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Cambodia Tree Seed Project



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Seed Source Registration System

DFW-CTSP Seed Sources

Developed by
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January 2002

Cambodia Tree Seed Project

(A) SEED SOURCE INFORMATION SHEET

a) Species information

Date of assessment: _____

Seed source reference no.(one letter and three digits): _____		
Gene Ecological zone: _____		
Provenance name: _____ Origin: _____		
Species (botanical):	Common name:	Species code:
Seed source for other species (indicate seed source no.)		

b) Location description

Seed source location:
Province _____ District: _____ Commune: _____
Village: _____
Name of Map and sheet no.: _____
UTM coordinates: _____
Geographical coordinates: Latitude: _____ 'N, Longitude: _____ 'E, Altitude: _____ m.a.s.l

c) Seed source classification

<input type="checkbox"/> Unclassified, <input type="checkbox"/> Identified stand, <input type="checkbox"/> Selected stand, <input type="checkbox"/> Seed production area, <input type="checkbox"/> Provenance seed stand <input type="checkbox"/> Seed orchard, indicate type: <input type="checkbox"/> ESSO, <input type="checkbox"/> SSO, <input type="checkbox"/> CSO

d) Type and ownership

Type of seed source:
<input type="checkbox"/> Forest concession, <input type="checkbox"/> Protected forest/forest reserve, <input type="checkbox"/> Special mgt. areas, <input type="checkbox"/> Private forest, <input type="checkbox"/> Community forest, <input type="checkbox"/> National park or wildlife reserve
Seed source owner:, <input type="checkbox"/> Government, <input type="checkbox"/> Private, <input type="checkbox"/> Other: _____, Name and address of owner / administrator: _____ _____
Collection permit: <input type="checkbox"/> Not required, <input type="checkbox"/> Required, indicate authority: _____
Collection contacts: _____

e) Climatic records or estimates (optional)

Nearest weather station: _____, Latitude: _____ N, longitude: _____ E
 Altitude: _____ m.a.s.l, Distance from site (km) _____, Number of years recorded: _____
 Rainfall regime: Raining season (which months): _____

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Rainfall, mm												
Temperature, °C												

Mean annual rainfall (mm): _____ Mean annual temperature, °C: _____
 Length of dry season (<60mm) (indicate months): _____
 Absolute min. temperature, °C and month: _____
 Absolute max. temperature, °C and month: _____

f) Site description

Terrain :
 Flat:
 Slope: Flat or gentle (<5%), Intermediate (5-10%), Steep(11-45%), Very steep
 Aspect: North, East, South, West, Variable
 Soil type: _____ pH: _____
 Texture: Sand, Loamy sand, Sandy loam, Loam, Silty clay, Clay,
 Other information: _____

g) Stand description (estimation)

Total area: _____ hectares, No. of trees per hectare: _____, No. of trees in stand: _____
 Of target species only: No. of trees per ha. : _____, No of trees in stand: _____
 Height range, m _____, Diameter range, cm: _____

Type of stand: Natural undisturbed stand, Logged/secondary forest
 Plantation, Planted year, _____, Unknown,
 Maturity of stand: Young stand, Mature stand, Over mature stand
 Species composition: One species Associated species, pls. Indicate: _____

 Inventory data attached Yes/No: _____

h) Assessment of marked mother trees in seed source

Stem form: _____, Branching: _____, Growth: _____, Health: _____, Others, pls. indicate: _____

 Score codes: 1. Very poor, 2. Poor, 3. Fair, 4. Good, 5. Very good.

i) Seed production

Flowering period (start): _____ Peak : _____
Fruit ripening period (start): _____ Fruit peaking period (collection): _____
Harvestable fruit production (estimated): _____ Kg/ha

j) Accessibility

Name and distance nearest provincial forest office: _____
Accessibility road, 2WD, 4WD, Remarks: _____
Walking distance from nearest road accessible by 4WD, Km : _____
Other information: _____

k) Labour availability

Name(s) of nearest village: _____
Distance from seed source to nearest village: _____
Available labourers: _____

