
Other information				

4-Wetlands around the location

Wetland Type	1. Creeks	2. Streams (Names: ….)	3.	4.
Management Authority				
Management Activities				
Ecosystem Services (with examples)				
Trend of wetland Condition (better/same/worse)				
History of Change				
Wildlife (with trend - increasing/same/ decreasing)				
Key threats				
Management Needs/ideas				
Other information				

5-Agriculture around the location

Land Type	1. Khet	2. Terraced Bari	3. Pakho Bari
Dominant farming system			
Major cropping pattern/sequence (rainy/winter/summer)			
Mixed and inter-crops (in sequence of rainy/winter/summer)			
Other minor crops (such as in kitchen garden)			
Area specific crops/varieties			
Crop/livestock varieties threatened/lost (with threat category)			
Multi-year stands - crop types			
Major fruit species			
Major tree species (other than fruits)			
History of Change in cropping pattern			
Percentage of abandoned land			

Causes of land abandonment			
Major livestock/breeds (in order of dominance)			
Remarks			

6-Vulnerability to agricultural system

Chemicals used	Crops
Urea	
DAP	
Potash	
Insecticide/ fungicide	
Herbicide	
Biopesticide	
Other (specify)	

Major threats to agriculture	Level of risk	Remarks
Drought		
Landslide and flooding		
Disease/insect damage		
Wildlife depredation		
Weeds/invasive species		
Land abandonment		
Land conversion		
Drying of water sources		
Chemical pollution		
Labor shortage		
Other (specify)		

Photograph - file name/number and description:

7-Wildlife depredation

Damage causing wildlife	Damaged crops	Extent of damage	Months of damage	Mitigation measures applied

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Records of photographs

SN	Description	Location from where photo was taken					Date	File name/ number	Remarks
		UTM Zone	Easting	Northing	Elevation (m)	Address			

Shortcut checklist of codes

Adjoining land cover (F1/G1/W1/A)	
Code	**Land Cover**
1	Forest
2	Other Wooded Land
3	Grassland
4	Cropland
5	Wetland
6	Built-up Area
7	Bare Rock
8	Other (specify)

Soil Texture (F1/G1/W1/A)			
Code	**Description**	**Code**	**Description**
B	Boulders. Grain size > 200 mm	**SiL**	Silt Loam
RS	Rocky sand. Sand with stones (60-200 mm)	**SiCL**	Silty Clay Loam
S	Sand	**SiC**	Silty Clay
SL	Sandy Loam	**L**	Loam
LS	Loamy Sand	**CL**	Clay Loam
SCL	Sandy Clay Loam	**C**	Clay
SC	Sandy Clay		

Distance to road (F1/G1/W1/A)	
Code	**Description**
0	Road crossing the sample or on the border
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

Distance to settlement (F1/G1/W1/A)	
Code	**Description**
0	Sample together with the settlement
1	Distance below 100 meters
2	Distance between 100 and 500 meters
3	Distance more than 500 meters

Roots in Soil (F1/G1)	
Code	**Description**
0	Absent
1	Sparse fine roots
2	Sparse coarse roots
3	Dense fine roots
4	Dense coarse roots

Site Specificity (F1/G1/GSS)	
Code	**Description**
1	Water-logged
2	Fresh flood plain
3	Old flood plain
4	Rocky terrain
5	Other (Specify)

Management regime (F1/G1/W1)			
Code	**Description**	**Code**	**Description**
0	Not determined	**7**	Community Forest
1	Private Forest/Land	**8**	Religious Forest
2	Government-managed Forest	**9**	Collaborative Forest
3	Protected Area (NP, WR, HR)	**10**	Leasehold Forest
4	Buffer Zone managed by government	**11**	Public Land Forest
5	Buffer Zone Community Forest	**12**	Forest Protection Area
6	Conservation Area	**13**	Other (specify)

Forest management activities (F1)	
Code	**Description**
0	No activities
1	Protection (e.g., fencing)
2	Weeding/cleaning
3	Shrub clearing
4	Dead/lying tree collection
5	Selection felling
6	Shelterwood/Clear felling
7	Fireline construction
8	Other (specify)

