

Report
on
Preparation of Standards for Urban Forests Establishments and Management

Government of Nepal
Ministry of Forests and Environment
Forest Research and Training Center
Babarmahal, Kathmandu.

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Forewords

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Government of Nepal has emphasized to maintain green environment at household level with the recommendation to plant at least two trees in each household . This provision, regardless of rapid urbanization, will open a door of hope and will address at least a part of fundamental right of every citizen to live in clean environment as ensured by Constitution of Nepal thereby promoting UFs. This document will guide the tree species selection with urban forest establishment and management.

I would like to thank International Conservation Development Partnership Inc for preparing this report. I appreciate Bimala Lama for conducting this program. I would like to express my gratitude research officer Sabitri Aryal for supervising and guiding the program. I would like to further thank to DDG Mr Dhirendra Kumar Pradhan for his support. I am further thankful to Reviewer team Mr Bimal Kumar Acharya, Mrs Manju Ghimire, Mr Bishnu Prasad Dhakal and Mr Kiran Kumar Pokharel for improving this document in publishable form. At last but not least, I acknowledge all professional, FRTC staff and who involved directly or indirectly to shape this document.

I am very hopeful that this document will be helpful to guide and support the policy maker, municipality, and people for establishment and management of urban forest.

Yam Prasad Pokharel
Director General
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Chapter 1: Background

1.1 Introduction

Among several approaches of natural resource management, Urban Forestry (UF) is one which has been developed recently to meet urban demands of ecological, aesthetic and socioeconomic benefits. It encompasses the multidisciplinary approach to the planning and management of allforest and tree resources ranging from street trees to peri-urban woodlands in and near urban area ([Konijnendijk et al., 2005](#)). Urban forestry is generally defined as “the art, science and technology of managing trees and forest resources in and around urban community ecosystems for the psychological, sociological, economical and aesthetic benefits trees provide to the society”(Helms, 1998). Urban forestry embraces a multifaceted managerial system that include municipal watershed management, wildlife habitat creation and management, outdoor recreation opportunities, landscape design, recycling of municipal waste, tree care and the production of wood as a raw material. Urban forestry is a specialized branch of forestry that deals with cultivation and management of trees for their present and potential contribution to the physiological, sociological, and economic well-being of urban society. Originated from North America during 1960s and 1970s, UF attempts to bring several professions and approaches in one place. Adverse environmental effect because of urban population and infrastructure triggered the concept of UF worldwide.

Urban forestry is biologically and socially more complex than general plantation forestry for using small pieces of land to plant ornamental trees even in degraded lands either through flowering, fruit cultivation or forest farming. Urban forestry addresses “the land in and around areas of intensive human influence, ranging from small communities to dense urban centers, that is occupied or potentially occupied by trees and associated natural resource” ([Strom, 2007](#)). The concept of urban forestry encompassing planning, design, establishment and management of trees and forest stands with amenity values situated in or near urban areas has become more widely accepted ([Nilsson and Randrup, 1997](#)). It has five key components: arboriculture, arbor-ecology, arbor-economics, arbor planning and arbor-sociology ([Costello, 1993](#)). Urban forestry not only deals with city trees or with single tree management, but also with tree management in the entire area influenced and utilized by the urban population ([Randrup et al., 2005](#)). Managing urban population and environment has been one of the most important challenges in Nepal and other developing countries of the world.

Although cities occupy only 2 percent of the planet's surface, their inhabitants use 75 percent of its natural resources. The world is urbanizing quickly, too: by 2050, 70 percent of the global population will live in cities and towns ([Salbitano et al., 2016](#)). Sustainable urban development is crucial, therefore, for ensuring the quality of life of the world's people. Forests and trees in urban and peri-urban environments, if properly managed, can make important contributions to the planning, design and management of sustainable, resilient landscapes. They can help make cities:

- **safer** – by reducing stormwater runoff and the impacts of wind and sand storms, mitigating the “heat island” effect, and contributing to the adaptation and mitigation of climate change;
- **more pleasant** – by providing space for recreation and venues for social and religious events, and ameliorating weather extremes;
- **healthier** – by improving air quality, providing space for physical exercise, and fostering psychological well-being;
- **wealthier** – by providing opportunities for the production of food, medicines and wood and generating economically valuable ecosystem services; and
- **More diverse and attractive** – by providing natural experiences for urban and peri-urban dwellers, increasing biodiversity, creating diverse landscapes, and maintaining cultural traditions.

Urban planners and city administrators face daily challenges in managing complex urban environments, such as maintaining sufficient healthy and safe food, clean water, clean air, energy, housing and green spaces and addressing conflicts of interest related to land use. More than ever, they must rise to the challenge of ensuring that their cities are economically, socially and environmentally sustainable, resilient and capable of providing the ecosystem services needed by their citizens for a good quality of life. Well-designed and managed urban and peri-urban forest and tree are integral to meeting this challenge: urban forests can make significant contributions to the environmental sustainability, economic viability and livability of urban settlements.

Despite efforts of the governments, UF development has not achieved the expected results. Several reasons including but not limited to haphazard development of cities, encroachment of

open spaces like riverbanks and public lands by gray infrastructure and lack of recognition of forest value have always hindered the establishment, development and management of the UFs. Rapid urbanization throughout the world has brought about a wide range of challenges across the globe as more land is required to cater to the needs of growing population with a detrimental effect on UF. It has also become a priority area for policy makers and planners. Developing sustainable cities where all citizens can enjoy a quality life, and environment will be one of the main challenges of ours. Having recognized as one of the important aspects of the urban life, United Nations (UN) has predicted that by 2050 about 64% of the developing world will be urbanized ([United Nations, 2018](#)). According to [Lamichhane and Thapa \(2012\)](#), and [Salbitano et al. \(2016\)](#) urban forest is a network or system comprising all woodlands, groups of trees, and individual trees located in urban and peri-urban areas. UF, which abridges rural and urban areas as well as ameliorates environmental footprint, is the backbone of green development ([Salbitano et al., 2016](#)).

History reveals the practice of UF in Nepal dates back to Malla. Reports reveal that King Jayasthiti Malla (1380-1395 AD) issued an order to his officials and commoners to plant trees alongside walking streets and wells. At present, Government of Nepal has emphasized UF through Forest Decade (2014-2023) Program ([Goutam, 2018](#)), that promotes afforestation in public and private lands with the theme of "one house: one tree, one village: one forest and one town: several parks".

Nepal is one of the 10 least urbanized countries in the world. However, it is also one of the top 10 fastest urbanizing countries, and it has invited several problems in human life and environment like pollution, flooding and social disorders ([Bakrania, 2015](#)). Considering the importance of urban greens for multiple social, economic, ecological and environmental benefits, Government of Nepal has emphasized to maintain green environment at household level with the recommendation to plant at least two trees in each household ([GoN, 2013](#)). This provision, regardless of rapid urbanization, will open a door of hope and will address at least a part of fundamental right of every citizen to live in clean environment as ensured by Constitution of Nepal thereby promoting UFs.

1.2 Benefits of urban forestry

Urban green areas, like urban parks, vegetated areas, woodlands, even forest in most cities of the developed countries have traditionally been viewed principally as recreational amenities. In poorer and developing countries urban forestry must first pay attention on assisting in fulfilling necessities ([Kuchelmeister, 1998](#)). Thus, urban forestry comes from the recognition that such urban green areas can and should be used in an integrated, holistic manner for many other environmental and social benefits beyond recreational use and aesthetics in developing countries.

1.2.1 Economic and Livelihood benefits

In many developing countries large parts of the urban population are still heavily dependent upon fuel wood ([Kuchelmeister, 1998](#)) for their domestic energy needs. Urban and green areas can provide wood and non-wood forest products such as mushrooms, berries, (medicinal) herbs, rattan, and so forth. Focus on the Western world has been on additional economic values such as green areas contributing to more attractive cities for people to work, live and relax ([Gautam et al., 2006](#); [Nilsson and Schipperijn, 2005](#)). Studies in Denmark and Finland, for example, have shown the positive impact of nearby forests and green on house prices ([Anthon and Thorsen, 2001](#)). Beautification of Singapore and Kuala Lumpur, Malaysia, was one of the factors that attracted significant foreign investment that assisted rapid economic growth of the cities ([Braatz, 1993](#)). In addition, rehabilitating lands with vegetation is often more attractive and cost-effective than constructing new buildings on them ([Hauer et al., 2015](#)).

The preservation of vegetated areas, or green spaces, and creating and expanding more spaces in and around the cities can improve the quality of life by providing people with natural settings for leisure and recreation ([Baral and Kurmi, 2005](#); [Gautam et al., 2006](#)), and by safeguarding the quality of precious life-giving resources. Green areas also have the potential for affording citizens the opportunity to get direct economic benefits through urban agriculture or forestry. The proven savings in heating and cooling costs for buildings near urban trees are well documented. In addition to energy savings, increased levels of property values are economic benefits provided by urban trees ([Erickson, 2004](#)). Trees also play a vital role in bringing people together for social cohesion and interaction. Sometime, urban trees provide fuel wood and fodder for poor people living around these tree stands.

1.2.2 Environment and biodiversity benefits

Urban forestry can play a major role in improving urban environmental conditions and safeguarding biodiversity ([Baral and Kurmi, 2005](#); [Gautam et al., 2006](#); [Tyrväinen et al., 2005](#)). Trees intercept some air borne pollutants from the air and remove some gaseous pollutants via stomata uptake ([Erickson, 2004](#)). Scientists have proven that trees, in all settings provide extensive environmental benefits such as: carbon dioxide exchange, reduced energy use, air pollution reduction and water quality improvements. Trees keep our air supply fresh by absorbing carbon dioxide and production oxygen. In one year, an acre of trees can absorb as much carbon as is produced by a car driven up to 8700 miles (isa-arbor, 2015) and lower air temperature by evaporating water in their leaves. They have significant potential to cut down noise pollution acting as sound barriers([Gautam et al., 2006](#); [Harris, 1992](#)). Tree roots stabilize the soil and prevent erosion, improve water quality by slowing and filtering rainwater as well as protecting aquifers and watersheds. Trees provide protection from downward fall of rain, sleet, and hail as well as reduce storm run-off the possibility of flooding. Trees located along streets act as a glare and reflection control. Tree provides shade and shelter to wild birds and animals making environment biologically rich.

1.2.3 Social and cultural benefits

Urban green can have a positive impact on physical and mental health, by providing settings for physical exercise and cultural and spiritual values. In many developing countries, trees often have cultural and spiritual values ([Konijnendijk et al., 2005](#)) that could assist new urban dwellers in finding their place in cities and towns Parks and other green areas also provide educational opportunities for urban residents. For urban children, as well as adult students, the learning experience available in urban parks may be some of the few opportunities they have to learn about nature through firsthand experience. Active involvement in tree-planting programs has been shown to enhance a community sense of social identity, self-esteem and territoriality ([Dwyer et al., 1992](#)).

Finally, it can be said that the range of benefits that urban greening provides is both practical and comprehensive and addresses many of the social, environment and economic problems most cities face. Though not the panacea for every current urban ill, urban greening nonetheless can significantly treat a great many of them and create a much more salutary and desirable environment in which to live([Ansari, 2008](#))

However, there are some harmful effects of trees present in and around settlement. Some of these effects are very serious to human beings. Some researchers in 2009 reported that there were 407 deaths caused by wind related tree failures in the United States during 1995-2007, which is an average of 31 persons per year. Fallen trees or limbs from thunderstorms have also caused some death in Kathmandu valley. [Lamichhane and Thapa \(2012\)](#) had also reported that religious tree species such as *Ficus bengalensis* and *Ficus religiosa* are the most common hazardous trees in Pokhara Sub-metropolitan city and Bharatpur municipality. The urban people have preferred small and less branchy trees to minimize such effects.

1.3 Objectives

The general objective of the assignment is to prepare criteria and indicators for UF establishment and management in Nepal. The specific objectives are:

- (1) To assess the standards for urban forest establishment and management in Nepal
- (2) To prepare the standards for UF establishment and management in Nepal

1.4 Purpose and Scope of the Assignment

The overall scope of this survey is to prepare the of standards of UF establishment and management.

The assignment includes implementation scope as follows;

- (1) Preparation of an inception report outlining the approach, detailed methodology, and detailed work plan and sharing with FRTC in the presence Joint Secretaries, Under Secretaries and other officials
- (2) Preparation of a clear time-frame for the execution of the assignment to be discussed and agreed with FRTC
- (3) Designing the field data/information collection techniques following the methodology agreed in the Inception Report. The survey design includes a range of survey methodologies including quantitative as well as participatory techniques;
- (4) Carrying out a field survey to gather the required information and including information to be gathered by field observation;
- (5) Organizing sufficient consultations with key stakeholders about the objective of the assignment to solicit and interpret data and information;

- (6) Preparation of a draft report incorporating detailed standards of UF establishment and management;
- (7) Presenting the draft report outlining the approach, detailed methodology applied and detailed standards in the presence Joint Secretaries, Under Secretaries and other officials
- (8) Preparing final report after soliciting the feedback and comments received in the draft report

Chapter 2: Methodology and Methods

2.1 Overall Assignment Design and Methodology

This assignment adopted a reiterative, consultative, participatory, inclusive, consultative and communicative process throughout the assignment.

A statistically valid methodology along with participatory techniques were used for the collection and analysis of data and information. Besides, this assignment applied number of toolkits to be used for the collection of data and information from Focus Group discussion (FGD), consultation, interactions, and interviews.

2.2 The Sites of Interaction

As proposed in the inception report, the field level interactions were carried out in Dhankuta municipality in Dhankuta district, Kathmandu metropolitan in Kathmandu district and Butwal sub-metropolitan in Rupandehi district. In addition, the interactions were organized in Tilottama municipality in Rupandehi and Bharatpur metropolitan in Chitwan

As shown in Table 1, Though Kathmandu metropolitan has the highest population (2011 census), it has the least percentage of forest area. Butwal Sub-metropolitan, on the other hand, has the largest municipality with highest forest cover.

Table 1: Basic characteristics of the proposed municipalities

SN	Municipality	Number of wards	Population (GoN, 2021)	Area (sq.km) (GoN, 2021)	Forest Area (sq-km) / % (GoN, 2018)
1	Dhankuta in Dhankuta	10	36619	111	38.8 sq. km / 36.0%
2	Kathmandu in Kathmandu	32	975453	49.45	1.1 sq. km / 2.2%
3	Butwal in Rupandehi	19	138742	101.61	49.8 sq. km / 49.01%
	Tilottama/ Rupandehi	17	100149	126.19	13.6 sq. km / 10.78%
4	Bharatpur /Chitwan	29	280502	432.95	158.6 sq. km / 36.63%

2.3 Key Approaches

The study was conducted by applying various theoretical and practical approaches so that the assignment comes out with the realistic and most representative information. The approaches that applied during the assignment were adapted to the possible extent and adjusted according to

the local context and applicability. The approach of consultations and discussions were participatory, consultative and facilitative. More specifically, the following approaches were used:

2.3.1 Iterative

Design of the methodological framework and collection of data through different means were iterative. The draft methodological framework was shared with the expert and stakeholders for their inputs and feedback which were then duly incorporated in the final inception report. Furthermore, all the meetings, consultations and workshops were interactive so that the team of consultants could capture the best ways to establish the standards for UFs establishment and management.

2.3.2 Participatory, Inclusive and Consultative

Stakeholder participation and consultation is considered as a key approach of the design and operation of assignment. Participatory and inclusive approach were deployed through representation of multiple stakeholders at different levels (ranging from local to federal).