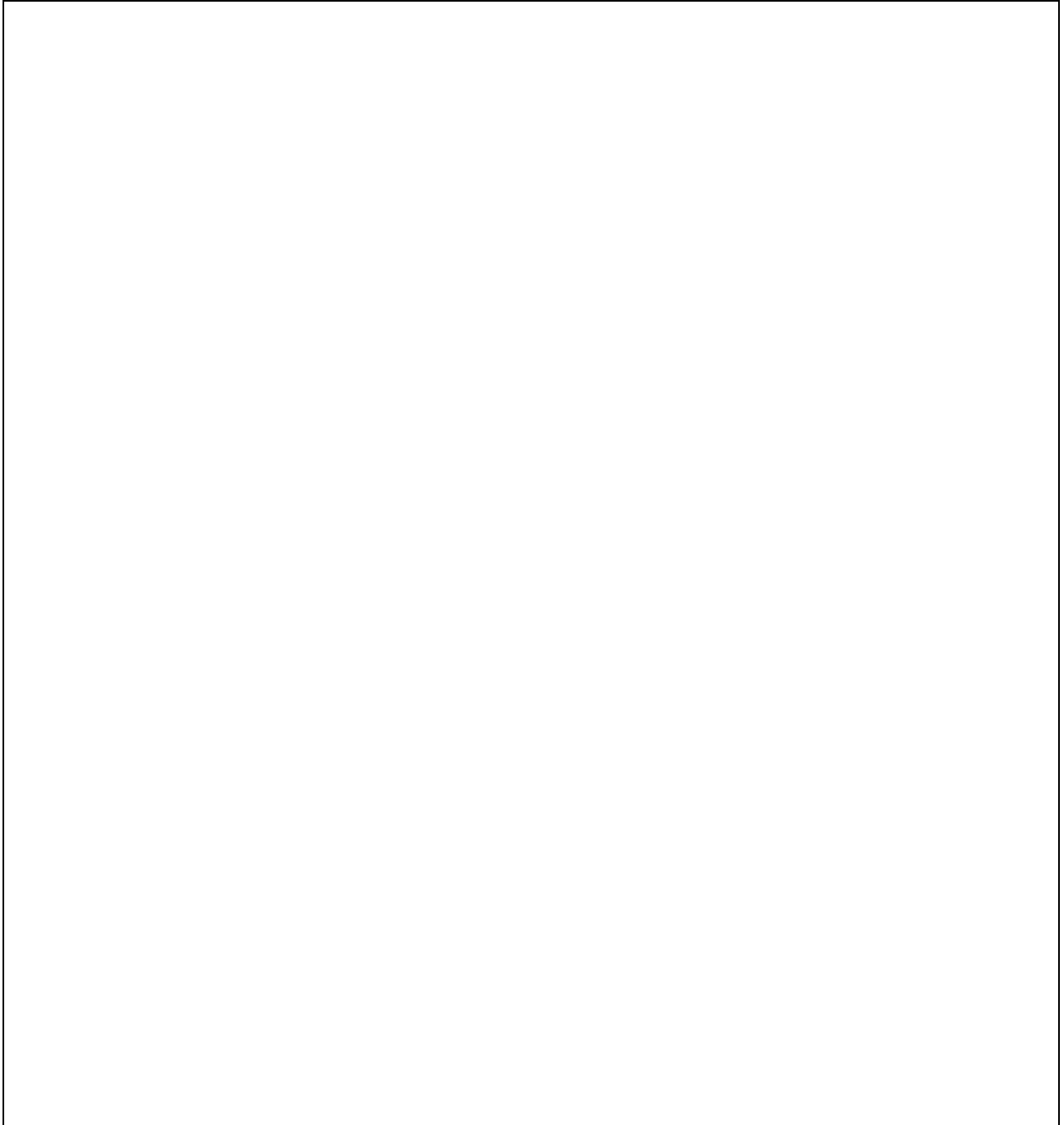
l) Other Information (management recommendations, observations etc.)

(B) LIST OF SEED SOURCES

Seed source ref. no.	Species	Provenance (origin)	Gene Ecological zone	Seed source classification *	Area (ha)	Owner

* U = unclassified, I = Identified stand, S = Selected stand, SPA = Seed Production Area, P = Provenance seed stand, SO = Seed orchard (ESSO = Extensive seedling seed orchard, SSO = Seedling seed orchard, CSO = Clonal seed orchard)

(C) MAP OF SEED SOURCES (typographical or sketch map)



DFW/CTSP Seed Source Register

Dec. 2001

1 Introduction

This is an explanatory guideline for filling out forms A-C (seed source part) in the seed documentation system.