Grassland Management Activities (G1)	
Code	**Description**
0	No activities
1	Protection (e.g., fencing)
2	Controlled grazing
3	Controlled fire
4	Weeding/cleaning
5	Grass cutting
6	Other (specify)

	Forest Origin (F1)
Code	**Description**
1	Primary forest
2	Other naturally regenerated forest
3	Planted forest
4	Enrichment plantation

Forest Development Stage (F1/G2)	
Code	**Description**
1	Seedling/sapling forest
2	Young growth forest
3	Mature forest
4	Old growth forest

Forest/Grassland Condition (F1/G1/GSS)	
Code	**Description**
1	Very good
2	Good
3	Moderate
4	Poor/degraded

Vertical Structure (F1)	
Code	**Description**
0	Shrubland
1	Single-storeyed forest
2	Double-storeyed forest
3	Multi-storeyed forest

Grassland Structure (G1/GSS)	
Code	**Description**
1	Tall Grassland
2	Medium Grassland
3	Short Grassland
4	Forbs
5	Other

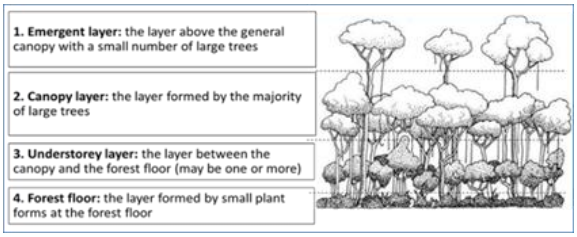
Average Quality Class of trees (F2)	
Code	**Description**
1	High quality sound trees
2	Sound trees
3	Cull trees

Average Crown Class of trees (F2)	
Code	**Description**
1	Dominant
2	Co-dominant
3	Intermediate
4	Suppressed
5	Understorey

DBH Classes (F2)	
Code	**Description**
1	DBH: <12.5 cm
2	DBH: 12.5 – 25 cm
3	DBH: 25 – 50 cm
4	DBH: >50 cm

Phenology (F2)	
Code	**Description**
0	Normal
1	Sprouting
2	Flowering
3	Fruiting
4	Leaf fall

Vertical Strata (F3)



Forest Disturbances (F3)					
Code	**Disturbance type**	**Code**	**Disturbance type**	**Code**	**Disturbance type**
1	Grazing	7	Sapling/pole cutting	13	Grass cutting
2	Forest fire	8	Shrub cutting	14	Invasive species
3	Cultivation	9	Lopping	15	Soil erosion (rills/gullies)
4	House/shed construction	10	Litter collection	16	Landslide and flood
5	Road construction	11	Fruit/seed collection	17	Disease/insect attack
6	Tree cutting	12	Recreation	18	Others (specify)

Grassland disturbances (G2)					
Code	**Disturbance type**	**Code**	**Disturbance type**	**Code**	**Disturbance type**
1	Grazing	6	Tree/shrub cutting	11	Landslide and flood
2	Uncontrolled fire	7	Recreation	12	Hailstone and thunder
3	Cultivation	8	Grass harvesting	13	Insect infestation
4	House/shed construction	9	Invasive plant species	14	Disease infestation
5	Road construction	10	Soil erosion (rills/gullies)	15	Others (specify) …..

Intensity of disturbance (F3/G2)	
Code	**Description**
0	Not visible
1	Slightly visible (<10%)
2	Moderately visible (10-50%)
3	Highly visible (>50%)

Abundance of wild fauna (F3/G2)	
Code	**Description**
1	Highly abundant
2	Moderately abundant
3	Rare

Source of information about wild fauna (F3/G2)	
Code	**Description**
1	Direct observation of fauna
2	Direct observation of signs
3	LRP/Local community
4	Other (specify)

Average development stage of trees (G2)	
Code	**Description**
1	Seedling/sapling
2	Young growth
3	Mature
4	Over mature

Palatability of grass/herbs (G3)	
Code	**Description**
0	Not palatable
1	Fairly palatable
2	Highly palatable