2.3.3 Effective Communication

Open communication with a variety of stakeholders through prior consents, planned meetings and briefings were maintained in collecting and exchanging opinions, information and ideas. Regular communication, sharing of drafts and absorption of comments to revise the draft were continued with FRTC and other stakeholders.

2.3.4 Disclosure and Verification

The consultant team followed the disclosure and verification approach to ensure the transparency of the findings as well as to develop the ownership and confirm accountability. This approach also facilitated development of dialogues with concerned stakeholders on issues raised apart from providing the explanations for given situation. For this, briefing, debriefing and field level consultations were organized to discuss and share the study findings during the study. Some information that are sensitive and confidential in terms of gravity of the work were kept undisclosed and appropriately dealt with confidentiality.

2.3.5 Analytical

Analytical approach inferring the investigation and inspection of the data generated from the statistical tools as well as from desk review were employed in the study. In addition, the

information generated through FGDs, Key Informants Interviews (KIIs) and informal discussions with stakeholders were analyzed accordingly to satisfy the objective of the assignment. All data sets and information collected for the assignment were transformed to some sort of quantitative form so that the computer based statistical software could be applied for scientific analysis of available information.

2.4 Study Framework

Overall study design for this assignment was largely underpinned by a conceptual framework shown in the figure 1. The framework illustrates that the assignment completed with three consecutive stages with the fulfillment of expected objectives. The task started from the review and assessment UF related policies, practices, guidelines and standards from local to global scale, and ends with the preparation and submission of final report including standards for the establishment and management of UF.

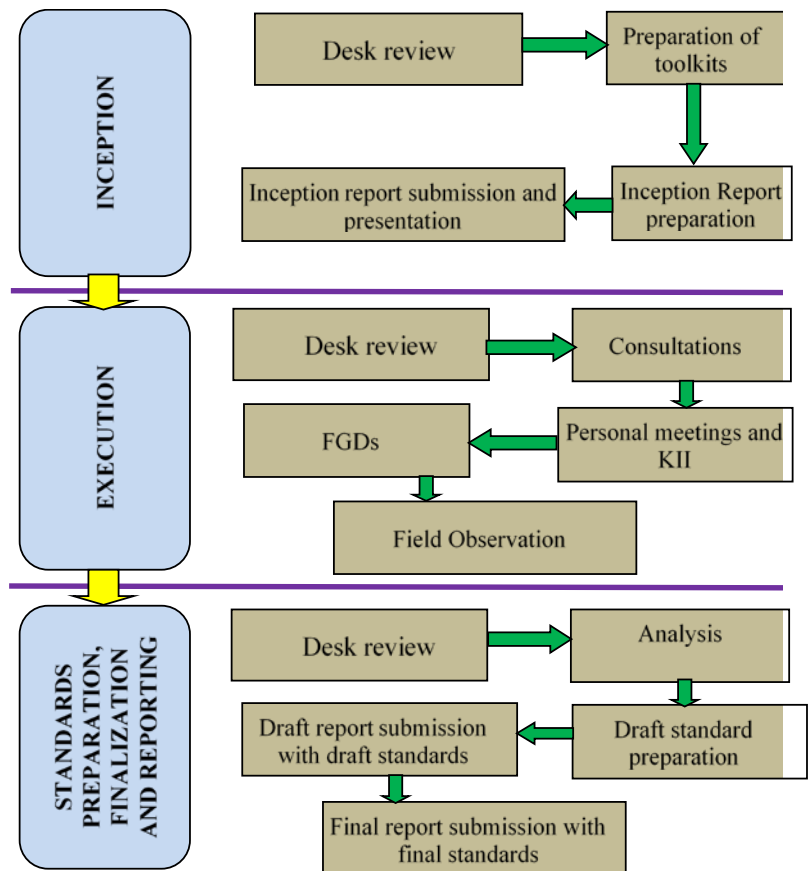


Figure 1: Conceptual Framework for the Assignment Completion

2.5 Activities and Methods

2.5.1 Inception Phase

The first task of this assignment was the inception phase. This phase was started immediately after signing the contract and ended when the inception report was presented in and accepted by FRTC.

A. Desk review

The assignment started with an extensive review of relevant documents. The general idea of the review was to gain basic insights into UF standards, guidelines and practices in Nepal and abroad. The UF policies, priorities, global and national status scenario of UF, key elements of

UF. Besides, the review aimed to identify the state-of-the-art methodology in developing UF standards in Nepal. The study team reviews the past and existing policies, laws, frameworks, guidelines, practices, plans, and reports ranging from local to global scale. The review was critical to collect insights for the development of the standards on UF establishment and management in Nepal. In addition to the documents presented in Reference (annex 1), the following documents were reviewed:

- Climate Resilient Planning, 2011
- Constitution of Nepal
- Environment Protection Act, 2019
- Environment Protection Regulation, 2019
- Environment-Friendly Local Governance Framework, 2013
- Forest Act, 2019
- Forest Policy, 2019
- Forestry Sector Strategy (2016-2025), 2016
- Local Government Operation Act, 2017
- National Environment Policy, 2019
- Nepal National Building Code, 2020
- Nepal Urban Road Standards, 2013
- Related Acts, regulations, guidelines and conducts of the selected local level

B. Survey toolkits

The consultant team prepared separate checklists for collecting data and information (all are attached in annex 2) from different sources including FGD, KII, consultations, with government officials, private/business sector, community people and experts.

C. Inception report presentation and finalization

The inception report which included a detailed methodology and approaches, survey toolkits to be used in consultations, meetings, FGDs, KIIs and interviews, was presented in the inception workshop at FRTC in the presence of joint secretaries, under-secretaries, and other officials. The report was then finalized soliciting the ideas, feedback and comments of the inception workshop.

2.5.2 Execution Phase

The second phase (i.e. the execution phase) consisted different ways of collection of data and information for the preparation of standards for UF establishment and management. The execution phase was the most important one for the assignment and started immediately after the acceptance of inception report by the FRTC.

A. *Personal meetings and key informants' interviews*

Persons involved for the establishment and management of UFs at local, provincial and federal level were identified. Personal level meetings were organized with these persons to identify the past and present practices and future plans. In additions, key informants were interviewed to identify the basic but realistic requirements and standards of UFs. A total of 22 (two females and 20 males) personal meetings and KIIs were conducted. The list of KII is presented in Annex 3.

B. *Focused group discussions with community*

Four FGDs were organized with the communities, with at least one in each of the selected municipalities to know their views and perceptions. Furthermore, the FGDs provided the present and potential roles, rights and responsibilities of different



stakeholders for the establishment and management of UFs. Three of these FGDs were in core areas of the cities whereas one was in per-urban areas. The FGDs were participatory and the involvement from different sectors, such as business (private), public, tourism and recreation, entertainment and construction. A total of 51 participants were involved in FGDs. The detail of the FGDs is presented in annex 4.

C. *Field observations*

The team of consultants directly visited 14 sites including parks, shelterbelts,



road side plantation, canal plantation, small-scale group plantations, ponds and other sorts of UFs to personally observe the alignment, arrangement, species selection, composition, different type of usages and so on. In addition, the team visited and consulted with nursery operators and seedling/sapling suppliers (government, private and community). The visited sites are presented in Annex 5.

2.5.3 Standards Preparation, Finalization and Reporting Phase

After the completion of the field execution/data collection, the team prepared the draft standards. The assignment completed with the submission of this final report (with final standards) to FRTC after receiving the feedback on the draft report.

A. Analysis

Data analysis consists of the extensive analysis and synthesis of both the desktop review and field assessment. Based on the data collected using questionnaire survey, the perception of the respondents on the UF were assessed

The information from all sources and observations were gathered together. Information acquired from the field were checked randomly for the accuracy. The collected data from the field were then sorted. Data management was done foreseeing the type and structure of the data, and quantitative and qualitative nature of the data etc.

Information gathered from the secondary sources (literature review) were sorted and relevant information were extracted and logical interpretations were made. For the information collected from FGDs and KIIs expert analysis was conducted.

B. Standards preparation, submission, presentation and finalization

A draft report was prepared incorporating the major findings and process of the whole study. The draft report also included the draft standards for the establishment and management of UFs. The draft was presented in FRTC and the final report with final standards is now prepared after soliciting the comment/feedback from FRTC.

Chapter 3: Findings

3.1 The Policies

Constitution of Nepal, under section Fundamental Rights and Duties, mentions that every citizen shall have the rights to live to live in a clean and healthy environment. Further, it says that the maintaining forest area in territory required for ecological balance shall be one of the policies of the state relating to protection, promotion and use of natural resources. While reviewing the schedules of the constitution, it seems that the establishment and management of urban forests in cities is in schedule 8 and 9 which means the rights of urban forests establishment and management is with Federation, Province and Local Level.

National Forest Policy, 2019 hardly speaks about urban forests. There are two minor policies under heading Forests Outside National Forests. The first of them is related to the provision of loan for the establishment, development and management of forests outside national forests, including urban forests. The second one is related to the activities for capacity building and technology transfer.

One of the objectives of National Environment Policy, 2019 is to develop and manage parks and greenery in urban areas. The policy, Environment Protection Act, 2019, Environment Protection Regulation, 2019, seem to be proactive in terms developing clean, green and healthy environment in the urban centers.

The Forestry Sector Strategy (2016-25) includes comparatively better strategies for the establishment and management of urban forests. These strategies include:

- Initiate and develop a new participatory urban forestry program for identified municipalities in close association with municipality administrations and relevant local stakeholders, including from the private sector;
- Promote urban forestry as partnership approach with the private sector (through corporate responsibility), local *Tole* groups, cultural and religious institutions and other voluntary organizations with an appropriate role for each;
- Establish a national urban forestry support unit involving government, local government/municipality and, possibly, the private sector, for example through outsourcing, to facilitate and promote urban forestry nationally;

- Integrate urban forestry and urban forestry plans as an integral component of urban planning by municipalities through legal provisions and through bylaws on creation of open space, tree planting for amenity, recreational facilities and safety; and
- Raise awareness amongst urban dwellers on the significance and benefits of urban forestry.

Forest act, 2019 allows local level to develop and manage urban forests in urban areas and urban settlements own its own or through other organizations and private sector. The Divisional Forest Office or Sub Division Forest Office shall provide the technical support to local governments for urban forests establishments and management.

While reviewing policies at local level, it seemed that none of the local level has the policies, strategies and acts and regulations required and related not only to urban forests in particular but forestry in general. They do include the provision of urban park establishment and development in their annual program (barshik niti tatha karyakram) without having guiding policy frameworks. establishments and management. However, all the local level has approved land use plan but the implementation status does not seem satisfactory. The local level are found to have approved and gazetted acts related to environment and natural resources conservation, and disaster risk reduction and management.

3.2 Institutional Arrangements

Though, according to the constitution, local level has the rights for the establishments and management of urban forests, they have no specific section dedicated to forestry. The urban forestry is given Neither they have forest technicians.

according to the Forest Act of 2019, the Division forest offices and sub-division forest offices should provide the technical support to local governments in issues related with urban forests. However, the core priority of the DFO and SDFO has been more concentrated to national forest (including government-managed forests, community forests, collaborative forests). The local level could have been equipped with forest technician so that they themselves establishment and manage the urban forests. Rights in one institution without proper human resource allocation poorly works.

3.3 Stakeholders' Coordination

The key stakeholders found for the establishments and management of urban forests were found as follows:

- Civil Society Organizations such as youth clubs
- Community Based Organizations such as Community Forest User Groups
- Community People
- Corporate Houses
- Division and Sub-Division Forest Offices
- Division Road Offices
- Federal Government
- International and National Non-Governmental Organizations
- Local Government
- Nepal Electricity Authority
- Private Sector including business people
- Provincial Government
- Public Institutions such as schools, hospital and banks

The narrative box in the right side highlights an existing weak coordination between government agencies. During an informal discussion, Dr. Rajendra KC, the secretary of Industry, Tourism, Forests

"When I was in one of the divisions in Province 1, the Division Road Office had to expand an urban road in Biratnagar. There was a medium-sized poplar tree which must go away to complete our work. I formally requested DFO to remove the tree which could not be happened for three months. I again approached DFO through Biratnagar Municipal Office. However, the DFO did not removed the tree and the road could not be completed. The budget was not used in that fiscal year. The road was expanded next year when the tree was removed in eleventh months of our request to DFO"
Shubharaj Neupane, Senior Divisional Engineer

and Environment of Lumbini province said that the Bhatbhateni Supermarket in Koteshwor was not willing to water the sapling planted in front of its building. In contrary, the small shopkeepers in its neighborhood had been providing regular water and erected the tree guards This indicated the less willingness of comparatively big corporate houses/private sectors to participate in urban forests establishment and management in compared to small shopkeepers/business persons.

We found weak coordination in planning and implementation of plantation works in urban centers. Dhankuta municipality and Division forest office Dhankuta bota allocated budget for road side plantation in Dharan Road. Division Forest Office itself had two-years old saplings but the municipality bought the saplings in Itahari. Later, municipality organized the plantation

inauguration program and invited the DFO. This made the DFO know the plan of the municipality and shifted its plantation venue in another site. In short, through FGD, KII and consultations, we found that there is lack of coordination amongst stakeholders in planning of infrastructure development works, designing, planning, implementation and monitoring and evaluation.

3.4 Urban Forestry Types

Based on literature review, consultations, KIIs and FGDs, we categorized urban forests based on ownership and trees' alignment.

3.4.1 Based on Ownership

Based on ownership, we found five types of urban forests.

A. Community : The forests in urban and peri-urban areas managed by local clubs, civil society, TOLE SUDHAR SAMITIS, Community Forest User Groups, Religious Forest Groups, Leasehold Forest Groups etc

B. Institutional: The forests in urban and peri-urban areas developed and managed by schools, colleges, universities, government offices, financial institutions, Non-Governmental Organizations etc.

C. Private: The forests in urban and peri-urban areas developed and managed by individuals in land that they legally entitlement.

D. Public:The forests in urban and peri-urban areas developed and managed by local government

E. National:The national forests in urban and peri-urban areas other than community owned.

3.4.2 Based on Trees' Alignment

Based the alignment of the trees, we found three types of urban forests.



A. *Linear*: Trees developed and managed in urban and peri-urban areas in a linear way such as road side plantation, canal/river side plantation etc.

B. *Non-linear*: The forests in urban and peri-urban areas developed and managed in non-linear way such parks.

C. *Individual/Scattered* : Trees in urban and peri-urban areas distributed randomly such as trees in derelict corners, trees in building compounds, individual trees in resting places (CHAUTARIES) etc.

3.5 Species Used in Urban Forestry

We did not find much differences on species selection criteria for different urban forests sites in visited municipalities. Species selection criteria varied between forestry professionals and other stakeholders. Forestry professionals emphasized on silvicultural characteristics such as root system, defoliation, branching pattern and others, whereas other stakeholders were mostly concerned on attractiveness and shade.

We found a number of species developed and managed in road side, canal/river side, parks, building compounds and parks. The appropriate species suggested for urban forestry in different sites with altitude is provided in annex 6.

In general, the basic characteristics of trees grown in different urban forest sites were:

- a) Road side: Fast growing, evergreen, light demander, flowering, small to medium height, mostly deep rooting species
- b) Parks: Flowering, attractive, evergreen or semi-deciduous, varying height,
- c) Canal/river side: Wet soil tolerating species, medium to tall trees, wide branching nature

3.6 Planting Stocks

In most of the cases, we were informed that the polythene grown seedlings are planted. However, in some cases bare root (such as populus) or stem cutting (such as rose) seedlings or saplings were said to have been planted.

