

Ministry of Forests and Soil Conservation  
REDD Implementation Center Nepal  
Forest Carbon Partnership Facility (additional readiness fund)

**Terms of reference for  
Establishment and measurement of national forest inventory sample  
plots in Terai and Mid Mountain region**

## 1. Background

Almost 45 percent of Nepal's land area is covered by forests. Various policy documents, including Nepal's Nationally Determined Contributions (NDC) recognize the need to sustainably manage forest resources since forests are an important part of the national economy and the fight against climate change. Nepal is globally known for its community-based approach to sustainable resource management which has significant potential to be expanded and benefit additional communities and forest-enterprises. Other opportunities for enhancing the role of forests in Nepal include watershed management for securing water quality and quantity in the long-term and nature-based tourism which will contribute to the local and national economy.

The World Bank, through FCPF, has been supporting the Government of Nepal on its efforts to reduce emissions from deforestation and forest degradation, and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks (REDD+). Under the Readiness Fund of FCPF, a grant of \$3.6 million was signed with the government in 2011 to help the country get ready for REDD+ through technical studies, consultations and capacity building activities. Since then, the government through the REDD Implementation Center (REDD IC) in the Ministry of Forests and Soil Conservation (MoFSC) has completed preparation of reports on national reference emissions level; national measurement, reporting, and verification (MRV) system; national REDD+ strategy; draft Strategic Environmental and Social Assessment (SESA) and Environmental and Social Management Framework (ESMF); REDD+ implementation framework; feedback and

grievance redress mechanism; and so on. The full suite of studies completed to date is publicly available on the Internet ([www.mofsc-redd.gov.np](http://www.mofsc-redd.gov.np)).

The REDD+ Readiness Grant ended in August 2015. To continue national REDD+ readiness, the government requested the FCPF for additional US\$5 million in November 2015. Based on the self-assessment report (i.e. R Package) of the progress achieved under the readiness grant that was approved by the 9<sup>th</sup> Participant's Assembly and 22<sup>nd</sup> Participant committee meeting of the FCPF held in Accra Ghana in 2016, the World Bank decided to provide additional grant of US\$ 5 million. The Bank entered into the grant agreement with the Government of Nepal in early 2017 for this additional financing.

As highlighted in the R Package, capacity building of the REDD+ stakeholders ranging from local to national level, improvement of the national forest inventory and monitoring system, development of biomass and carbon related allometric equations, sustainable management of forests, addressing drivers of deforestation and forest degradation, and implementation of MRV system are some of the key strategic areas to be focused during the additional readiness phase (2016-2019).

Regular and updated forest monitoring system, which is one of the four pillars (i.e. safeguard system, REDD+ strategy, forest reference level and forest monitoring system) of REDD+ policy mechanism, must be in place for countries to be eligible for performance based REDD+ policy implementation. Regular and updated forest monitoring system, which is one of the four pillars (i.e. safeguard system, REDD+ strategy, forest reference level and forest monitoring system) of REDD+ policy mechanism, must be in place for countries to be eligible for performance based REDD+ policy implementation. Because the measurement, reporting, and verification (MRV) of forest carbon change are indispensable for REDD implementation, the use of a ground-based inventory with remote sensing is recommended to monitor carbon stocks on a national scale (UNFCCC, 2009). For a ground-based inventory, permanent sample plots allow the monitoring of carbon stocks by area (Samreth et al., 2012).

National Forest Monitoring System (NFMS) is the key to measure performance in terms of reduced emissions from sources and removals by sinks (enhanced carbon stock in forests).

It is designed in line with decisions of UNFCCC-COPs to provide data and information that are transparent, consistent over time, suitable for measuring, reporting and verifying anthropogenic forest-related emissions by sources and removals by sinks, forest carbon stocks, and forest-area changes. The system should support decision making related to REDD+ strategy options and provide information to governmental organizations, NGOs, research institutions, other relevant institutions and public. The design of a monitoring system needs to be linked with the technical approach for assessing emissions and removals since the system is designed to monitor carbon stock changes over time.