Wetland specific codes

Wetland quality (W1)	
Code	**Description**
1	Very clean
2	Fairly clean
3	Moderate
4	Fairly polluted
5	Very polluted

Major Stressors (W1)	
Code	**Description**
1	Invasive alien species
2	Solid waste discharge
3	Industrial waste discharge
4	Development infrastructure
5	Excessive resource extraction
6	Landslide/sedimentation
7	Others (specify) …

Management Authority (W1)	
Code	**Description**
0	Not determined
1	Government
2	Local Management Committee
3	Private Sector/Individual
	Other (specify)

Management activities (W1)			
Code	**Description**	**Code**	**Description**
0	No activities	**4**	Fencing
1	Removal of invasive species	**5**	Pollution control measures
2	Sediment clearing	**6**	Other (specify)
3	Plantation		

Conservation Status (W1)	
Code	**Description**
0	No conservation status
1	Ramsar site
2	Important Birds Area (IBA)

Ecosystem Services being derived (W1)					
Code	**Description**	**Code**	**Description**	**Code**	**Description**
0	Not known	**5**	Hydropower	**10**	Timber/Fuelwood/Fodder
1	Drinking water	**6**	Recreational	**11**	Fishery
2	Irrigation	**7**	Aesthetic	**12**	Medicine
3	Agriculture (on itself)	**8**	Cultural	**13**	Other (Specify)
4	Pollution control (Oxidation tank)	**9**	Educational		

Vegetation modifier at shoreline (W2)		
Code	**Description**	
1	Moss-Lichen	Moss
2		Lichen
3		Moss-Lichen
4	Emergent	Persistent
5		Non-persistent
6	Shrub/Scrub	Broad-leaved deciduous
7		Conifer deciduous
8		Broadleaved evergreen
9		Conifer evergreen
10		Dead
11	Forested	Broad-leaved deciduous
12		Conifer deciduous
13		Broadleaved evergreen
14		Conifer evergreen
15		Dead

Shoreline Type (W2)		
Code	**Description**	
0	Modified shoreline (constructed)	
1	Rocky shore	Bedrock
2		Rubble
3		Cobble-Gravel
4	Unconsolidated shore	Sand
5		Mud
6		Organic
7		Vegetation (Pioneer)

Bed Type (W2)		
Code	**Description**	
1	Aquatic bed	Algal
2		Aquatic Moss
3		Rooted Vascular
4		Floating Vascular
5	Stream bed	Bedrock
6		Rubble
7		Cobble-gravel
8	Unconsolidated bed	Sand
9		Mud
10		Organic
11		Vegetation (Pioneer)

Bottom Type (W2)		
Code	**Description**	
1	Rocky Bottom	Bedrock
2		Rubble
3		Cobble-gravel
4	Unconsolidated bottom	Sand
5		Mud
6		Organic

WTR (Water Reservoir Type) (W3)	
Code	**Description**
1	Bank-side Type
2	Dammed-valley Type

Origin (W3)	
Code	**Description**
1	Snow-fed Region
2	Mahabharat Region
3	Chure Region
4	Tarai Region

Mouth (W3)	
Code	**Description**
1	The sample river/stream/creek terminates in a river/stream of a higher order
2	The sample river/stream/creek terminates in a lake/pond

Channel Shape (W3)	
Code	**Description**
1	Straight
2	Meander
3	Braided

Outlook (W3)	
Code	**Description**
1	Irregular
2	Circular
3	Quadrangular
4	Linear

Formation (W3)	
Code	**Description**
1	Natural
2	Semi-natural
3	Artificial

No. of inlet (W3)	
Code	**Description**
0	No inlets
1	One inlet
2	Two inlets
3	> two inlets

No. of outlet (W3)	
Code	**Description**
0	No inlets
1	One inlet
2	Two inlets
3	> two inlets

Depth (W3)	
Code	**Description**
1	> 6 meters
2	2.5 - 6 meters
3	< 2.5 meters
4	Only wet

Agriculture specific codes

Land Type (A)	
Code	**Description**
1	*Khet*
2	Terraced *Bari*
3	*Pakho Bari*

Irrigation (A)	
Code	**Description**
1	All season irrigation
2	Rainy season irrigation
3	Rainfed