The height of the planting stocks varies according to the species and site. In general, the height of seedling or sapling for urban plantation was found a bit higher than in normal plantation. According to discussions with forest technicians and municipalities, the height of sapling for road site plantation is about 5 feet and in other sites it is lower than this.

General people don't have share and views while selecting species for sites developed through projectized approach. Such as local people in Dharan Road, Dhankuta, Butwal-Bhairahawa Road, Koteshwor-Shatdobato Road had not involved in selecting the species. In contrary, local people directly or through their representative get involved in plantation in parks, canal side, around, pound and inner roads of the cities.

3.7 Land Preparation and Plantation

Land preparation works was found poorly organized except in plantation in sites of projectized developed schemes such as Yoga park in Bagmati river corridor in Shankhamul, Koteshwor-Satdomato Road and Butwal-Bhairahawa Road. The results of the FGDs and KIIs showed that the pitting is done in other sites when the saplings or seedling are arrived in plantation sites.

The plantation in urban cities requires intensive land preparation because of the accumulation of rocks, cemented materials and other pollutants such as plastics. However, we poorly noticed the addition of soil in such sites resulting in higher mortality rate of the planted seedlings/saplings.

The general understanding of plantation season in Nepal is rainy. However, some species requires plantation in other seasons. Saplings of poplar was planted in Butwal-Bhairahawa Road corridor for two rainy seasons but almost all of them died. This could have been associated not only poor land preparation but also with the inappropriate selection of the plantation season. Poplar saplings are normally planted in winter.

3.8 Protection Measures

In some portion of Butwal-Bhairahawa road corridor plantation, individual or group of people were given the rights to grow certain vegetables. This approached seemed to have been ideal in this area from protection point of view because



people not only make the soil light but also provide irrigation and fertilizers in a regular basis. The similar approach was observed in some specific locations of Bishnumati river corridor plantation. Road side plantation in bigger cities (for example Baneshwor-Maitighar Road), corporate houses were found to have been provided the responsibilities of protection.

Tree guards made of iron or steel were found to have been used in many areas in Kathmandu, Dhankuta, Bharatpur and Butwal. However, the saplings were not guarded in most of the visited parks. The practice of mess wire fencing was practiced in some of the locations in Butwal-Bhairahawa road corridors.

3.9 Issues Associated with Urban Forestry Development and Management

Based on the review of literature, FGDs, KIIs and consultations, three types (institutional, social and political, and biophysical and technical issues were identified.

3.9.1 Institutional

- a) Absence of urban forestry governing body
- b) Poor or unsustainable inter–agency coordination
- c) Lack of organizational capability
- d) Insufficient policy instruments including master plan and standards
- e) Lack of M&E system for urban forestry program.

3.9.2 Social and political

- a) Vandalism/indifference or apathy by the public
- b) Uncontrolled squatting / encroachment
- c) Improper use of street corridors
- d) Damage or removal of trees during infrastructure development
- e) Land use conflicts/lack of proper zoning
- f) Lack of tree protection ordinances or laxity in implementation of existing laws.
- g) Ineffective urban population and migration control programs

3.9.3 Biophysical and technical

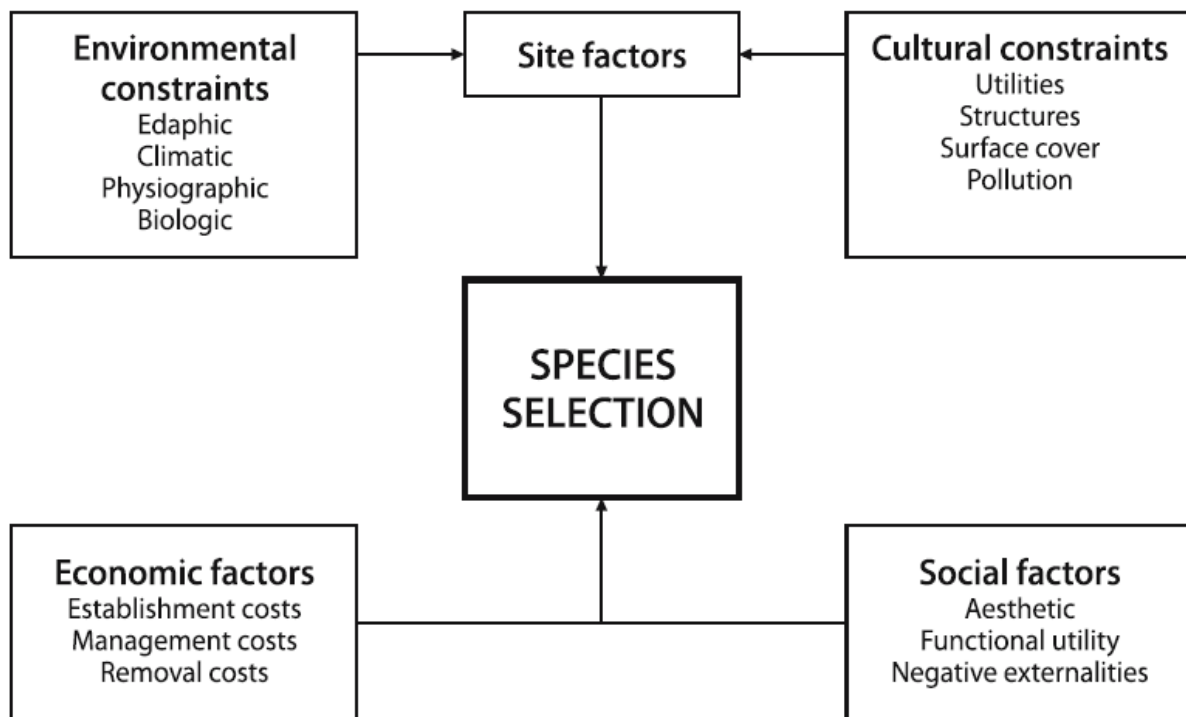
- h) Lack of water during summer
- i) Unsuitable soil physical and chemical properties
- j) Poor species-site compatibility
- k) Incompatible design of drainage systems and other underground utilities

1) Lack of maintenance, protection and monitoring of growth/survival

Chapter 4: Urban Forests Establishment and Management Standards

4.1 Species Selection Standards

Choice of species with proper genotype is important because trees need to be healthy and vigorous for proper functioning. A common problem is that some species are over-used. A model can be used to secure species diversity and to protect them against possible insect attacks and diseases. For maximum protection against such conditions, the urban forest should contain no more than 10% of any single tree species, no more than 20% of species in any tree genus and no more than 30% of species in any tree family. For street trees, we suggest that within a species, several clones should be used in the city, if at all possible. We have recommended some species (Annex 6) after the analysis of naturally occurring species of the region, the site condition and the climate. We strongly recommend to update the annex 6 with technical support from Species Recommendation Committee. The process for selecting species for urban uses may be facilitated using a Species Selection Model as shown in the figure below.



The following standards are to be used in selection of species:

- The main selection criteria are climatic adaptation (growth rhythm, adaptation to high and low temperatures, winter survival and tolerance of water stress), growth and exterior

characters, incorporation of functional properties (plants for shade, wind shelter, playground elements, aesthetic elements, etc.) and resistance against pests and diseases.

- Cooperation with nurseries, architects and city planners is both desirable and necessary.
- Untraditional species should be tested, selected and demonstrated for planners and practitioners.
- Pragmatic selection programs are the cheapest alternative and can make use of plant materials in production. Exploration of existing collections in parks, arboreta, botanical gardens, private gardens, road plantings and landscape may be used to broaden the use of species and genotypes.
- In a tree improvement program, several populations, preferably comprising a broad gene pool should be maintained and explored. The aim should be the dynamic selection and breeding of genotypes.
- Involvement of the professionals with sound knowledge in plant characteristics and site properties is required for the successful implementation of the urban forestry development plan.
- Selection of plant species depends upon the objectives of the urban forest development program and the locational condition of the proposed site.
- Native species with suitable traits for the site conditions and the climate should be identified. Local species can be best adapted in local environment and it also contributes to conserve local biodiversity along with the culture.
- Species or cultivars with inherently resilient characteristics should be selected to cope the harsh city environment.
- If the tree is large, the branching property should be ascending.
- Select the species of taproot system. Avoid the species of fibrous root system especially for roadside plantation.
- Avoid the species that produces prop-roots, areal roots and form buttress for roadside plantation.
- Avoid the species that produce long horizontal branches for street plantation.
- Species to plant at median area should be small or medium height with ornamental values and capable to withstand with space constraints for branches and root at mature age.

- In case of plantation under high voltage transmission lines or cable lines, the species that will not attain the height exceeding the cable/wire height at mature stage.
- Choose the suitable species listed in annex 6.
- Consult the Species Recommendation Committee for new species other than listed in the guidelines has to use.

4.2 Plant/Seedling/Sapling Quality Standards

- Select the high-quality planting materials without any damages, infections, and with sufficient number of healthy leaves.
- In general, plants with the minimum height of 6 ft. or above at the time of plantation should be used for street site plantation and at least 3 ft. or above height, according to the species characteristics, should be used for other sites.

4.3 Site Preparation Standards

- Site evaluation: The planners should visit the plantation sites to assess the site condition such as the light, aspect, slope, depth of soil, pH, drainage, and other essential soil properties. It will also help to know the site suitability for the proposed plant species.
- Site condition modification: The changes might need to be made at the site to make it suitable for the plantation. . Improving drainage system, compost and other fertilizer application, changing soil pH may help to establish the seedlings.
- Avoid the sites with hard rocks with no soil.
- Select the site with at least 3 feet depth of soil.

4.4 Plantation standards

- If the road is constructed on the embankment, the trees should be planted as possible as high on the sides of the embankment.
- In the case of water-logged area, the trees should be planted on sufficient high ground.
- The tree should be planted in such a way that gives better shade on the carriageway throughout the year. Staggered way is most preferable for the planting of trees on the roadside.
- Trees should be planted on both sides of the road and in the dividers

- Urban forestry developers should select the rainy season for plantation purpose. With the irrigation facilities and species characters, plantation can be organized in other seasons also.
- Pits for plantation should be dug at the space behind the pathway so that the branches do not reach to the roadways at mature stage.
- A sufficient distance from hard and other structures should maintain to avoid the potential damages that may occur due to branching nature of the tree.
- Root barriers should install at the side where the structures of other utilities are constructed to avoid the possible damages.

4.5 Pruning and Shade Management Standards

- Tending operations such as mulching, weeding, watering, fertilization, pruning and thinning must be conducted regularly after planting to the mature age.
- In case of trees of park areas grown for shade, should lightly prune up to 8 feet height to give clear walking space.
- Trees with bird nests and used by other animals for rearing their offspring should not be pruned for that season.

4.6 Plant/Seedling/Sapling Replacement Standards

- Replacement plantation should be made immediately after removing the trees i.e. dead or any hazard trees.
- The species for replacement plantation should be selected from the list provided in annex 6.
- Use the same species at the place of removed tree.
- Plant the tree as close to the location of the tree that was removed.
- Plant the replacement tree not closer than 10 feet from the existing trees.

4.7 Traffic and Pedestrian Management Standards

- Street trees must be managed in such a way that the branches, roots and tree trunk should not disturb the street users including vehicles and walkers.
- At least 5-8 feet of clearance should be made above pathways.

- Roadside trees should be pruned at least up to 6 m height to give a clear and safe open space to the vehicles (as maximum vehicle height in Nepal is 4.5 m) and to give a clear sight to the traffic signals.
- The standard height of traffic lights in Nepal is 30 ft. (approximately 10 m). If possible, plantation should not be done near to the traffic lights or if there is, then they should be pruned up to the height to give clear sight to the traffic lights.
- At least 10 feet of distance should be maintained with street light. In case of way corner street lights, minimum distance should be of 20 feet.
- At crossing points such as zebra crossing, open space of certain distance should be maintained at both sides of the points to give a clear visibility to the vehicle riders.
- At turning points and at the corners of cross-roads, trees should not be planted. If plants need to be planted, then sparsely and of low height plant species should be used.

4.8 Stakeholders' Engagement Standards

- All related stakeholders should be involved in all stages of urban forest development including planning, implementation, monitoring and evaluation.
- A committee with the following composition should be formed for policy and strategic guidance, and national and international coordination. The committee should have the right to add members from experts and other organizations
 - Secretary, Ministry of Forests and Environment, Coordinator
 - Director General, Department of Environment, Member
 - Director General, Department of Forest Research and Training Center, Member
 - Secretaries, Ministry of Industry, Tourism, Forest and Environment of seven provinces, Members
 - Director General, Department of Roads, Member
 - Director General, Department of Urban Development and Building Construction, Member
 - Director General, Department of Agriculture Development, Member
 - Representative, Municipal Association of Nepal, Member
 - Representative, National Association of Rural Municipality in Nepal, Member
 - Chairperson, Floriculture Association of Nepal, Member

- Director General, Department of Forests and Soil Conservation, Member
- An implementation committee as referred below should be formed for operation level planning, and implementation. This committee should provide implementation support to the local governments. The committee should have the right to add members as experts and representatives from related organizations.
- Mayor/Chairperson, Metropolitan/Sub-metropolitan/Municipality/Rural Municipality, Coordinator
- Chief, Agriculture Knowledge Center, Member
- Chief, Division Road Office, Member
- Chief, Division Building Office, Member
- Chairperson, Floriculture Association of Nepal District Committee, Member
- Expert, appointed by coordinator, Member
- The committee can decide to add members from Community-Based Forest Management Groups/Federations
- Division Forest Officer, Division Forest Office, Member Secretary
- A Species Recommendation Committee with the following composition should be formed for Regular updating the species (annex 6) at local context. The committee should have the right to add members from experts.
- Representative, Officer appointed by Divisional Forest Officer
- Representative, Officer appointed by Floricultural Association of Nepal District Chapter
- Representative, Officer appointed by Local Government
- Urban Forest Development demands contributions of different stakeholders for various activities. An engagement plan should be made with defined roles and responsibilities for all stakeholders. The engagements can be divided spatially or temporarily.
- Depending on the type (such as road site) and location, the newly planted area should be provided to neighboring community/household for protection purposes of the trees by allowing them to use the space between the trees for limited crop productions for certain period of time without any harm to the trees.

4.9 Trees Removal Standards

The hazard trees (death, dying with insufficient live foliage, branches, roots, or other tissue to sustain life, infested with pests or disease, has sustained physical damage,

potential to damage public properties) of urban forests developed under government owned lands, should be removed based on Government Trees Removing Criteria, 2071 (रकारी रुख हटाउने मापदण्ड, २०७१).

- The hazard trees of private land can be removed after the approval from forest authority and concern municipality. All safety measures should be taken.

4.10 Standards on Ecology and Biodiversity Maintenance

Urbanization could be an entry point to introduce the exotic species whose spread into natural ecosystems may threaten the conservation of local biodiversity. So, following considerations in urban forestry development plan may help to conserve local biodiversity.