Department of Forest Research and Survey (DFRS) is the central authority for planning, designing and conducting national forest monitoring system in Nepal. However, the current monitoring system was not developed considering technical requirements for REDD+ performance measurement. Existing sample plots established across the country are not sufficient to meet accuracy and reliability required by the UNFCCC. There are 2,544 sample plots established across the country (DFRS, 2015). In particular, very few sample plots have been established in the mountain region comparing Terai and Churia. Nepal needs to proceed towards spatially explicit activity data and forest strata level emission factors. Reliability of emission factors estimation can be improved further as number of sample plots are increased and distributed equally throughout different physiographic regions and remeasure regularly.

This assignment is designed to support national forest monitoring system by establishing additional sample plots in the regions where the accuracy of the inventory data is comparatively low and remeasure already establish sample plots across the country starting this year (2017) from Terai. Additional 56 clusters (205 plots) are required to get desirable accuracy in Terai region. Considering allocated fund for this fiscal year (2074-75) 75 plots are expected to be established in Mid Mountain region.

## 2. Objectives

The main objective of this assignment is to establish 56 sampling clusters (approx. 200 plots) in Terai region to be included in the national forest inventory and monitoring system. Those sample plots will be additional sample plots to the previously established

permanent sample plots in the given region. Data collected from the additional plots will be helpful on reducing the confidence limits of the inventory results. Specific objectives of this assignment are:

- To establish additional 56 sampling clusters (approx. 200 plots) in the Terai region. Numbers of existing sample plots in this region are not sufficient to draw desirable and statistically accurate inferences.
- To measure newly established sample plots in the Terai region taking REDD+ performance related variables into account.
- To re-measure national forest inventory sample plots in the Mountain region taking REDD+ performance related variables into account.

### 3. Scope of work

This assignment entails the following tasks.

#### **3.1 Desk Review and Analysis**

Main purpose of review and analysis is to develop a deep and updated understanding of forest inventory systems, methodologies, tools and techniques unfolding in recent years and compare them with methodologies, tools and techniques DFRS has been using and finalize methodologies to be applied for this time with justification. The following would be some steps to be followed:

- Review forest inventory related strategies, policies and guidelines of DFRS;
- Review and analyze existing national forest monitoring and inventory system in Nepal;
- Review literature on methods, systems and approaches of national forest monitoring system being practiced in countries with biophysical contexts similar to Nepal;
- Review related policies, guidelines and methodological frameworks produced by IPCC, UNFCCC, UNREDD, FCPF and other related agencies;
- Analyze all of the reviewed documents, methods, approaches and guidelines to develop a detail plan how the assignment will be undertaken;

### **3.2 Consultation**

- Technical/advising committee developed to oversee this assignment must be regularly, consulted. In fact the consultant team will be guided by the technical/advising committee,
- Related officials from DFRS, REDD IC, DOF and the MFSC should be consulted regularly,
- Regional Directorates and DFOs in the districts of the sample plots,
- Local communities (CFUGs and others) as appropriate.

### **3.3 Sampling design**

Sampling design should be compatible with the previous design that was applied to Forest Resource Assessment conducted by DFRS. The design will be systematic cluster sampling with a random start. All additional sample plots should be selected from the pool of sample clusters designed by DFRS/FRA in 2010. DFRS will communicate and coordinate with the firm for this part of assignment to prepare a compatible sampling design and required number of sample plots to be selected from the population of sample clusters.

### **3.4 Identify sample plots**

Coordinate, land use and accessibility of selected additional sample will be determined during the above-mentioned process of sampling design. The crews should identify and establish the permanent sample plots based on the co-ordinates provided. The crews must follow the method developed by DFRS for national Forest Resources Assessment i.e. Forest Resources Assessment Field Manual 2010 (revised 2017) to identify and establish the additional sample plots.