Current Activity (A)	
Code	**Description**
0	Abandoned (for more than a year)
1	Fallow (temporarily uncultivated)
2	Cultivated

Existing Crops: Crop Codes

Code	Crop	Nepali name
Cereal Crops		
01	Paddy	Dhaan
02	Maize	Makai
03	Wheat	Gahun
04	Finger millet	Kodo
05	Buckwheat	Phapar
06	Barley	Jou
07	Naked Barley	Uwa
08	Fox tail millet	Kaguno
09	Proso Millet	Chino
10	Sorghum	Junelo
11	Amaranth	Latte, Marse
Fruits		
40	Banana	Kera
41	Mango	Aanp
42	Litchi	Litchi
43	Papaya	Mewa
44	Citrus	Suntala jati
45	Apple	Syau

Code	Crop	Nepali name
Pulses		
20	Blackgram	Maash
21	Redgram	Rahar
22	Greengram	Mung
23	Rice bean	Masyang
24	Lentil	Musuro
25	Beans	Simi
26	Pea	Kerau
27	Cowpea	Bodi
28	Horsegram	Gahat
29	Soybean	Bhatmaas
Oilseeds		
50	Rapeseed	Tori
51	Sesame	Til
52	Niger	Philunge
Vegetables		
60	Summer vegetables	
61	Winter vegetables	

Code	Crop	Nepali name
Cash Crops		
30	Potato	Aalu
31	Sugarcane	Ukhu
32	Hemp	Jut
33	Tea	Chiya
34	Coffee	Kaphi
35	Cardamom	Alainchi
36	Arecanut	Supari
37	Ginger	Aduwa
38	Turmeric	Besar
Others		
70	Forage crops	
80	Warm water fishery	
81	Cold water fishery	
90	Abandoned lands	
91	Fallow lands	
92	Other crops	

Growth Stage (of main crop)	
Code	**Description**
1	Seedling
2	Vegetative
3	Flowering
4	Ripening

Density of Trees and Shrubs	
Code	**Description**
1	A few individuals
2	Sparse
3	Dense

Community consultation specific codes

Accessibility	
Code	**Description**
0	No road access
1	Seasonal access with earthen road
2	All-season access with earthen road
3	All-season access with black-topped road

Ecosystem Services (F&GL) - give examples for each			
Code	**Description**	**Code**	**Description**
0	Nothing	**6**	Resin
1	Fuel	**7**	Clean water
2	Forage	**8**	Recreation
3	Timber	**9**	Tourism
4	Food	**10**	Cultural
5	Medicine	**11**	Other (specify)

Dominant Farming System (A)	
Code	**Description**
1	Cereal production dominated mixed farming
2	Cash crop production dominated mixed farming
3	Fruit production dominated mixed farming
4	Vegetable production dominated mixed farming
5	Livestock production dominated mixed farming
6	Other (specify)

Causes of Agriculture Abandonment (A)	
Code	**Description**
1	Wildlife damage
2	Water scarcity
3	Unproductive land
4	Labor shortage (temporary migration)
5	Permanent migration
6	Other (specify)

Level of Risk (of major threats to farming system) (A)	
Code	**Description**
0	Non-existent
1	Minimum
2	Moderate
3	Maximum

Extent of wildlife damage (A)	
Code	**Description**
1	Mild (Yield decreased by <5%)
2	Medium (Yield decreased by 5-20%)
3	Severe (Yield decreased by >20%)

Checklist of instruments

	Fieldwork plan (with GPS-located list of sample plots)		Camera (with charger and USB cable)		Species Identification Manual (with species code)
	Topographic map		Diameter tape		Plastic bag (A4 size)
	Google Map/Earth (on mobile)		Linear tape (20m, 5m)		Pencil, cutter, eraser
	Data collection forms (F-2, G-2, W-1, A-1, C-1, P-1)		Vernier calliper		Clip board
	GPS (with batteries)		Root cutter		Herbarium press
	Suunto clinometer/compass		Knife (hansiya)		Metal ruler
	Relascope		pH Meter		