- Select the native species suitable and adaptable to the site conditions.
- Use different tree species to plant. A single species can be used for street plantation to give a homogeneous view to the streetscapes but use of various species would be advantageous for park or patch of forest development.
- Trees of different genera, families, species, sizes, and ages should be used to achieve the range of ecosystem services including climate change adaptation and mitigation
- Select the tree species that produce edible fruits for birds and other animals.
- Trees used by birds and other wild animals for nesting and offspring rearing purposes should not be disturbed with any kind of tending activities.
- Trees at the site of water resources and other vulnerable landslides should not be removed until they possess for human life and properties.
- The patches of natural forests in urban areas should be kept undisturbed for the continuation of the ecosystem services.
- Use the same species as replacement plant in the place of removed trees and maintain the number of tree species.
- In park area or around the pond or riverside areas, suitable understory species should be used under existing or future top layer tree.
- Encourage local residents to plant the indigenous trees in their backyards or other remaining lands. The governments (local, provincial or central) may need to provide any incentives as encouragements.

- Plan to develop the urban forests in such a way that it can fulfil the need of connectivity between two or more natural forests that can facilitate for easy movements of animals from one point to another and enhance the genetic exchange.

4.12 Safety and Security Standards

- Different kinds of fencing can be used to protect the plantation sites or suitable tree-guards can be used for individual tree protection mainly for street site plantation.
- Tree care takers or nearby households or community groups can be used to arrange the protection mechanism. Depending on the type (such as road site) and location, the newly planted area should be provided to neighboring community/household for protection purposes of the trees by allowing them to use the space between the trees for limited crop productions for certain period of time without any harm to the trees.
- Concern authorities including municipality, forest offices and road related offices should form a team to monitor the sites and to determine the risky trees to remove. The individual people can also inform the concern authorities about the hazardous trees to take the required actions.
- People should be informed by using appropriate extension measures about no harm to trees and legal provisions for illegal actions.
- Decayed and death branches and hazardous trees should be removed timely and safely.
- Trained professionals should be involved involve in cutting and removing the branches and trees.
- Workers must be well equipped with all required tools and safety gears. Insurance of the workers is a must criterion.
- People should be well informed about the work using information boards or other signal giving tools or by using few workers at certain distance.
- If possible, another alternative way should be given to the pedestrians and vehicle riders if the work is risky for the people and time taking.
- Fell the trees at another side than roadside. If not, better to fell down at the sides parallel to the road applying the all-safety measures.

Annexes

Annex 1: References

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Annex 2a: Checklist for Personal Meetings and Key Informant Interviews

वन अनु न्धान तथा तालिम केन्द्र / इन्टरनेशनल डेभलपमेन्ट पार्टनरी प इन्क्परेटेड

हरी वन विका तथा व्यवस्थापन मापदण्ड तयार

नमस्कार । हामी ICDPI बाट वन अनु न्धान तथा तालिम केन्द्रको आर्थिक वर्ष २०७७/०७८ को स्वीकृत वार्षिक कार्यक्रम अन्तरगत हरी वन विका तथा व्यवस्थापन मापदण्ड तयार गर्ने ि ली लामा तपाईं ग उपस्थित भएका छौं । यहाँले दिनुभएको जानकारी तथा ूचनाले नेपालका हरी क्षेत्रमा वनको विका तथा व्यवस्थापनका मापदण्ड बनाउन हयोग पुग्नेछ । हामीले तपाईंले दिएको ूचना तथा जानकारीहरूलाई मापदण्ड बनाउने प्रयोजनको लागि मात्र प्रयोग गर्नेछौं । थै यी ूचना तथा जानकारीहरूलाई अन्य प्रयोजनमा प्रयोगमा ल्याउने छैनौं ।

भेक्षकको नाम:

भेक्षण मिति:

उत्तरदाताको नाम

उत्तरदाता म्लग्न निकाय:

उत्तरदाताको पद:

उत्तरदाताको म्पर्क नम्बर:

१. हरी वनाको अवस्था कस्तो छ ?
२. हरी विका र हरी वनलाई एक आप मा मायोजन गरी विका गरिएको नेपालका कुनै हर वा य को कुनै खा भाग भेट्टाउन ुभाव दिनुहुन्छ ? त्यहाका खा विषेशता के छन् ?
३. हरी वन विका म्बन्धि नीति तथा कानुन छन् ? छन् भने के के हुन् ? (टिपोटकताले प्रत्येक नीति तथा कानुनका प्रमुख विषेशता नोट गर्ने)
४. हरी वनका प्रकार :
पार्क घर बगैचा पोखरी वरिपरि डक किनार ब्लक वन फाट्टफुट्ट रुख अन्य
५. हरी वनका रोकवारवालाहरु को को हुन् ? तिनीहरुको भूमिका के के होला ?
६. हरी वनबाट के के फाइदा प्राप्त भएका छन ? त्य को वितरण क री हुन्छ ?
७. हरी वन स्थापना गर्ने प्रमुख दायित्व क को हा ? किन ?
८. हरी वन व्यवस्थापन गर्ने प्रमुख दायित्व क को हो ? किन ?
९. हरी वन विका का चुनौती के के हुन ? तथा अव र के के छन ?
१०. हरी वनमा कस्ता प्रकारका विरुवाका प्रजाति रोपिएका छन् ? यी प्रजाति रोप्नुको कारण के हुन ब्छ ?
११. हरी वनमा कस्ता प्रकारका विरुवा रोप्नु पर्ला ?
१२. हाल प्रचलनमा रहेका हरी योजना निर्माण तथा हरी वन विका म्बन्धी प्रया हरुमा यहाँका ुभाव ?
१३. हरी वनले निम्त्याउने /निम्त्याएका खतराहरु के के हुन् ?
१४. यी खतरा क री न्यूनिकरण गर्न किन्छ ?
१५. हरी वनमा भू-स्वामित्व र रुखको अधिकारलाई क री परिभाषित गर्न किएला ?
१६. हरी विका गर्दा हरी वनलाई क री मायोजना गर्न किएला ?
१७. हरी वन विका का अन्य चुनौति के के होलान् ?
१८. यी चुनौतीलाई क री घटाउन किएला ?
१९. हाल हरी क्षेत्रमा रुखहरुको व्यवस्थापन क री गरिन्छ ?
२०. यो व्यवस्थापनमा यहाँका ुभाव के हुन क्लान् ?

यहाँको मयको लागि धन्यवाद !

Annex 2b: Checklist for Focused Group Discussions

वन अनु न्धान तथा तालिम केन्द्र / इन्टरनेशनल डेभलपमेन्ट पार्टनरी प इन्क्पोरेटेड

हरी वन विका तथा व्यवस्थापन मापदण्ड तयार

नमस्कार । हामी ICDPI बाट वन अनु न्धान तथा तालिम केन्द्रको आर्थिक वर्ष २०७७/०७८ को स्वीकृत वार्षिक कार्यक्रम अन्तरगत हरी वन विका तथा व्यवस्थापन मापदण्ड तयार गर्ने ि ली लामा तपाईं हरंग उपस्थित भएका छौं । यहांहरुले दिनुभएको जानकारी तथा ूचनाले नेपालका हरी क्षेत्रमा वनको विका तथा व्यवस्थापनका मापदण्ड बनाउन हयोग पुग्नेछ । हामी तपाईंहरुले दिएको ूचना तथा जानकारीहरुलाई मापदण्ड बनाउने प्रयोजनको लागि मात्र प्रयोग गर्नेछौं । तथै यी ूचना तथा जानकारीहरुलाई अन्य प्रयोजनमा प्रयोगमा ल्याउने छैनौं ।

र्क्षकको नाम: र्क्षण मिति: जम्मा हभागी: महिला: पुरुष म्पर्क
व्यक्तिको नाम: म्पर्क व्यक्तिको नम्बर:
FGD भएको नपा: वडा नं: टोल

१. हरी वनका प्रकार (नगर क्षेत्रमा बैभन्दा बढी भएको आधारमा प्राथमिकताको निर्धारण गरी १, २ लेख्ने आधारमा देख्ने)
पार्क घर बगैचा पोखरी वरिपरि डक किनार ब्लक वन फाट्टफुट्ट रुख अन्य
२. तपाईंहरुलाई हरी क्षेत्रमा रुख विरुवा तथा वनको आवश्यकता किन छ ? यस्ता रुख विरुवा र वनको प्रयोग के मा भएको छ (प्रयोगको महत्वको प्राथमिकताको आधारमा क्रमश लेख्ने) ?
३. य नगर क्षेत्रमा कुन कुन विरुवा कस्तो कस्तो क्षेत्रमा रोपिएको छ ?
४. विरुवा रोप्ने काम क ले गर्ने गरेको छ ?
५. विरुवा रोप्दा तपाईंहरुको भूमिका के हुने गरेको छ ?
६. विरुवा कहांबाट ल्याउने गरेको छ ?
७. हरी वन विका तथा रक्षणका चुनौतिहरु के के हुन क्छन् ?
८. हरका कस्ता स्थानमा कति म्म उचाईका रुख छन् ?
९. रुखका हांगा आफै भर्छन् कि काटनु पर्छ ?
१०. काट्ने गरेको छ भने लगभग कति माथि म्मका हांगा काट्ने गरेको छ ?
११. हरमा कस्ता स्थानमा भएका रुखका हांगाहरु क री फैलिएका छन् ?
१२. यस्तो फैलावट भएका रुखको के कस्ता फाइदा र के कस्ता बेफाइदा रहेका हुन्छन् ?
१३. रुख विरुवा तथा वनको व्यवस्थापन क ले गर्ने गरेको छ ? क ले गर्दा उपयुक्त होला ?
१४. हरी वनले निम्त्याएका कुनै खतरा छन् कि ? छन् भने के छन् ?
१५. वर्तमान नीति तथा कानुनले केहि अप्ठ्यारा पारेको छ कि ?
१६. हरी वन विका तथा व्यवस्थापनमा कुन रोकारवालाको कस्तो भूमिका छ ?
१७. हरी वन विका तथा व्यवस्थापनमा कुन रोकारवालाको कस्तो भूमिका हुनुपर्छ ?

यहांहरुको मयको लागि धन्यवाद !

Annex 2c: Checklist to discuss with Local Governments

वन अनु न्धान तथा तालिम केन्द्र / इन्टरनेशनल डेभलपमेन्ट पार्टनर्री प इन्क्पोरेटेड

हरी वन विका तथा व्यवस्थापन मापदण्ड तयार

वैक्षकको नाम:	वैक्षण गरेको मिति:				
विवरण उपलब्ध गराउने व्यक्तिको नाम:	पद:				
स्थानिय तहको नाम:	जम्मा वार्ड ंख्या:				
जन ंख्या:	जम्मा:				
महिला:	पुरुष:				
दलित:	जनजाति:	मधेशी:	मूस्लिम:	अन्य (ब्रह्ममण, क्षेत्री, ठकुरी):	
घरधुरी ंख्या:	दलित:	जनजाति:	मधेशी:	मूस्लिम:	अन्य:

१. स्थानीय तहले आफै बनाएका तलका मध्ये कुन कुन नीति, कानुन तथा नियम छन् ?
 - क) वन रक्षण तथा व्यवस्थापन म्वन्धि नीति, रणनीति (अल्पकालिन तथा दीर्घकालिन) योजना तथा ऐन
 - ख) भूउपयोग योजना तर्जुमा गरेको र कार्यान्वयन गरेको छ ?
 - ग) र्वजनिक जग्गा जस्तै खोला किनारा, नदी किनार पोखरीको डिल, पार्क, आदिको रक्षण तथा व्यवस्थापन म्वन्धि कुनै योजना, रणनीति, नीति, कानुन तथा नियम छ ?
 - घ) जलवायु परिवर्तनको अनुकुलन म्वन्धि नीति तथा योजना ?
 - ङ) जलवायु परिवर्तनको न्यूनीकरण म्वन्धि नीति तथा योजना ?
 - च) वातावरण रक्षण म्वन्धि नीति, रणनीति, एने, नियम तथा योजना ?
 - छ) भू तथा जलाधार म्वन्धि नीति, रणनीति, एने, नियम तथा योजना ?
 - ज) प्राकृतिक तथा मानवजन्य प्रकोप रोकथाम तथा नियन्त्रण म्वन्धि भू तथा जलाधार म्वन्धि नीति, रणनीति, एने, नियम तथा योजना ?
 - झ) हरी वन म्वन्धि नीति, रणनीति, एने, नियम तथा योजना ?
 - ञ) वन म्वन्धि रोग, किरा तथा Invasive Alien Plant Species (IAPS) रोकथाम र नियन्त्रण म्वन्धि नीति, रणनीति, एने, नियम तथा योजना ?
 - ट) म्वन्धित अन्य (लेख्ने)
२. हरी वन विका तथा व्यवस्थापनका लागि यहांबाट कौलाई विशेष जिम्मेवारी दिइएको छ ?
३. वर्तमान अवस्थामा य नगरमा हरी वनको आवश्यकता किन र के छ ?
४. हरी वनका प्रकार (नगर क्षेत्रमा बैभन्दा बढी भएको आधारमा प्राथमिकताको निर्धारण गरी १, २ लेख्ने आधारमा देख्ने)

पार्क घर बगैचा पोखरी वरिपरि डक किनार ब्लक वन फाट्टफुट्ट रुख अन्य
५. य नगर क्षेत्रमा कुन कुन विरुवा कस्तो कस्तो क्षेत्रमा छन् ?
६. य तहको हरी क्षेत्रमा रुख विरुवा तथा वनको आवश्यकता किन छ ? यस्ता रुख विरुवा र वनको प्रयोग के मा भएको छ (प्रयोगको महत्वको प्राथमिकताको आधारमा क्रमश लेख्ने) ?
७. य नगर क्षेत्रमा कुन कुन विरुवा कस्तो कस्तो क्षेत्रमा छन् ?
८. रोपण क ले गर्ने गरेको छ ?
९. रोपण गर्ने विरुवा कस्तो प्राकारको हुने गरेको छ (bare root, cutting, seedling, direct showing, polythene seedling etc)
१०. विरुवा ामान्यतया कति वर्षको, कति उचाईको हुने गरेको छ ?
११. रोपणको लागि विरुवा कहांबाट ल्याउने गरेको छ ?

१२. कस्तो स्थानमा कतिको दुरीमा रोपण गर्ने गरिएको छ (जस्तै डक किनार, व्यक्तिगत बगैचा, पार्क, खोला छेउ आदि) ?
१३. रुखका हांगा आफै भर्छन् कि काट्नु पर्छ ?
१४. काट्ने गरेको छ भने लगभग कति माथि म्मका हांगा काट्ने गरेको छ ?
१५. हरी वन विका तथा रक्षणका चुनौतिहरु के के हुन व्छन् ?
१६. हरी वन विका तथा व्यवस्थापनमा कुन रोकारवालाको कस्तो भूमिका छ ?
१७. हरी क्षेत्रका कुन स्थानमा कुन प्रकारको मोडल मार्फत हरी वनको विका तथा व्यवस्थापन गर्न किएला?
१८. घीय, प्रादेशिक वा आफ्नै स्थानीय तहका नीति, एने तथा कानुनले केही अप्ठ्यारो पारेका छ ?
१९. हरी वनले निम्त्याएका कुनै खतरा छन् कि ? छन् भने के छन् ?
२०. स्थानीय तहले हरी वन विका का लागि गरेका प्रया तथा कार्यहरु ?
२१. अन्य निकाय ले हरी वन विका का लागि गरेका प्रया तथा कार्यहरु ?
२२. यस्ता खतरा न्यूनीकरण गर्न स्थानीय तहको भूमिका के हुन क्ला ?
२३. हरी वनका अव र तथा चुनौती के के हुन् ?

यहांहरुको मयको लागि धन्यवाद !