### **3.5 Sample plots measurement**

The field crew must measure all the biophysical attributes inside sample plots included in the Forest Resources Assessment Field Manual 2010 (revised in 2017). Plot attributes, Trees and Climber attributes, Crown cover, Regeneration status, Herb and shrub information and Soil sample data are the major attributes data that will be collected

from the field measurements. The crew must record the data in the paper sheet designed by DFRS (please see annex 1 for the tally sheet). The crews must follow the method developed by DFRS for national Forest Resources Assessment i.e. Forest Resources Assessment Field Manual 2010 (revised 2017).

### **3.6 Data Entry**

Data that are recorded in the paper sheet should be entered in the software interface that is designed by DFRS. The firm will be responsible for entering the data into the designed database system. There will be a separate manual for entering data into the DFRS designed database.

### **3.7 Reporting**

#### **3.7.1 Inception with detail actions and time plan**

Inception report shall be submitted at the end of the two weeks of the contract agreement made. The inception report shall cover detail methodology and time plan.

#### **3.7.2 Intermediate reporting**

The firm should submit intermediate progress report in every two months from the start of the contract. Firm shall also report the completion of field visit after every completion of field work (field mission).

#### **3.7.3 Final report**

The firm shall submit 5 hard copies with digital copy of the final report after completion of the activities incorporating all the comments and suggestion from national level stakeholder meeting and others. In addition to this, firm should provide all relevant photographs, maps, and raw data used in the activity.

## **4. Qualification and Team composition**

### **4.1 Qualification of Firm**

Any Firm registered in national VAT system is eligible to apply. The firm should have proven and relevant work experience in forest inventory, sustainable forestry and REDD+ initiative in Nepal. The firm should possess at least five years' experience with valid registration, VAT clearance, demonstrated annual transaction, audit and renew. If consortium is bidding, letter of joint venture from partnering firms should be submitted. The profile of firm should contain a minimum of following information

- Mission, vision and objectives
- Date of registration and place of registration
- Relevant work experiences of last five years
- Annual transaction for last five years
- Human Resources
- VAT clearance certificate

#### **4.2 Qualification and composition of Team**

This assignment will be coordinated by a team leader and executed by at least 5 field crews. A forest inventory field crew, taking into account the amount of information to be collected and the tasks of each individual, is composed by four members. Each field crew consists of the crew leader, one assistant to crew leader, one technical assistant with forestry expertise and an ecologist (taxonomist), all hired and trained prior to start of the inventory work. Additional persons for example drivers, cook and local helpers may be included to improve performance of the field crews, when conditions require greater resources. In addition, it is desirable that Local Resource Persons (LRPs) are hired to act as guides in the field (team composition is based on existing field inventory team composition of the DFRS). All the crew members should be experienced with standard forestry practices and have basic knowledge on participatory interview techniques to collect socio-economic data from local people.

Training of the crews on the assessment methodology should be undertaken at the beginning of the fieldwork in theoretical and practical sessions, where the techniques of the forest and tree measurements, tally of data and techniques of interviews will be explained

and practiced. In each crew the responsibilities of each crew member must be clearly defined and their tasks are proposed in the following paragraphs.

Roles, responsibilities and qualification required for each of the team members are as the following:

### **1. National team leader cum Forest Resources Assessment (FRA) Specialist**

**Roles and responsibilities:** The National Team Leader cum FRA specialist will lead the team in close coordination with and under the guidance of the technical team developed for overseeing this assignment. The team leader will:

- Assess and analyze FRA documents, NFI systems and other related documents (published, unpublished);
- Develop a plan of actions (i.e. guideline) considering available team members, provided time and objectives of the assignment;
- Coordinate the team and make sure that all of the crews and crew members are trained and capable to undertake their respective jobs;
- Coordinate consultation meetings and policy discussions;
- Manage all financial, administrative and reporting on time;
- With field crew leaders, develop detail plan of field action with timeline;
- Ensure that data are recorded properly (data entry) and database is maintained;
- Prepare a final report combining reports from all the thematic experts;

**Required Qualification:** the team leader cum FRA specialist should be a Nepali national and have strong knowledge on forest resources assessment, sampling design and undertaking sample plot measurement. He/she should have minimum qualification and experiences as below

- Hold at least a postgraduate degree (masters, preferably PhD) in forestry, environmental science or related fields. Degree in forest inventory will be an advantage.
- Have at least 10 years working experience in designing and undertaking FRA including sampling design, plot measurement and coordinating inventory activities.