This guideline is modified from the DFSC/VTSP guidelines on seeds source register and adaptive to the Cambodian situation by Arvid Sloth and CTSP staff..

Form A: Seed Source Information

a) Species information

Seed source reference number: This number consists of a letter (A, B, C etc) referring to the ecological region and a 3-digit identification number (e.g. 001) referring to a particular seed source.

Gene ecological Zone: A gene ecological zone is defined as a zone with relatively homogeneity homogenous ecological conditions that are different from conditions outside the zone. This lead to assume that genetic composition of tree population within the zone also is fairly alike. A gene ecological zone should have relatively well defined boundaries. Gene ecological zones may follow general ecological zones, hence identical to regions or they may be adapted to particular species. There is at present no well-established seed zone system in Cambodia.

Provenance name and origin: The provenance name is the location where the trees grow, named after for instance the nearest village, town, hill, lake or other definite geographical area. Origin is the original source of planting material (e.g. provenance and country for exotics) and hence pertains only to planted seed sources.

Species. For established seed sources there will usually be only one species for a particular seed source. However, natural forest may, within a limited area, be seed sources for several species. In that case a form should be filled for each species, but the seed source reference number may be the same.

Common name normally refers to Cambodian name unless other is specifically stated.

Species code is an 8 digit code consisting of the first 4 letters of the genus name and the first 4 letters of the species name, all written in capital letters e.g. ACACMANG for *Acacia mangium*.

b) Location description

Position must be read from global position system (GPS) based on satellite position. Only one measurement is usually necessary for each seed source. It should preferably indicate the center of the seed source.

The exact location should also be indicated with geographical coordinates. Coordinates can be read from detailed maps. The whole country of Cambodia is Northern latitude (N) and Eastern (E) longitude. When indicating positions in coordinates it should be remembered that the distance between two longitudes (e.g. 17 and 18°) is 111 km, and that 1 degree is divided into 60 minutes. Altitude is conveniently measured by an altimeter (or the GPS) and is indicated as 'meters above sea level (m.a.s.l.)'. In hilly or mountainous terrain, altitude may be indicated as a range, e.g. 950-1000 m.a.s.l.

c) Seed Source Classification

The seven main categories are:

1. Unclassified. If there is doubt of which region a seed source belongs, it should be ticked in this box
2. Identified stand. A stand of trees of a defined provenance, which has been identified for seed collection, but there has been no comparison with other stands to assess relative quality of phenotypes.
3. Selected stand. A stand of trees selected due to its high frequency of superior trees, which are above average for the region.

4. Seed production area: A stand of trees from a plantation or a natural forest which have been upgraded by removal of inferior phenotypes and managed for early and abundant seed production e.g. by pruning and thinning.
5. Provenance seed stand. A stand of trees raised from seed of one (or more) particular promising provenance (s), primarily for the production of seeds, but with no or little selection of mother trees.
6. Seed orchard: A seed source established from selected clones or families, isolated and managed for high quality seed production.

Seed orchards are further divided into 3 groups:

- a. Extensive Seedling Seed Orchards (ESSO) [formerly called seed stand]: Seed orchard established from a number of selected trees from one or more known provenances where family identity is not maintained.
- b. Seedling Seed Orchards (SSO). Seed orchard raised from seeds from selected plus trees, which have been tested / are under testing in progeny trials and inferior genotypes removed / to be removed before seed collection. Family identity is maintained and the orchard is designed so as to minimize inbreeding.
- c. Clonal Seed Orchards (CSO). Seed orchards raised from clonal material such as grafting, budding or air-layering. Clonal identity is maintained and the orchard is designed so as to minimize selfing. CSO is normally combined with a separate progeny trial.

There should be only one tick-out-box of seed source class except from the subgroups of seed orchards, where one of the 3 classes is ticked together with the Seed Orchard.

d) Type and Ownership

The main types of forest classification in Cambodia are:

- Forest Concessions are forest tracts that are under or have been under concessionary management.
- Protected forests/forest reserve is forests with restricted use, e.g. allocated for watershed, or general environmental protection.
- Special mgt areas are forests set aside for conserving nature and the natural forest ecosystem, the forest fauna and/or genetic resources.
- Private forests are all forest owned by individuals or private companies, or who have long-term lease on land tenure.
- Community forests are forests not allocated to individuals but where small communities such as villages have the land tenure.
- National Parks and wildlife reserves are natural forests with strongly restricted use, established for e.g. protection of wildlife and biodiversity of plants. The parks are owned by central government and administered by MoE.