Annex 2d: Checklist to discuss with Division Road Offices

वन अनु न्धान तथा तालिम केन्द्र / इन्टरनेशनल डेभलपमेन्ट पार्टनरी प इन्क्पोरेटेड

हरी वन विका तथा व्यवस्थापन मापदण्ड तयार

वैक्षकको नाम:

वैक्षण गरेको मिति:

विवरण उपलब्ध गराउने व्यक्तिको नाम:

पद:

जिल्ला

१. हरी क्षेत्रमा वन विका को लागि डक कार्यालयको के भूमिका रहेको छ ?
२. हरी क्षेत्रमा रहेका वन व्यवस्थापनमा डक कार्यालयको के भूमिका रहेको छ ?
३. हरी क्षेत्रमा वन तथा रुखको विका कहाँ र क री गर्न किन्छ ? अहिलेको अवस्था के छ ?
४. डक, वन, खानेपानी तथा ढल निर्माण जस्ता विभिन्न निकायको आपी म्वन्ध र मन्वय कस्तो छ ?
५. हरी डक निर्माणमा रुख तथा वन क्षेत्र विका , रक्षण तथा व्यवस्थापनको पाटो क री लिएर जान किएला ?
६. डक निर्माण तथा स्तरोन्नती गर्नका लागि कस्ता गुण भएका रुख विरुवा उपयुक्त हुन्छन् ?
७. के डक कार्यालय आफैले पनि हरी क्षेत्रमा रुख विरुवा रोपण गर्दछ ? यदि गर्दछ भने विरुवाका जात, प्रकार, उचाइ, तथा विरुवा ल्याउने स्थान
८. हरी क्षेत्रका रुख जोगाउन डक कार्यालयका मस्या के हुन् ? क री माधान गर्न किएला ?
९. हरी वन तथा रुख स्थापना तथा व्यवस्थापनका अव र तथा चुनौति के के छन् ?

यहांको मयको लागि धन्यवाद !

Annex 2e: Checklist to discuss with Division/Sub-Division Forest Offices

वन अनु न्यान तथा तालिम केन्द्र / इन्टरनेशनल डेभलपमेन्ट पार्टनरी प इन्क्पेरिटेड

हरी वन विका तथा व्यवस्थापन मापदण्ड तयार

वैक्षकको नाम:	पद:	कार्यालय:	वैक्षण गरेको मिति:
विवरण उपलब्ध गराउने व्यक्तिको नाम:	पद:		जिल्ला
१. वर्तमान अवस्थामा हरी वनको आवश्यकता किन र के छ ?			
२. हरी वनका प्रकार (नगर क्षेत्रमा बैभन्दा बढी भएको आधारमा प्राथमिकताको निर्धारण गरी १, २ लेख्ने आधारमा देख्ने)			
पार्क <input type="checkbox"/> घर बगैचा <input type="checkbox"/> पोखरी वरिपरि <input type="checkbox"/> डक किनार <input type="checkbox"/> ब्लक वन <input type="checkbox"/> फाट्टफुट्ट रुख <input type="checkbox"/> अन्य <input type="checkbox"/>			
३. हरी क्षेत्रमा कस्ता प्रकारका रुख विरुवा कस्तो ठाउँमा रहेका छन् ?			
४. हरी क्षेत्रमा रुख विरुवा तथा वनको आवश्यकता किन छ ? यस्ता रुख विरुवा र वनको प्रयोग के मा भएको छ (प्रयोगको महत्वको प्राथमिकताको आधारमा क्रमश लेख्ने) ?			
५. रोपण क ले गर्ने गरेको छ ?			
६. रोपण गर्ने विरुवा कस्तो प्रकारको हुने गरेको छ (bare root, cutting, seedling, direct showing, polythene seedling etc)			
७. विरुवा ामान्यतया कति वर्षको, कति उचाईको हुने गरेको छ ?			
८. रोपणको लागि विरुवा कहाँबाट ल्याउने गरेको छ ?			
९. कस्तो स्थानमा कतिको दुरीमा रोपण गर्ने गरिएको छ (जस्तै डक किनार, व्यक्तिगत बगैचा, पार्क, खोला छेउ आदि) ?			
१०. कस्तो प्रकारको हावापानी, माटो, मोहोडा, पानीको मात्रा आदी मा कुन कुन प्रजातीका विरुवा लगाउने गरेको छ ?			
११. हरी वनका लागि उपयुक्त प्रजातीको :			
क) हांगा फैलावटको तरिका, ख) जराको गहिराई, ग) काण्डको दरिलोपन, घ) मुना आउने क्षमता			
ङ) प्रकाशको आवश्यकता, च) उपयोगिता, छ) फल तथा फूल, ज) रुखको उचाइ			
१२. ामान्यतया प्रति य वटा विरुवा रोपण गर्न कति खर्च लाग्छ ?			
१३. विरुवा रोपणको लागि जमिन तयारी क री गर्ने गरिन्छ ?			
१४. रक्षण के के क री गर्ने गरिएको छ ?			
१५. हरी वन विका तथा रक्षणका चुनौतिहरु के के हुन व्छन् ?			
१६. हरी वन विका तथा व्यवस्थापनमा कुन रोकारवालाको कस्तो भूमिका छ ?			
१७. हरी वनका अव र तथा चुनौतीहरु के रहेका छन् ?			
१८. हरी वनले निम्त्याएका कुनै खतरा छन् कि ? छन् भने के छन् ?			
१९. यस्ता खतरा क रि कम गर्न किएला ?			
२०. घीय, प्रादेशिक वा स्थानीय तहका नीति, एने तथा कानुनले केही अप्ठ्यारो पारेका छ ?			
२१. हरी क्षेत्रका कस्ता स्थानमा कुन प्रकारको मोडलम हरी वनको विका तथा व्यवस्थापन गर्न किएला ?			

यहाँको मयको लागि धन्यवाद !

Annex 3: List of Key Informants

SN	Name	Related municipality	Contact number	Address	Position	Sex
1	Balaram Pokharel	Butwal	9847059047	Tilottama SDFO, Ramnagar, Butwal	AFO	Male
2	Raju Prasad Bhandari	Tilottama	9847480856	Tilottama SDFO, Ramnagar, Butwal	Ranger	Male
3	Prabin Bidari	Butwal	9845022799	Forest Research and Training Center, Lumbini province, Butwal	Director	Male
4	Yogesh Chapagain	Butwal	9843903451	Butwal Sub-Metropolitan Office	Environmental Engineer	Male
5	Ajaya Gupta	Tilottama	071-560205	Gupta Nursery	Proprietor	Male
6	Sanyog Basnet	Butwal	071-547474	MoITFE, Lumbini Province	AFO	Male
7	Dipak Gyawali	Butwal	071-547474	MoITFE, Lumbini Province	Spokesperson	Male
8	Sanjaya Tiwari	Butwal	9864327229	PFD, Lumbini	Deputy Director	Male
9	Nabin Shrestha	Tilottama	9845408155	PCTMCDB, Butwal	Soil and Watershed Conservation Officer	Male
10	Roshana Pokhrel	Kathmandu	9841438290	SDFO, Lainchaur, Kathmandu	AFO	Female
11	Kyam Raj Tiwari	Kathmandu	9851099812	Kathmandu Ward no. 26	Chairperson	Male
12	Pradep Bagale	Kathmandu		Nepal Scout Society	Assistant Director	Male
13	Bishnu Mainali	Kathmandu	9821218682	Namuna Garden, Sinamangal, Pepsicola	Chairperson	Male
14	Rabi Raj Thapaliya	Kathmandu	9851299992	Nepal Conflict Control Police Branch	DSP	Male
15	Badri Kumar Karki	Kathmandu	9851193986	DFO, Kathmandu	DFO	Male
16	Januka KC	Bharatpur		Bharatpur Metropolitan Office	Officer 6 th	Female
17	Om Sagar Bhandari	Bharatpur	9849468463	DFO, Chitwan	AFO	Male

SN	Name	Related municipality	Contact number	Address	Position	Sex
18	Shubharaj Neupane	Dhankuta	9851072438	Department of Roads	Senior Divisional Engineer	Male
19	Sujan Maharjan	Kathmandu	9856051695	DoFSC	Under Secretary	Male
20	Bhuwan Mani Sharma	Dhankuta		DFO, Dhankuta	Ranger	Male
21	Bikram Amatya	Dhankuta		DFO, Dhankuta	Officer 6 th	Male
22	Narendra Guragain	Morang		DFO, Morang	Officer 6 th	Male

Annex 4: Focused Group Discussions

SN	Name	Related Municipality	Contact Number	Institution	Sex
1	Uma Devi Chhetri	Butwal	9866622699	Community people	Female
2	Gita Gyawali	Butwal	9847191764	Community people	Female
3	Yamuna Kaucha	Tilottama	9847092465	Community people	Female
4	Deu Prasad Pun	Tilottama	9847057981	Community people	Male
5	Ram Krishna Wagle	Butwal		Community people	Male
6	Harihar Khanal	Butwal		Community people	Male
7	Achyutam Prasad Acharya	Butwal	9857029975	Community people	Male
8	Laya Kisan Thapa	Tilottama	9857038196	Community people	Male
9	Rupesh Maharjan	Butwal		Community people	Male
10	Arun Bhandari	Tilottama		Community people	Male
11	Rajendra Rijal	Butwal	9847034712	Community people	Male
12	Sabita Magar	Tilottama		Community people	Female
13	Purna kala Parajuli	Butwal	9811575939	Community people	Female
14	Ajaya Gupta	Tilottama	071-560205	Gupta Nursery	Male
15	Arun Shakya	Kathmandu		Community people	Male
16	Macha Kaji Maharjan	Kathmandu		Community people	Male
17	Yamuna Shrestha	Kathmandu		Community people	Female
18	Suryaman Dangol	Kathmandu		Community people	Male
19	Manju Khadka	Kathmandu		Community people	Female
20	Kabita Thapa	Manamaiju		Community people	Female
21	Shyam Kumar Maharjan	Kathmandu		Community people	Male
22	Kedar Prasad Dangal	Kathmandu		Community people	Male
23	Gokarna Prasad Aryal	Kathmandu		Community people	Male
24	Keshab Pradas Thapaliya	Kathmandu		Community people	Male
25	Ram Raj Panta	Kathmandu	9849258724	Community people	Male
26	Kush Karki	Kathmandu		Community people	Male
27	Roshana Pokharel	Kathmandu	9841438290	Sub-Division Forest Office, Lainchaur	Female
28	Mukunda Marasini	Kathmandu		Community people	Male
29	Lila Ballabh Bhushal	Bharatpur	9845088622	Community people	Male
30	Shobhakhar Kandel	Bharatpur	9845050920	Community people	Male
31	Ram Bahadur Gurung	Bharatpur	9861140510	Community people	Male
32	Bal Krishan Paudel	Bharatpur	9855050405	Community people	Male
33	Kumar Gurung	Bharatpur	9845244626	Community people	Male

SN	Name	Related Municipality	Contact Number	Institution	Sex
34	Khumlal Upadhyaya	Bharatpur	9845032759	Community people	Male
35	Sita Khanal	Bharatpur	9845206145	Community people	Female
36	Liladhar Gaire	Bharatpur	9845219902	Community people	Male
37	Harikrishna Bhattarai	Bharatpur	9851127314	Community people	Male
38	Shyam Bahadur Malabu	Bharatpur	9845665398	Community people	Male
39	Rishiram Adhikari	Bharatpur	9855064486	Community people	Male
40	Suraj Pratap Rana	Bharatpur	9855046126	Community people	Male
41	Ghanashyam Sapkota	Bharatpur	9845330185	Community people	Male
42	Resham Nepali	Bharatpur	9821273670	Community people	Male
43	Saroj Ghimire	Dhankuta		Provincial Forest Directorate	Male
44	Bhuwan Mani Sharma	Dhankuta		Division forest office, Dhankuta	Male
45	Dayaram Rai	Dhankuta		Community people	Male
46	Sewak Karki	Dhankuta		Community people	Male
47	Hari Maya Rai	Dhankuta		Community people	Female
48	Narayani Basnet Khadka	Dhankuta		Community people	Female
49	Dhurba Rai	Dhankuta		Community people	Male
50	Pasang Tamang	Dhankuta		Community people	Male
51	Liladhar Nemwang	Dhankuta		Community people	Male

Annex 5: List of Observed Sites

1. Koteswor-Satdobato road in Kathmandu and Lalitpur
2. Baneshwor-Maitighar road in Kathmandu Metropolitan, Kathmandu
3. Gupta Nursery, Tilottama Municipality, Rupandehi
4. Hill Park, Butwal Sub-Metropolitan, Rupandehi
5. Butwal-Bhairahawa road, Rupandehi
6. Kuleswor Aawas, Kuleswor, Kathmandu Metropolitan, Kathmandu
7. Balkumari-Maitighar Bagmati corridor, Kathmandu and Lalitpur
8. Tripureswor-Balkhu road, Kathmandu Metropolitan Kathmandu
9. Namuna Garden Block 5, Pepsicola, Sinamangal, Kathmandu Metropolitan, Kathmandu
10. Narayani River corridor, Bharatpur Metropolitan, Chitwan
11. Green Park Malpotchok, Bharatpur Metropolitan, Chitwan
12. Dharan Road, Dhankuta municipality, Dhankuta
13. , Arjun and Khadka Nurseries, Seule, Dhankuta
14. Namuna Children Park, Dhankuta Municipality, Dhankuta

Annex6: Recommended Species

Species recommended for road side plantation

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
बबुल	<i>Acacia nilotica</i>	Gum arabic tree	3 × 3	up to 1200	Exotic	An intolerant, drought resistant tree. It is relatively fast-growing species.
ढेतो फि र	<i>Albizia procera</i>	Tree-coma	6 × 6	up to 1350	Indigenous	Fast-growing, semi-deciduous, light-demanding and fairly drought-tolerant species and can grow well on shallow soils.
एरेजकेरिया	<i>Araucaria spp.</i>		3 × 3	up to 1900	Exotic	Shade-tolerant species.
नीम	<i>Azadirachta indica</i>	Indian lilac	4 × 4	up to 900	Indigenous	It is a strong light-demander, hardy, drought-resistant, fast growing. It is a frost -tender.
भिम ँन पाते	<i>Buddleja asiatica</i>		2 × 2	350-2000	Indigenous	Can tolerate a broad range of soils but is regarded as a facultative wetland plant.
ढांकी/रातो कोइरालो	<i>Bauhinia purpurea</i>	Pink bauhinia	2 × 2	up to 1600	Indigenous	It demands plenty of light and requires good drainage. Severe frost kills the leaves of seedlings and saplings, but they recover during summer. The species is frost-hardy.
कोइरालो/ ँतो कोइरालो	<i>Bauhinia variegata</i>	Varietatad bauhinia	2 × 2	up to 1900	Indigenous	It occurs in climates with hot, dry summers and mild winters. It demands plenty of light and requires good drainage.
पलां	<i>Butea monosperma</i>	Flame of the forest	2 × 2	up to 1100	Indigenous	The tree is very drought resistant and frost hardy. It grows on a wide variety of soils including shallow, gravelly sites, black cotton soil, clay loams, and even saline or waterlogged soils.
कल्कीफूल	<i>Callistemon citrinus</i>	Bottle brush tree	4 × 4	up to 1800	Exotic	It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought.
राजवृक्ष	<i>Cassia fistula</i>	Indian laburnum	2 × 2	up to 1400	Indigenous	Hardy tree with a wide range of environmental tolerances. The species is reported to tolerate mild drought, slopes, and soil types ranging from acidic to alkaline as well as shallow and nutrient-depleted soils and dry, shallow mountain slopes
खरी	<i>Celtis australis</i>	Nettle tree	3 × 3	700-2400	Indigenous	It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.
कपुर	<i>Cinnamomum camphora</i>	Camphor tree	2 × 2	up to 1500	Exotic	It is reported to grow well on fertile, well-drained, sandy loam soils but does not perform well on heavy soils with impeded