- Good understanding of forest types, species distribution, sustainable management of forests, natural resource management, forest governance, and community based forestry and other relevant activities.
- Demonstrate technical capacity, including data keeping (entry), data analysis and report generation;
- Understanding of theory, principles, guidelines and approaches of FRA;
- Good understand of climate change, REDD+, biomass and carbon trading related issues and publications.
- Sound knowledge on forestry sector institutions, current program implementation arrangements and process in Nepal.
- Writing, facilitation, and communication skills are essential.

## **2. Field Manager**

**Roles and responsibilities:** The Field Manager will manage all the equipments, logistics, transportation and other requirements for the Field Crews in close coordination the Team Leader and Crew Leaders. The field manager specifically will:

- Assess and analyze NFI systems and other related documents (published, unpublished);
- Develop a plan of field crew mobilization (i.e. guideline) considering available team members, provided time and objectives of the assignment;
- Coordinate the crew team and make sure that all of the crews and crew members are trained and capable to undertake their respective jobs;
- Coordinate consultation meetings regarding field operations;
- Manage equipment, field manual and tally sheets distributions and reporting regarding the field work completion on time;
- With field crew leaders, develop detail plan of field action with timeline;
- Ensure that data are recorded properly (data entry) and responsible for all completed datasheet supply to DFRS;
- Assist to prepare a final report combining reports from all the thematic experts;

**Required Qualification:** the field manager should be a Nepali national and have strong knowledge on forest resources assessment, sampling design and undertaking sample plot measurement. He/she should have minimum qualification and experiences as below

- Hold at least a postgraduate degree in forestry, environmental science or related fields. Degree in forest inventory will be an advantage.
- Have at least 5 years working experience in designing and undertaking FRA including sampling design, plot measurement, FRA logistics and coordinating inventory activities.
- Good understanding of forest types, species distribution, sustainable management of forests, natural resource management, forest governance, and community based forestry and other relevant activities.
- Demonstrate technical capacity, including data keeping (entry), data analysis and report generation;
- Understanding of theory, principles, guidelines and approaches of FRA;
- Sound knowledge on forestry sector institutions, current program implementation arrangements and process in Nepal.
- Writing, facilitation, and communication skills are essential.

### **3. Crew Leaders**

**Responsibilities:** The crew leaders are responsible for organizing all the phases of the fieldwork, from the preparation to the data collection. They have the responsibility of contacting and maintaining good associations with the community and all the relevant stake holders and he/she should keep a good overview of the progress achieved in the fieldwork. They will specifically:

- Coordinate all FRA inventory works with the Project Field Manager, plan the measurements and provide the crew members with specific instructions regarding inventory actions and practical arrangements;
- Plan the field work, collect field forms and maps;
- Administer the location of clusters and plots;
- Plan the work division for the crew members;

- Contact local forestry officers, authorities and the community and request their assistance to contact local people, identify stake holders, guides and workers;
- Conduct Quality Assurance and Quality Control (QA/QC) of measurements and verification of their correspondence to the instructions as per the field manual;
- Take care of all the safety instructions while executing inventory in the field;
- Organize meetings after field work in order to sum up daily activities;
- Take care of logistics of the crew by organizing and obtaining information on accommodation facilities, recruiting local workers, organizing access to the clusters;
- Take care of financial matters as per the financial and administrative guideline of FRA Nepal Project;
- Organize interview and discussion with local stake holders and local people;
- Record and delineate both plot and forest stand -specific characteristics, disturbances and time measurements;
- Before departing from the plot ensure that field forms are correctly filled up and that collected data are reliable;
- Enter or organize entering of field data in the field computer as soon as possible after each working day; and
- Keep keen coordination with other crew leaders to assure unified conduct in all FRA actions.