Owner of seed source refers to the tenure right; name of person or authority is indicated

e) Climatic records

The provincial weather station best representing the climate at the site of seed source is selected; that is usually the closest station, but in case of hilly or mountainous terrain a distant mountain station may better reflect the climate at the site than a closer lowland station.

All stations in Cambodia have a distinct rainy and dry season, with rainy season during the summer months.

f) Site description

Terrain: The form is self-explanatory.

Slope: Indicated in percentage, i.e. number of meters raises or falls in elevation per 100 meters horizontal.

Aspect: means the main direction of slopes in hilly or mountainous terrain

Soil type: The main soil type is indicated in common terms, e.g. limestone, alluvial soil etc; texture is classified in categories according to the size of particles, the most coarse grained is sand and the most fine-

grained is clay. pH is measured on representative soil samples and is indicated as a range e.g. 4.3-5.0. Soil samples are collected in the field and analyzed in the laboratory.(ph kit if possible)

g) Stand description

Total area of the seed source is indicated in hectares. Number of trees per hectare is calculated based on main spacing. Total number of trees in the stand is calculated by multiplying the two figures.

Height range of mature trees is indicated for less than 10 trees. Diameter range is indicated for the same trees.

Type of stand

- **Natural undisturbed stands** are all stands considered not established by humans, i.e. always indigenous species, and natural regeneration is the main dynamic of regeneration. These stands have not been logged.
- **Logged/secondary stands** , as above but have been logged.
- **Plantations** are all types of stands planted, both production forests and established seed sources. Plantations also include e.g. road, riverside and other types on non-block plantings

Maturity of the stand are categorized in three types.

- **Young stands** are stands largely under mature size and with small seed production.
- **Mature stands** have reached almost full production capacity in terms of seed.
- **Over-mature** stands are stands with small production due to senescence.

h) Assessment of trees in seed source. The average phenotypic appearance of the trees in the stand is assessed for 4 main characters viz. stem form, branching, growth and health. Where other characters are relevant, they should be added under 'others' (e.g. percentage of crown). The characters should be scored on a scale from 1 to 5. For grafted clonal seed orchards, assessment of phenotype is not applicable (n.a.), or it may be based on secondary information from a progeny trial, which should then be indicated.

i) Seed production

The months of flowering and fruiting is indicated.

Records on earlier fruit collection or crop assessment data forms the basic for crop production estimates. Any figure is converted into production per hectare.

j) Accessibility

Of primary concern is the accessibility during seed collection. If this is during the rainy season, access may be impeded by flooding, which should be noted on the form. Under 'other information' should be a short description of how to reach the seed source.

k) Labor availability

Indicate name and distance to places where casual workers for collection and preprocessing are available. Note specifically if some workers have been trained or have experience in collection

l) Other information (recommendations, observations etc.)

Observations could be degree of general or selective logging, threat from local communities, recent burning, attack by insect's etc. Recommendation could be on e.g. protection and management (e.g. thinning necessary, weeding necessary or fertilization Write also any other relevant information pertaining to seed sources which has not been indicated on previous forms.

Form B. List of Seed Sources

The database lists key information from form A: Seed source information records. Each seed source has one line in the table.

Form C. Provincial / regional map of seed sources.

The location of each seed source is indicated on a provincial or regional map. Seed source reference number is indicated directly on the map.

Checklist for Seed Source Survey

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1. Authority

- Permission letter from DFW attached with trip plan

2. Office and field equipment

- Seed source registration system
- Global positioning system (GPS)
- Binocular
- pH kit
- Camera with film
- Compass
- Secateurs
- Field notebook
- List of official and private phone number (contact person)
- Topographical map(s)
- Administrative map
- Reference material on flora etc.
- Measuring tape (diameter tape)
- Rulers, pens, pencils
- Some cotton bags (small & medium)

3. Vehicle items

- Brake fluid
- Extra fuel
- Towrope
- Winch operating switch
- Wire

4. Safety equipment

- First aid kit (standard or remote area kit)
- Mobile phone

5. Miscellaneous

- Lighter
- Axe
- Knife
- Torches