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						drainage.
तेजपात	<i>Cinnamomum tamala</i>	Indian cassia lingnea	2 × 2	200-2000	Indigenous	Requires well-drained, sandy loam soils but does not perform well on heavy soils with impeded drainage.
राज ल्लो	<i>Cupressus torulosa</i>	Himalayan cypress	3 × 3	1800-3500	Indigenous	It cannot grow in the shade. It prefers dry or moist soil.
जापानी धूपी	<i>Cryptomeria japonica</i>	Japanese cedar	3 × 3	1300-2600	Exotic	Grows in forests on deep, well-drained soils subject to warm, moist conditions, and it is fast-growing under these conditions. It is intolerant of poor soils and cold, drier climates.
अशोक(ीता)	<i>Saraca indica</i>	Sorrowless tree	2 × 2	up to 900	Exotic	Lofty evergreen tree, commonly planted due to its effectiveness in alleviating noise pollution. It exhibits symmetrical pyramidal growth with willowy weeping pendulous branches and long narrow lanceolate leaves with undulate margins.
अशोक(ते हिांगे)	<i>Polyalthia longifolia</i>	Mast tree	2 × 2	up to 1000	Exotic	Lofty evergreen tree, commonly planted due to its effectiveness in alleviating noise pollution.
अ रिफूल	<i>Lagerstroemia indica</i>	Crepe myrtle	2 × 2	up to 1500	Exotic	Soils may vary from well drained to occasionally flooded, but not peat soil. This species is resistant to fire
ैजन	<i>Moringa oleifera</i>	Drumstick tree	2 × 2	up to 1100	Exotic	It is quite drought tolerant. It is not harmed by frost, but can be killed back to ground level by a freeze. Does well in well drained clay or clay loam without prolonged waterlogging.
ि प्लीकान	<i>Crateva religiosa</i>	Sacred garlic pearl	2 × 2	up to 1500	Indigenous	Grows best in a rich, slightly acid soil. Prefers a position in full sun or light shade. Established plants are moderately drought tolerant
रुख कमल	<i>Magnolia grandiflora</i>	Bull bay	6× 6	900-1700	Exotic	The tree is a fast-growing light demander species. Young plants will be affected by drought and does not tolerate water logged condition and is sensitive to fire. This tree is frost hardy.
किम्बु	<i>Morus alba</i>	White mulberry	3 × 3	900-2400	Exotic	Shade bearing fruit tree with deep root system.
जाकारान्डा	<i>Jacaranda mimosifolia</i>	Jacaranda	5 × 5	up to 1600	Exotic	Jacaranda mimosifolia is fast growing and resprouts easily if damaged.
रुद्राक्ष	<i>Elaeocarpus</i>	Utrasum bead-	5 × 5	700-1700	Indigenous	It is drought-tolerant. It also grows in different types of soils

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
	<i>sphaericus</i>	tree				particularly in alluvial, laterite, red and black soils containing sufficient organic matter. However, it has been observed that in the hot conditions of sub-tropics, the plants do not produce fruits.
कांगियो फूल	<i>Grevillea robusta</i>	Silky oak	5 × 5	750-1500	Exotic	It can survive moderate winter frosts. It is not resistant to persistent strong winds. Establishes well in riverine habitats, on alluvial soils that are free of waterlogging and mildly acid to neutral. Loam soil is preferred. It also occurs on clay loam and sand.
लांकुरी	<i>Fraxinus floribunda</i>	Ash tree	4 × 4	1200-2000	Indigenous	Requires rich moist soils. Prefers a deep loamy soil, even if it is on the heavy side.
फि लिङ्गे / फि रिङ्गे	<i>Osmanthus fragrans</i>	Fragrant olive	3 × 3	1300-3000	Indigenous	This tree grows in part shade/part sun; tree grows in full sun with well drained loamy to sandy acidic soil.
शमी	<i>Ficus benjamina</i>	Weeping fig	9 × 9	up to 1200	Indigenous	It performs best in bright sunny locations but will also survive in shade. It is intolerant to cold
वर	<i>Ficus benghalensis</i>	Banyan tree	9 × 9	up to 1800	Indigenous	A tender plant that is drought-resistant. Requires well-drained rich soil.
पीपल	<i>Ficus religiosa</i>	Wisdom tree	9 × 9	up to 1500	Indigenous	It grows on a wide variety of soils but prefer deep, alluvial sandy loam with good drainage.
रवर	<i>Ficus elastica</i>	Rubber plant	9 × 9	up to 1500	Exotic	He species is not wind-tolerant and tends to break apart in strong winds, but is tolerant of shade and drought, and can grow in almost any type of soil so long as it is well-drained and deep.
श्रीखण्ड / तौचन्दन	<i>Santalum album</i>	Sandal wood	4 × 4	up to 1200	Exotic	It does not tolerate frost or waterlogging, but is drought-hardy and is a light demander.
वै	<i>Salix babylonica</i>	Weeping willow	3 × 3	800-3600	Exotic	It is a light-demanding species. It tolerates flooding, and in extreme cases even submergence.
वकैनु	<i>Melia azedarach</i>	Persian lilac	3 × 3	up to 1800	Exotic	It is highly adaptable and tolerates a wide range of conditions. Deep, fertile, sandy loam soils support the best growth.

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
अमला	<i>Phyllanthus emblica</i>	Emblic myrobalak	6 × 6	up to 1500	Indigenous	Prefers dry climate. It is a hardy plant and can be grown in variable soil conditions. The crop can tolerate salinity and alkalinity.
मौवा(तराई)	<i>Bassia latifolia</i>	Butter tree	4 × 4	up to 1200	Indigenous	Prefers well-drained soil and can grow in heavy clay soil. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.
म ला	<i>Eucalyptus spp.</i>		5 × 5	up to 1600	Exotic	It is a strong light-demander, intolerant of suppression and weeds. It is a fire resistant.
इपिल इपिल	<i>Leucaena leucocephala</i>	Lead tree	3 × 3	up to 1300	Exotic	It is not tolerant of acid soils or waterlogged conditions.
पैयुं	<i>Prunus cerasoides</i>	Himalayan wild cherry	4 × 4	1300-2400	Indigenous	Prefers well-drained soil. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.
जापानी चेरी	<i>Prunus serrulata</i>	Japanese cherry	4 × 4		Exotic	Best grown in moist, fertile, well-drained loams in full sun to part shade.
लाली गुरां	<i>Rhododendron arboretum</i>	Rhododendron		1000-3600	Indigenous	The plant prefers light (sandy) to medium (loamy) soil & requires fairly moist & acidic soil. It can grow in semi shade or no shade area.
गुलाब जामुन	<i>Syzygium jambos</i>	Rose apple	6 × 6	up to 1400	Exotic	Prefers moist locations and will tolerate waterlogging. It can also survive, but less well, on drier sites once established.
पारिजात	<i>Nyctanthus arbortristis</i>	Night flowering jasmine	3 × 3	700-1300	Indigenous	It is a very common ornamental species planted in many places for its fragrant flower.
नुचांप/फूल चांप	<i>Michelia champaca</i>	Golden champak	4 × 4	450-1500	Indigenous	Requires moist, deep and fertile soils.
टेकोमा/घटपुष्प	<i>Tecoma stans</i>	Yellow bells	2 × 2	up to 1500	Exotic	It is drought-tolerant and grows well in warm climates.
गुनी	<i>Podocarpus nerifolius</i>	Brown pine	5 × 5	650-1600	Indigenous	It can grow in semi-shade or no shade. It prefers moist soil and can tolerate drought and frost. The plant can tolerate strong winds as well.
फिन्दूरे	<i>Mallotus philippinensis</i>		5 × 5	up to 1800	Indigenous	Tree withstands considerable shade; it is frost-hardy and resistant to drought. Plants will grow mostly in a wide range of

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						soil types, including infertile soils, limestone, acid, and rocky land.
क्वालियन्डा	<i>Calliandra calothyrsus</i>		2 × 2	up to 1300	Exotic	A very versatile species, calliandra does well under a wide range of soils and is outstanding in those of low fertility.
पहेलो निलकांडा	<i>Duranta goldiana</i>	Golden dew drop		up to 1000	Exotic	Tolerates acidic to slightly alkaline soils and is moderately salt tolerant. It prefers well drained, fertile soils and partial shade
जमाने मान्द्रो	<i>Mahonia nepalensis</i>			1400-3000	Indigenous	It is not frost tender and can grow in heavy clay soil. It can grow in semi-shade or no shade. It prefers moist soil.
लालुपाते	<i>Euphorbia pulcherrima</i>	Poinsettia	1 × 1	up to 1400	Exotic	
करवीर	<i>Nerium oleander</i>	Pink oleander		up to 1000	Exotic	Oleander is a rapidly growing evergreen, rounded shrub or small tree. It prefers full sun to partial shade and well-drained and fertile soil, although it is adaptable to many soil conditions.
करिपत्ता	<i>Murraya koenigii</i>	Curry leaf tree		up to 1600	Indigenous	Requires moist soil.
जाइफूल	<i>Jasminum humile</i>	Yellow jasmine		1200-3400	Indigenous	Prefers well-drained soil. It can grow in semi-shade or no shade. It prefers dry or moist soil.
रातकी रानी	<i>Cestrum nocturnum</i>	Night jasmine		up to 1500	Exotic	Thrives in light, sandy soil and can adapt to a variety of soil types and conditions, but has low salt and waterlogging tolerance. It does best under full sun but tolerates light shade.
ानो धाइरो	<i>Woodfordia fruticosa</i>	Fire flame bush		up to 1500	Indigenous	Prefers well-drained soil and can grow in nutritionally poor soil. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds
बाह्रमाे फूल	<i>Hibiscus rosa-sinensis</i>	Shoe flower			Exotic	Prefers well-drained soil. Suitable pH: acid, neutral and basic (alkaline) soils. It cannot grow in the shade. It prefers moist soil and is frost tender.
कागते फूल	<i>Bougainvillea Spp.</i>	Paper flower		up to 1500	Exotic	Best on moist and Warm climates.
स्वस्थानी फूल	<i>Pyrostegia venusta</i>	Flame vine		up to 1450	Exotic	Grows best in part shade/part sun condition.
वनतडी	<i>Pandanus furcatus</i>	Himalayan screw pine	2 × 2	700-1100	Indigenous	Best in moist and shady places.

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
रुख उन्नु	<i>Cythea spinulosa</i>	Tree fern		350-3000	Indigenous	A cold tolerant tree fern and is best suited for warm temperature climates.
	<i>Caryota urens</i>	Fish tail palm	1.5 × 1.5		Exotic	It prefers moist, shady, cool places. C. urens is a slow-growing, shade-tolerant or shade-demanding species.
	<i>Livistona chinensis</i>	Chinese fan palm	3 × 3		Exotic	Plants are adapted to a wide range of soil conditions including clay, loam, sand, acidic and alkaline soils, but it prefers well-drained soils.
	<i>Hyophorbe lagenicaulis</i>	Bottle palm	0.5 × 0.5		Exotic	Requires well-drained sandy soils bt is slow growing species. It grows best in full sunlight but can tolerate moderate shade.
	<i>Roystonea regia</i>	Royal palm	5 × 5		Exotic	They grow well in wet soils, yet are quite drought tolerant once they become established.
कलवल	<i>Cycas revoluta</i>	Sago palm	2 × 2		Exotic	This is a very slow growing plant.
कुमु	<i>Schleichera oleosa</i>			up to 300	Indigenous	It grows on rather dry to occasionally swampy locations on various, often rocky, gravelly or loamy, well drained, preferably slightly acid soils. S. oleosa is fire-resistant. Seedlings are frost sensitive and light-demanding.
टटेलो	<i>Orozyllum indicum</i>	Broken bones	2 × 2	up to 1300	Indigenous	Sandy-loam fertile soil is best suited for good growth and development of the species; but it can also grow well in medium to deep black soils to sandy loam soils.
एभोकाडो	<i>Persea americana</i>	Avocado	3 × 3	800-1600	Exotic	Requires a well-drained aerated soil because the roots are intolerant of anaerobic conditions; waterlogging for more than 24 hours can kill trees. Moderately cold-tolerant
आप	<i>Magnifera indica</i>	Mango	3 × 3	up to 1300	Indigenous	The trees are drought tolerant and thrive in well-drained soils. For good growth, they need a deep soil to accommodate the extensive root system.
नास्पती	<i>Pyrus communis</i>	Pear	3 × 3	700-1900	Exotic	Prefers well-drained soil and can grow in heavy clay soil. It can grow in semi-shade or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.
आरु	<i>Prunus persica</i>	Peach	2 × 2	1100-2000	Exotic	Prefers well-drained soil. It cannot grow in the shade. It prefers

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						moist soil.
लिची	<i>Litchi chinensis</i>	Litchi	4 × 4	up to 1200	Exotic	The tree needs well-drained soil that is rich in organic matter.
म्यांगोस्टिन	<i>Garcinia mangostana</i>	Mangosteen	3 × 3	up to 1000	Exotic	It does best in deep, rich organic soil, especially sandy loam or laterite, which have good drainage. I
इम्ली	<i>Tamarindus indica</i>	Tamarind tree		up to 1500	Exotic	Young trees are killed by the slightest frost, but older trees seem more cold resistant. It grows in most soils but prefers well-drained deep alluvial soil.
हलुवावेद	<i>Diospyros kaki</i>	Japanese persimmon		1800-3200	Exotic	Prefers a good deep loamy soil in sun or light shade but succeeds in most soils. Dislikes very acid or wet and poorly drained soils. Young trees require some winter protection for their first winter or two
गुलाब	<i>Rosa spp.</i>	Rose	1 × 1		Exotic	

Species recommended for river and canal site and around pond plantation

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
बबुल	<i>Acacia nilotica</i>	Gum arabic tree	3 × 3	up to 1200	Exotic	An intolerant, drought resistant tree. It is relatively fast-growing species.
फिरान	<i>Albizia chinensis</i>	Silk tree	9 × 9	up to 1500	Indigenous	Grows best on moist alluvial soils, well-drained loams or clay soils. Its ability to grow on dry, sandy, stony, and shallow soils makes it a useful species for reforestation of difficult sites.
रातो फिरी	<i>Albizia julibrissin</i>	Pink siris	3 × 3	900-2100	Indigenous	Prefers areas of high summer heat and is frost tolerant. It prefers open sunny ravines.
कालो फिरी	<i>Albizia lebbek</i>	Parrot tree	5 × 5	up to 1200	Indigenous	It is a light-demanding species. The species can tolerate a wide range of climates and soil types.
ढेतो फिरी	<i>Albizia procera</i>	Tree-coma	6 × 6	up to 1350	Indigenous	Fast-growing, semi-deciduous, light-demanding and fairly drought-tolerant species and can grow well on shallow soils.
छतिवन	<i>Alstonia scholaris</i>	Devil's tree	6 × 6	up to 900	Indigenous	Can grow on variety of soils such as alluvia, basaltic red earth, yellow earth with grey-brown topsoil, stony red earth.
एरेउकेरिया	<i>Araucaria spp.</i>		3 × 3	up to 1900	Exotic	Shade-tolerant species.
नीम	<i>Azadirachta indica</i>	Indian lilac	4 × 4	up to 900	Indigenous	It is a strong light-demander, hardy, drought-resistant, fast growing. It is a frost-tender.
भिम न पाते	<i>Buddleja asiatica</i>		2 × 2	350-2000	Indigenous	Can tolerate a broad range of soils but is regarded as a facultative wetland plant.
टांकी/रातो कोइरालो	<i>Bauhinia purpurea</i>	Pink bauhinia	2 × 2	up to 1600	Indigenous	It demands plenty of light and requires good drainage. Severe frost kills the leaves of seedlings and saplings, but they recover during summer. The species is frost-hardy.
कोइरालो/ढेतो कोइरालो	<i>Bauhinia variegata</i>	Variegated bauhinia	2 × 2	up to 1900	Indigenous	It occurs in climates with hot, dry summers and mild winters. It demands plenty of light and requires good drainage.
पलां	<i>Butea monosperma</i>	Flame of the forest	2 × 2	up to 1100	Indigenous	The tree is very drought resistant and frost hardy. It grows on a wide variety of soils including shallow, gravelly sites, black cotton soil, clay loams, and even saline or waterlogged soils.
राजवृक्ष	<i>Cassia fistula</i>	Indian laburnum	2 × 2	up to 1400	Indigenous	Hardy tree with a wide range of environmental tolerances. The species is reported to tolerate mild drought, slopes, and soil