**Required Qualification:** the crew leaders should be Nepali national and have strong knowledge and skills of forest resources assessment, sampling design and sample plot measurement. They should have minimum qualification of Master Degree in forestry or environmental sciences or other related areas. They should have at least five years' experience of accomplishing similar assignment including coordinating forest inventory field activities, data entry, sample plots measurement, organizing consultation meetings and other related activities.

#### **4. Assistant crew leaders**

**Responsibilities:** Assistant crew leaders will be responsible for the following roles:

- Sign out all equipment for measurements and keep responsibility on them:

- Properly fill the Tally and sample tree field forms, Dead tree field forms, Shrub and Seedling Field form, and participate in the related measurements;
- Measure the bearing of tally trees and heights of sample trees, measure height of each sample tree by using Vertex IV and Transponder T3;
- Ensure that the equipment of the crew is always complete, in proper order and operational before, during and after the field measurement and take care of all equipment;
- Take pictures of the field activities for the documentation purpose;
- Assist crew leader on QA/QC of measurements and verification of their correspondence;
- Takeover in the crew leader's absence; and
- Assist the crew leader to organize social survey and discussion, as per necessity.

**Required Qualification:** assistant crew leaders should have strong knowledge and skills of forest resources assessment, sampling design and sample plot measurement. They should have minimum qualification of graduate degree, preferably BSc Forestry. They should have at least three years' experience of accomplishing similar assignment including coordinating forest inventory field activities, data entry, sample plots measurement, organizing consultation meetings and other related activities.

## **5. Technical Assistants (Forest Rangers)**

**Responsibilities:** Technical assistants will be responsible for the following activities:

- Assist the assistant crew leader to measure the horizontal distance of trees from plot center by using loggers tape or Vertex IV and Transponder T3 with support of local helpers, if needed;
- Distinguish all the tallied trees, sample trees and their characteristics as per their different diameter threshold size within the CCSP according to the field manual;
- Measure diameter of each tallied tree within the CCSP as per the standard forestry practices;
- Assist the height measurements;

- Determine crown cover density at five points within CCSP i.e. at the plot center and at the four cardinal points 20 meters apart from a plot center, using a spherical densitometer;
- Quantify shrubs, saplings and seedlings within four sub-plots of each CCSP as per the instruction given by field manual;
- Measure dead wood (i.e., fallen stems, stem fragments and large branch fragments) from the plot with a radius of 10 m by determining the tip and base diameter along with the total length; and
- Assist the crew leader to organize social survey and discussion, as per necessity.

**Required Qualification:** Forest Rangers will serve as the technical assistants. They should have basic understanding, knowledge and skills of forest resources assessment, sampling design and sample plot measurement. They should have minimum qualification of successful completion of ranger course. They should have at least three years' experience of accomplishing similar assignment including coordinating forest inventory field activities, data entry, sample plots measurement, organizing consultation meetings and other related activities.

## **6. Ecologists/Taxonomists**

**Responsibilities:** Ecologists/taxonomists will have the following responsibilities:

- Collect biodiversity information (both plant and animal) as per the instructions provided by the field manual;
- Identify the plant/wildlife species with support from local helpers;
- In the tree measurements, assist the technical assistant in identifying the tree and shrub species, as per necessity;
- Collect samples (specimen) of unidentified plants or traces of wildlife and take pictures to document them;
- Assess the soil characteristics (e.g., soil depth, soil texture and proportion of coarse fractions) as per necessity with support from local helpers as per the instructions provided by the field manual;

- Collect soil samples from the sub-plots as per the instruction provided by the field manual as per necessity with support from local helpers;
- Collect data on NTFPs to be complemented through the social survey and discussions with local people; and
- Assist the crew leader to organize and collect data in social survey and discussion.

**Required Qualification:** Ecologists and or Taxonomists for this assignment should have minimum of graduate degree in plant Science. They should have at least three years' experience in identifying plant diversity, preferably in identifying forest tree species, biodiversity and ecological systems.

## 7. Local Resource Persons

**Responsibilities:** Local resource person will have the following responsibilities:

- Assist to take field measurements;
- Open ways to facilitate access and visibility to team members;
- Provide the common/local name of forest species, NTFP, vascular plants and wildlife's;
- Inform about access to the cluster;
- Provide information about the local forest uses and management; and
- Assist to organize discussion at local level by contacting local authorities and community.

**Required Qualification:** Local resource persons should be literate preferably have a secondary school education. They should have experienced in facilitating community forestry including group mobilization, identifying local names of the plants, basic local/traditional usage of the plant resources and measuring forest resources.

## 5. Deliverables and reporting

The expected duration for this assignment is five months. There are several deliverables expected to produce.

1. A detail work-plan with inception report: detail work plan for establishment and measurement of additional 56 clusters (approx. 200 plots) in Terai region and measurement of another 200 plots (approx.) in Mid Mountain region NFI sample plots should be submitted within a month after the agreement. The work plan should outline a detailed schedule for each deliverable under the scope of work outlined above in order to meet specific milestones.
2. Details of added NFI sample plots: Details of the added sample plots including GPS location, site characteristics, access, land use types etc. in the Terai region.
3. Establishment of additional plots as permanent sample plots in the field with the standard system described in DFRS FRA field manual.
4. List of measured variables and analyzed information (from additional plots in Terai and pre-established plots in Mid-mountain region): variables that were measured in the sample plots should be submitted describing purpose and use of them in analyzing data and generating information. Variables and their measurement should be consistent with the FRA field manual and REDD+ MRV system. Technical or advisory committee must be consulted before finalizing variables to be measured.

The work plan should be developed in close collaboration with DFRS and REDD IC. The Team Leader will report to the technical/advisory committee. Committee members representing DFRS and REDD IC will inform progress status to the DG DFRS and Chief REDD IC the respectively.

## 6. Inputs to the firm

### 6.1 Documents and Consultation

DFRS and REDD IC will provide access to background documents to carry out the assignment. In particular, the consultants are required to review, familiarize with, and incorporate in the work of the present assignment

- (i) results of the relevant REDD+ readiness studies (i.e. MRV and FRL) that REDD IC carried out and
- (ii) reports of ongoing NFI system and periodic reports of forest resources assessment.

Both DFRS and REDD IC will support for necessary communication for consultations, sample plots establishment and measurement in the field at all levels. REDD IC will support the firm to coordinate and attend the national level and field level consultations process as and when necessary and feasible.

DFRS, REDD IC and the World Bank will review and provide regular input and suggestions to the consultant(s), which are required to be taken into account. The deliverables must be agreeable to DFRS, REDD IC and the Bank.

## **6.2 Equipment and Tools**

DFRS will provide the necessary technical equipment to the firm to conduct forest inventory in the field. Following equipment will be provided to the firm or crews which is essential to complete the field measurements:

- (i) Vertex IV and Transponder (1/crew)
- (ii) GPS Device (1/crew)
- (iii) Diameter Tapes (2/crew)
- (iv) Measuring Tapes (2/crew)
- (v) Sunto Clinometer (2/crew)
- (vi) Densimeter (1/crew)
- (vii) Metal Detectors (1/crew)
- (viii) Compass (1/crew)
- (ix) Tree Calipers (1/crew)

The firm should be responsible for proper use and safety of all the equipment provided by DFRS. Any breakage and loss of equipment should be reimbursed from the organization that is providing the services for the work.

## **6.3 Trainings**

DFRS will facilitate the firm for the training and orientation for crew leaders and other crew members regarding field navigation, measurement, data collection and data entry. Field crews will only be mobilized after a proper training from DFRS.