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						types ranging from acidic to alkaline as well as shallow and nutrient-depleted soils and dry, shallow mountain slopes
क्याँ या लामिया	<i>Cassia siamea</i>	Yellow cassia	3 × 3	up to 1400	Exotic	Capable of growing under a wide variety of climatic conditions ranging from humid through to arid, but it cannot tolerate low temperatures (<10°C) and will be killed outright by even the slightest frost.
खरी	<i>Celtis australis</i>	Nettle tree	3 × 3	700-2400	Indigenous	It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.
कपुर	<i>Cinnamomum camphora</i>	Camphor tree	2 × 2	up to 1500	Exotic	It is reported to grow well on fertile, well-drained, sandy loam soils but does not perform well on heavy soils with impeded drainage.
गुन्धकोकिला	<i>Cinnamomum glaucescens</i>	Nepali sassafras	3 × 3	600-1400	Indigenous	Prefer an acidic soil with ample moisture in the growing season and a position with some shade.
देवदार	<i>Cedrus deodara</i>	Himalayan cedar	6 × 6	1900-2600	Indigenous	Tolerant tree grow freely well in shade. Grows on variety of deep rich soils. Growth is poor on rocky soils
अरिफूल	<i>Lagerstroemia indica</i>	Crepe myrtle	2 × 2	up to 1500	Exotic	Soils may vary from well drained to occasionally flooded, but not peat soil. This species is resistant to fire
जैजन	<i>Moringa oleifera</i>	Drumstick tree	2 × 2	up to 1100	Exotic	It is quite drought tolerant. It is not harmed by frost, but can be killed back to ground level by a freeze. Does well in well drained clay or clay loam without prolonged waterlogging.
रुख कमल	<i>Magnolia grandiflora</i>	Bull bay	6 × 6	900-1700	Exotic	The tree is a fast-growing light demander species. Young plants will be affected by drought and does not tolerate water logged condition and is sensitive to fire. This tree is frost hardy.
किम्बु	<i>Morus alba</i>	White mulberry	3 × 3	900-2400	Exotic	Shade bearing fruit tree with deep root system.
नारेश्वर	<i>Mesua ferrea</i>	Ceylon iron wood	5 × 5	up to 1500	Indigenous	The plant requires well drained and deep fertile soil, stiff clay soil. It is a strong shade bearer and is susceptible to frost and drought.
गोलाइची/चुवा	<i>Plumeria rubra</i>	Temple tree	5 × 5	up to 1200	Exotic	Requires rich, dry to medium moisture and well drained loamy

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						soil.
जाकारान्डा	<i>Jacaranda mimosifolia</i>	Jacaranda	5 × 5	up to 1600	Exotic	Jacaranda mimosifolia is fast growing and resprouts easily if damaged.
कांगियो फूल	<i>Grevillea robusta</i>	Silky oak	5 × 5	750-1500	Exotic	It can survive moderate winter frosts. It is not resistant to persistent strong winds. Establishes well in riverine habitats, on alluvial soils that are free of waterlogging and mildly acid to neutral. Loam soil is preferred. It also occurs on clay loam and sand.
लांकुरी	<i>Fraxinus floribunda</i>	Ash tree	4 × 4	1200-2000	Indigenous	Requires rich moist soils. Prefers a deep loamy soil, even if it is on the heavy side.
फि लिङ्गे / फि रिङ्गे	<i>Osmanthus fragrans</i>	Fragrant olive	3 × 3	1300-3000	Indigenous	This tree grows in part shade/part sun; tree grows in full sun with well drained loamy to sandy acidic soil.
शमी	<i>Ficus benjamina</i>	Weeping fig	9 × 9	up to 1200	Indigenous	It performs best in bright sunny locations but will also survive in shade. It is intolerant to cold
बर	<i>Ficus benghalensis</i>	Banyan tree	9 × 9	up to 1800	Indigenous	A tender plant that is drought-resistant. Requires well-drained rich soil.
पीपल	<i>Ficus religiosa</i>	Wisdom tree	9 × 9	up to 1500	Indigenous	It grows on a wide variety of soils but prefer deep, alluvial sandy loam with good drainage.
काभ्रो	<i>Ficus lacor</i>	Elephant fig	6 × 6	up to 1600	Indigenous	
रबर	<i>Ficus elastica</i>	Rubber plant	9 × 9	up to 1500	Exotic	He species is not wind-tolerant and tends to break apart in strong winds, but is tolerant of shade and drought, and can grow in almost any type of soil so long as it is well-drained and deep.
खमारी/गमारी	<i>Gmelina arborea</i>	Malaya bush tree	6 × 6	up to 1200	Exotic	A light demander and doesn't stand bed drainage, moderately frost hardy and has good power of recovering and doesn't stand excessive drought.
वै	<i>Salix babylonica</i>	Weeping willow	3 × 3	800-3600	Exotic	It is a light-demanding species. It tolerates flooding, and in extreme cases even submergence.
वकैनु	<i>Melia azedarach</i>	Persian lilac	3 × 3	up to 1800	Exotic	It is highly adaptable and tolerates a wide range of conditions.

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						Deep, fertile, sandy loam soils support the best growth.
अमला	<i>Phyllanthus emblica</i>	Emblic myrobalak	6 × 6	up to 1500	Indigenous	Prefers dry climate. It is a hardy plant and can be grown in variable soil conditions. The crop can tolerate salinity and alkalinity.
मौवा(तराई)	<i>Bassia latifolia</i>	Butter tree	4 × 4	up to 1200	Indigenous	Prefers well-drained soil and can grow in heavy clay soil. It cannot grow in the shade. It prefers dry or moist soil and can tolerate drought.
मला	<i>Eucalyptus spp.</i>		5 × 5	up to 1600	Exotic	It is a strong light-demander, intolerant of suppression and weeds. It is a fire resistant.
इपिल इपिल	<i>Leucaena leucocephala</i>	Lead tree	3 × 3	up to 1300	Exotic	It is not tolerant of acid soils or waterlogged conditions.
पैयुं	<i>Prunus cerasoides</i>	Himalayan wild cherry	4 × 4	1300-2400	Indigenous	Prefers well-drained soil. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.
वन जामुन	<i>Syzygium cumini</i>	Indian black cherry	3 × 3	up to 1600	Indigenous	Prefers moist locations and will tolerate waterlogging thus is commonly found on riverbanks, but it can also survive, but less well, on drier sites once established.
गुलाब जामुन	<i>Syzygium jambos</i>	Rose apple	6 × 6	up to 1400	Exotic	Prefers moist locations and will tolerate waterlogging. It can also survive, but less well, on drier sites once established.
चुनचाप/फूल चाप	<i>Michelia champaca</i>	Golden champak	4 × 4	450-1500	Indigenous	Requires moist, deep and fertile soils.
गुनी	<i>Podocarpus nerifolius</i>	Brown pine	5 × 5	650-1600	Indigenous	It can grow in semi-shade or no shade. It prefers moist soil and can tolerate drought and frost. The plant can tolerate strong winds as well.
फिन्दूरे	<i>Mallotus philippinensis</i>		5 × 5	up to 1800	Indigenous	Tree withstands considerable shade; it is frost-hardy and resistant to drought. Plants will grow mostly in a wide range of soil types, including infertile soils, limestone and acidic
क्वालियन्ड्रा	<i>Calliandra calothyrsus</i>		2 × 2	up to 1300	Exotic	A very versatile species, it does well under a wide range of soils and is outstanding in those of low fertility.
करवीर	<i>Nerium oleander</i>	Pink oleander		up to 1000	Exotic	Oleander is a rapidly growing evergreen, rounded shrub or

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						small tree. It prefers full sun to partial shade and well-drained and fertile soil, although it is adaptable to many soil conditions.
िनो धाइरो	<i>Woodfordia fruticosa</i>	Fire flame bush		up to 1500	Indigenous	Prefers well-drained soil and can grow in nutritionally poor soil. It cannot grow in the shade. It prefers moist soil. The plant can tolerate strong winds
कागते फूल	<i>Bougainvillea Spp.</i>	Paper flower		up to 1500	Exotic	Best on moist and Warm climates.
स्वस्थानी फूल	<i>Pyrostegia venusta</i>	Flame vine		up to 1450	Exotic	Grows best in part shade/part sun condition.
रुख उन्नु	<i>Cythea spinulosa</i>	Tree fern		350-3000	Indigenous	A cold tolerant tree fern and is best suited for warm temperature climates.
कलवल	<i>Cycas pectinate</i>	Assam cycas	2 × 2	300-1200	Indigenous	Best on deep, often clay-rich and more fertile soils.
अर्जुन	<i>Terminalia arjuna</i>	Hallock		up to 1500	Indigenous	It grows well on fertile, neutral soils, especially loose, moist, alluvial loam with good water supply and drainage
टटेलो	<i>Orozylum indicum</i>	Broken bones	2 × 2	up to 1300	Indigenous	Sandy-loam fertile soil is best suited for good growth and development of the species; but it can also grow well in medium to deep black soils to sandy loam soils.
आप	<i>Magnifera indica</i>	Mango	3 × 3	up to 1300	Indigenous	The trees are drought tolerant and thrive in well-drained soils. For good growth, they need a deep soil to accommodate the extensive root system.
नास्पती	<i>Pyrus communis</i>	Pear	3 × 3	700-1900	Exotic	Prefers well-drained soil and can grow in heavy clay soil. It can grow in semi-shade or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.

Species recommended for parks

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
बेल	<i>Aegle marmelos</i>	Wood apple	6 × 6	up to 1400	Indigenous	Slow-growing, medium sized tree, up to 12-15 m tall and said to do best on rich, well-drained soil.
लेखपांग्रो	<i>Aesculus indica</i>	Horse chest nut	9 × 9	1200-2600	Indigenous	Fast growing and frost tender tree species suitable in well-drained soil.
कालो फि रि	<i>Albizia lebbek</i>	Parrot tree	5 × 5	up to 1200	Indigenous	It is a light-demanding species. The species can tolerate a wide range of climates and soil types.
तेतो फि रि	<i>Albizia procera</i>	Tree-coma	6 × 6	up to 1350	Indigenous	Fast-growing, semi-deciduous, light-demanding and fairly drought-tolerant species and can grow well on shallow soils.
छतिवन	<i>Alstonia scholaris</i>	Devil's tree	6 × 6	up to 900	Indigenous	Can grow on variety of soils such as alluvia, basaltic red earth, yellow earth with grey-brown topsoil, stony red earth.
एरेउकेरिया	<i>Araucaria spp.</i>		3 × 3	up to 1900	Exotic	Shade-tolerant species.
नीम	<i>Azadirachta indica</i>	Indian lilac	4 × 4	up to 900	Indigenous	It is a strong light-demander, hardy, drought-resistant, fast growing. It is a frost -tender.
भिम ेन पाते	<i>Buddleja asiatica</i>		2 × 2	350-2000	Indigenous	Can tolerate a broad range of soils but is regarded as a facultative wetland plant.
राजवृक्ष	<i>Cassia fistula</i>	Indian laburnum	2 × 2	up to 1400	Indigenous	Hardy tree with a wide range of environmental tolerances. The species is reported to tolerate mild drought, slopes, and soil types ranging from acidic to alkaline as well as shallow and nutrient-depleted soils and dry, shallow mountain slopes
क्याफिया यामिया	<i>Cassia siamea</i>	Yellow cassia	3 × 3	up to 1400	Exotic	Capable of growing under a wide variety of climatic conditions ranging from humid through to arid, but it cannot tolerate low temperatures (<10°C) and will be killed outright by even the slightest frost.
कपुर	<i>Cinnamomum camphora</i>	Camphor tree	2 × 2	up to 1500	Exotic	It is reported to grow well on fertile, well-drained, sandy loam soils but does not perform well on heavy soils with impeded drainage.
तेजपात	<i>Cinnamomum tamala</i>	Indian cassia lingnea	2 × 2	200-2000	Indigenous	Requires well-drained, sandy loam soils but does not perform well on heavy soils with impeded drainage.

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
राज ल्लो	<i>Cupressus torulosa</i>	Himalayan cypress	3 × 3	1800-3500	Indigenous	It cannot grow in the shade. It prefers dry or moist soil.
जापानी धूपी	<i>Cryptomeria japonica</i>	Japanese cedar	3 × 3	1300-2600	Exotic	Grows in forests on deep, well-drained soils subject to warm, moist conditions, and it is fast-growing under these conditions. It is intolerant of poor soils and cold, drier climates.
लौठ ल्ला	<i>Taxus wallichiana</i>	Himalayan yew	3 × 3	2200-3500	Indigenous	
देवदार	<i>Cedrus deodara</i>	Himalayan cedar	6 × 6	1900-2600	Indigenous	Tolerant tree grows freely well in shade. Grows on variety of deep rich soils. Growth is poor on rocky soils
अशोक(ीता)	<i>Saraca indica</i>	Sorrowless tree	2 × 2	up to 900	Exotic	Lofty evergreen tree, commonly planted due to its effectiveness in alleviating noise pollution. It exhibits symmetrical pyramidal growth with willowy weeping pendulous branches and long narrow lanceolate leaves with undulate margins.
अशोक(ते हिांगे)	<i>Polyalthia longifolia</i>	Mast tree	2 × 2	up to 1000	Exotic	Lofty evergreen tree, commonly planted due to its effectiveness in alleviating noise pollution.
ैजन	<i>Moringa oleifera</i>	Drumstick tree	2 × 2	up to 1100	Exotic	It is quite drought tolerant. It is not harmed by frost, but can be killed back to ground level by a freeze. Does well in well drained clay or clay loam without prolonged waterlogging.
ि प्लीकान	<i>Crateva religiosa</i>	Sacred garlic pearl	2 × 2	up to 1500	Indigenous	Grows best in a rich, slightly acid soil. Prefers a position in full sun or light shade. Established plants are moderately drought tolerant
रुख कमल	<i>Magnolia grandiflora</i>	Bull bay	6× 6	900-1700	Exotic	The tree is a fast-growing light demander species. Young plants will be affected by drought and does not tolerate water logged condition and is sensitive to fire. This tree is frost hardy.
किम्बु	<i>Morus alba</i>	White mulberry	3 × 3	900-2400	Exotic	Shade bearing fruit tree with deep root system.
नारेश्वर	<i>Mesua ferrea</i>	Ceylon iron wood	5 × 5	up to 1500	Indigenous	The plant requires well drained and deep fertile soil, stiff clay soil. It is a strong shade bearer and is susceptible to frost and drought.
गोलाइची/चुवा	<i>Plumeria rubra</i>	Temple tree	5 × 5	up to 1200	Exotic	Requires rich, dry to medium moisture and well drained loamy soil.
जाकारान्डा	<i>Jacaranda mimosifolia</i>	Jacaranda	5 × 5	up to 1600	Exotic	Jacaranda mimosifolia is fast growing and resprouts easily if damaged.