## 7. Supervision, Monitoring and Quality Control:

DFRS will be responsible for supervision, monitoring and quality control measurement of the activities of Firm to improve the quality of work. Separate budget will be allocated for above mention purpose (Firm will not be responsible for this cost). The firm will undertake the assignment under the coordination and supervision of the technical committee formed for this assignment at the DFRS.

Supervision and monitoring of the work will be done simultaneously with the measurement activities conducted by the firm. DFRS staff will supervise and facilitate the measurement process during the field campaign.

Quality control (re-measurement) measurement will be carried out in 10 percent of total plots measured by the firm after the completion of the field plots measurement. This measurement will be independently carried out by DFRS crews to establish the accuracy of the data.

## 8. Defect Liability:

The firm shall be responsible for authenticity of the field data and any other technical or economic data collected from any sources. The firm shall be responsible for the correctness of the activities. If any discrepancy is found even after submission and acceptance of the Final Report, the consultant shall review the data, repeat the study work if necessary and furnish DFRS with revised work at no extra cost.

## 9. Property Right:

The database, processed data, daily field books, original sets of maps and reports will be the property of DFRS and must be submitted to the employer together with the submission of Final Report. The data should not be used anywhere else without the written consent of DFRS.

## 10. Selection process and Criteria

The short-listed firm will be asked for the development of a detailed proposal. The selection process of Expression of Interest (EoI) and proposal will follow The World Bank's Guidelines for Consultant Procurement 2011.

## 11. Schedule of work

The assignment is expected to start in the middle of December 2017 and accomplished in 6 (six) months.

## 12. Application Procedure

Eligible firm should provide Expression of Interest in a sealed envelope containing the following documents.

- Letter of Expression of Interest
- Profile of the Firm
- Copy of Registration Certificate
- Copy of Renewal Certificate
- Copy of Annual Audit Report for last three years
- CVs of potential experts
- Letter from partnering institutions if joint venture is proposed

The short-listed firm will be requested to submit a full proposal along with following documents.

- Technical proposal for the assignment (establishment of NFI plots in Mid Mountain and re measurement of NFI plots in the Terai) in a sealed envelope. The proposal should include duly signed CVs of experts
- Financial proposal for FIP development in a sealed envelope.

### **Further communication**

Department of Forest Research and Survey (DFRS)

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**References:**

DFRS. (2015). *State of Nepal's Forests: Forest Resource Assessment (FRA) Nepal*, Department of Forest Research and Survey (DFRS), Kathmandu, Nepal.

Samreth, V., Chheng, K., Monda, Y., Kiyono, Y., Toriyama, J., Saito, S., . . . Ito, E. (2012). Tree biomass carbon stock estimation using permanent sampling plot data in different types of seasonal forests in Cambodia. *Japan Agricultural Research Quarterly: JARQ*, 46(2), 187-192.

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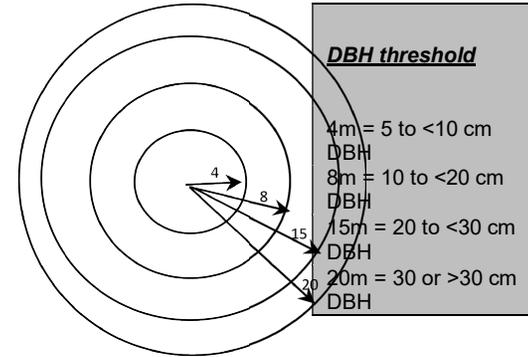
# Appendix 1: FRA Tally Sheet to be used during sample plots measurement

FRA-Nepal:  
Form

## 3. Tally and Sample Tree / Climber Field

### General data

Plot code



# of tally trees measured:
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tree no	forest stand	bearing	distance m	species	species_name	dia_cm	quality_class	crown_class	sample tree type	height m	base_tot_ht	height_crown_m	base_cr_ht	age y	radial-growth	Base slope(+/-)
1																
2																
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