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
रुद्राक्ष	<i>Elaeocarpus sphaericus</i>	Utrasum bead-tree	5 × 5	700-1700	Indigenous	It is drought-tolerant. It also grows in different types of soils particularly in alluvial, laterite, red and black soils containing sufficient organic matter. However, it has been observed that in the hot conditions of sub-tropics, the plants do not produce fruits.
कांगियो फूल	<i>Grevillea robusta</i>	Silky oak	5 × 5	750-1500	Exotic	It can survive moderate winter frosts. It is not resistant to persistent strong winds. Establishes well in riverine habitats, on alluvial soils that are free of waterlogging and mildly acid to neutral. Loam soil is preferred. It also occurs on clay loam and sand.
लांकुरी	<i>Fraxinus floribunda</i>	Ash tree	4 × 4	1200-2000	Indigenous	Requires rich moist soils. Prefers a deep loamy soil, even if it is on the heavy side.
फि लिङ्गे / फि रिङ्गे	<i>Osmanthus fragrans</i>	Fragrant olive	3 × 3	1300-3000	Indigenous	This tree grows in part shade/part sun; tree grows in full sun with well drained loamy to sandy acidic soil.
खमारी/गमारी	<i>Gmelina arborea</i>	Malaya bush tree	6 × 6	up to 1200	Exotic	A light demander and doesn't stand bed drainage, moderately frost hardy and has good power of recovering and doesn't stand excessive drought.
रुख कटहर	<i>Artocarpus heterophylla</i>	Jack fruit	9 × 9	up to 1200	Indigenous	It can withstand lower temperatures and frost. The tree will not tolerate drought or flooding. It flourishes in rich soils of medium or open texture and grows even in the poorest soils
श्रीखण्ड/ ेतोचन्दन	<i>Santalum album</i>	Sandal wood	4 × 4	up to 1200	Exotic	It does not tolerate frost or waterlogging, but is drought-hardy and is a light demander.
वै	<i>Salix babylonica</i>	Weeping willow	3 × 3	800-3600	Exotic	It is a light-demanding species. It tolerates flooding, and in extreme cases even submergence.
वकैनु	<i>Melia azedarach</i>	Persian lilac	3 × 3	up to 1800	Exotic	It is highly adaptable and tolerates a wide range of conditions. Deep, fertile, sandy loam soils support the best growth.
अमला	<i>Phyllanthus emblica</i>	Emblic myrobalak	6 × 6	up to 1500	Indigenous	Prefers dry climate. It is a hardy plant and can be grown in variable soil conditions. The crop can tolerate salinity and alkalinity.
मौवा(तराई)	<i>Bassia latifolia</i>	Butter tree	4 × 4	up to 1200	Indigenous	Prefers well-drained soil and can grow in heavy clay soil. It cannot

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						grow in the shade. It prefers dry or moist soil and can tolerate drought.
म ला	<i>Eucalyptus spp.</i>		5 × 5	up to 1600	Exotic	It is a strong light-demander, intolerant of suppression and weeds. It is a fire resistant.
इपिल इपिल	<i>Leucaena leucocephala</i>	Lead tree	3 × 3	up to 1300	Exotic	It is not tolerant of acid soils or waterlogged conditions.
पैयुं	<i>Prunus cerasoides</i>	Himalayan wild cherry	4 × 4	1300-2400	Indigenous	Prefers well-drained soil. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.
गुलाव जामुन	<i>Syzygium jambos</i>	Rose apple	6 × 6	up to 1400	Exotic	Prefers moist locations and will tolerate waterlogging. It can also survive, but less well, on drier sites once established.
पारिजात	<i>Nyctanthus arbortristis</i>	Night flowering jasmine	3 × 3	700-1300	Indigenous	It is a very common ornamental species planted in many places for its fragrant flower.
नुचांप/फूल चांप	<i>Michelia champaca</i>	Golden champak	4 × 4	450-1500	Indigenous	Requires moist, deep and fertile soils.
टेकोमा/घटपुष्प	<i>Tecoma stans</i>	Yellow bells	2 × 2	up to 1500	Exotic	It is drought-tolerant and grows well in warm climates.
गुनी	<i>Podocarpus nerifolius</i>	Brown pine	5 × 5	650-1600	Indigenous	It can grow in semi-shade or no shade. It prefers moist soil and can tolerate drought and frost. The plant can tolerate strong winds.
फिन्दूरे	<i>Mallotus philippinensis</i>		5 × 5	up to 1800	Indigenous	Tree withstands considerable shade; it is frost-hardy and resistant to drought. Plants will grow mostly in a wide range of soil types, including infertile soils, limestone, acid, and rocky land.
क्वालियन्ड्रा	<i>Calliandra calothyrsus</i>		2 × 2	up to 1300	Exotic	A very versatile species, calliandra does well under a wide range of soils and is outstanding in those of low fertility.
वनतडी	<i>Pandanus furcatus</i>	Himalayan screw pine	2 × 2	700-1100	Indigenous	Best in moist and shady places.
रुख उन्नु	<i>Cyrtia spinulosa</i>	Tree fern		350-3000	Indigenous	A cold tolerant tree fern and is best suited for warm temperature climates.
कलवल	<i>Cycas pectinate</i>	Assam cycas	2 × 2	300-1200	Indigenous	Best on deep, often clay-rich and more fertile soils.
टटेलो	<i>Orozyllum indicum</i>	Broken bones	2 × 2	up to 1300	Indigenous	Sandy-loam fertile soil is best suited for good growth and development of the species; but it can also grow well in medium to

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
						deep black soils to sandy loam soils.
एभोकाडो	<i>Persea americana</i>	Avocado	3 × 3	800-1600	Exotic	Requires a well-drained aerated soil because the roots are intolerant of anaerobic conditions; waterlogging for more than 24 hours can kill trees. Moderately cold-tolerant
आप	<i>Mangifera indica</i>	Mango	3 × 3	up to 1300	Indigenous	The trees are drought tolerant and thrive in well-drained soils. For good growth, they need a deep soil to accommodate the extensive root system.
नास्पती	<i>Pyrus communis</i>	Pear	3 × 3	700-1900	Exotic	Prefers well-drained soil and can grow in heavy clay soil. It can grow in semi-shade or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.
आरु	<i>Prunus persica</i>	Peach	2 × 2	1100-2000	Exotic	Prefers well-drained soil. It cannot grow in the shade. It prefers moist soil.
लिची	<i>Litchi chinensis</i>	Litchi	4 × 4	up to 1200	Exotic	The tree needs well-drained soil that is rich in organic matter.

Species recommended for building compound

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
बेल	<i>Aegle marmelos</i>	Wood apple	6 × 6	up to 1400	Indigenous	Slow-growing, medium sized tree, up to 12-15 m tall and said to do best on rich, well-drained soil.
नीम	<i>Azadirachta indica</i>	Indian lilac	4 × 4	up to 900	Indigenous	It is a strong light-demander, hardy, drought-resistant, fast growing. It is a frost -tender.
भिम ेन पाते	<i>Buddleja asiatica</i>		2 × 2	350-2000	Indigenous	Can tolerate a broad range of soils but is regarded as a facultative wetland plant.
टांकी/रातो कोइरालो	<i>Bauhinia purpurea</i>	Pink bauhinia	2 × 2	up to 1600	Indigenous	It demands plenty of light and requires good drainage. Severe frost kills the leaves of seedlings and saplings, but they recover during summer. The species is frost-hardy.
कल्कीफूल	<i>Callistemon citrinus</i>	Bottle brush tree		up to 1800	Exotic	It cannot grow in the shade. It prefers dry moist or wet soil and can tolerate drought.
कपुर	<i>Cinnamomum camphora</i>	Camphor tree	2 × 2	up to 1500	Exotic	It is reported to grow well on fertile, well-drained, sandy loam soils but does not perform well on heavy soils with impeded drainage.
राज ल्लो	<i>Cupressus torulosa</i>	Himalayan cypress	3 × 3	1800-3500	Indigenous	It cannot grow in the shade. It prefers dry or moist soil.
जापानी धूपी	<i>Cryptomeria japonica</i>	Japanese cedar	3 × 3	1300-2600	Exotic	Grows in forests on deep, well-drained soils subject to warm, moist conditions, and it is fast-growing under these conditions. It is intolerant of poor soils and cold, drier climates.
अशोक(पीता)	<i>Saraca indica</i>	Sorrowless tree	2 × 2	up to 900	Exotic	Lofty evergreen tree, commonly planted due to its effectiveness in alleviating noise pollution. It exhibits symmetrical pyramidal growth with willowy weeping pendulous branches and long narrow lanceolate leaves with undulate margins.
अशोक(ते हिांगे)	<i>Polyalthia longifolia</i>	Mast tree	2 × 2	up to 1000	Exotic	Lofty evergreen tree, commonly planted due to its effectiveness in alleviating noise pollution.
अ रेफूल	<i>Lagerstroemia indica</i>	Crepe myrtle	2 × 2	up to 1500	Exotic	Soils may vary from well drained to occasionally flooded, but not peat soil. This species is resistant to fire
फि प्लीकान	<i>Crateva religiosa</i>	Sacred garlic pearl	2 × 2	up to 1500	Indigenous	Grows best in a rich, slightly acid soil. Prefers a position in full sun or light shade. Established plants are moderately drought tolerant

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
किम्बु	<i>Morus alba</i>	White mulberry	3 × 3	900-2400	Exotic	Shade bearing fruit tree with deep root system.
जाकारान्डा	<i>Jacaranda mimosofolia</i>	Jacaranda	5 × 5	up to 1600	Exotic	It is a fast growing and resprouts easily if damaged.
रुद्राक्ष	<i>Elaeocarpus sphaericus</i>	Utrasum bead-tree	5 × 5	700-1700	Indigenous	It is drought-tolerant. It also grows in different types of soils particularly in alluvial, laterite, red and black soils containing sufficient organic matter. However, it has been observed that in the hot conditions of sub-tropics, the plants do not produce fruits.
फलेदो	<i>Erythrina stricta</i>	Coral tree	6 × 6	up to 1600	Indigenous	
गुगाफूल	<i>Erythrina crista-galli</i>	Cock spur coral tree	4 × 4		Exotic	Prefers well-drained soil. Suitable pH: acid, neutral and basic (alkaline) soils. It cannot grow in the shade.
शमी	<i>Ficus benjamina</i>	Weeping fig	9 × 9	up to 1200	Indigenous	It performs best in bright sunny locations but will also survive in shade. It is intolerant to cold
बर	<i>Ficus benghalensis</i>	Banyan tree	9 × 9	up to 1800	Indigenous	A tender plant that is drought-resistant. Requires well-drained rich soil.
पीपल	<i>Ficus religiosa</i>	Wisdom tree	9 × 9	up to 1500	Indigenous	It grows on a wide variety of soils but prefer deep, alluvial sandy loam with good drainage.
रबर	<i>Ficus elastica</i>	Rubber plant	9 × 9	up to 1500	Exotic	He species is not wind-tolerant and tends to break apart in strong winds, but is tolerant of shade and drought, and can grow in almost any type of soil so long as it is well-drained and deep.
रुख कटहर	<i>Artocarpus heterophylla</i>	Jack fruit	9 × 9	up to 1200	Indigenous	It can withstand lower temperatures and frost. The tree will not tolerate drought or flooding. It flourishes in rich soils of medium or open texture and grows even in the poorest soils
श्रीखण्ड/ ेतोचन्दन	<i>Santalum album</i>	Sandal wood	4 × 4	up to 1200	Exotic	It does not tolerate frost or waterlogging, but is drought-hardy and is a light demander.
वकैनु	<i>Melia azedarach</i>	Persian lilac	3 × 3	up to 1800	Exotic	It is highly adaptable and tolerates a wide range of conditions. Deep, fertile, sandy loam soils support the best growth.
अमला	<i>Phyllanthus emblica</i>	Emblic myrobalak	6 × 6	up to 1500	Indigenous	Prefers dry climate. It is a hardy plant and can be grown in variable soil conditions. The crop can tolerate salinity and alkalinity.

Nepali Name	Scientific Name	English Name	Spacing (m×m)	Suggested altitude (m)	Origin	General Characters
पैयुं	<i>Prunus cerasoides</i>	Himalayan wild cherry	4 × 4	1300-2400	Indigenous	Prefers well-drained soil. It can grow in semi-shade (light woodland) or no shade. It prefers moist soil.
पारिजात	<i>Nyctanthus arbortristis</i>	Night flowering jasmine	3 × 3	700-1300	Indigenous	It is a very common ornamental species planted in many places for its fragrant flower.
टेकोमा/घटपुष्प	<i>Tecoma stans</i>	Yellow bells	2 × 2	up to 1500	Exotic	It is drought-tolerant and grows well in warm climates.
फिन्दूरे	<i>Mallotus philippinensis</i>		5 × 5	up to 1800	Indigenous	Tree withstands considerable shade; it is frost-hardy and resistant to drought. Plants will grow mostly in a wide range of soil types, including infertile soils, limestone, acid, and rocky land.
क्वालियन्ड्रा	<i>Calliandra calothyrsus</i>		2 × 2	up to 1300	Exotic	A very versatile species, calliandra does well under a wide range of soils and is outstanding in those of low fertility.
वनतडी	<i>Pandanus furcatus</i>	Himalayan screw pine	2 × 2	700-1100	Indigenous	Best in moist and shady places.
कलवल	<i>Cycas pectinate</i>	Assam cycas	2 × 2	300-1200	Indigenous	Best on deep, often clay-rich and more fertile soils.
टटेलो	<i>Orozylum indicum</i>	Broken bones	2 × 2	up to 1300	Indigenous	Sandy-loam fertile soil is best suited for good growth and development of the species; but it can also grow well in medium to deep black soils to sandy loam soils.
एभोकाडो	<i>Persea americana</i>	Avocado	3 × 3	800-1600	Exotic	Requires a well-drained aerated soil because the roots are intolerant of anaerobic conditions; waterlogging for more than 24 hours can kill trees. Moderately cold-tolerant
आप	<i>Magnifera indica</i>	Mango	3 × 3	up to 1300	Indigenous	The trees are drought tolerant and thrive in well-drained soils. For good growth, they need a deep soil to accommodate the extensive root system.
नास्पती	<i>Pyrus communis</i>	Pear	3 × 3	700-1900	Exotic	Prefers well-drained soil and can grow in heavy clay soil. It can grow in semi-shade or no shade. It prefers moist soil and can tolerate drought. It can tolerate atmospheric pollution.
आरु	<i>Prunus persica</i>	Peach	2 × 2	1100-2000	Exotic	Prefers well-drained soil. It cannot grow in the shade. It prefers moist soil.
लिची	<i>Litchi chinensis</i>	Litchi	4 × 4	up to 1200	Exotic	The tree needs well-drained soil that is rich in organic matter.