Guide to handling of tropical and subtropical forest seed

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TRADE AND TRANSFER OF FOREST SEED

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Extract from 'Guide to Handling of Tropical and Subtropical Forest Seed'
by Lars Schmidt, Danida Forest Seed Centre. 2000.

Other Chapters of the book Guide to Handling of Tropical and Sub-Tropical Forest Seed by Lars Schmidt soon available on www.dfsc.dk

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TRADE AND TRANSFER OF FOREST SEED

15.1 Introduction

The demand for seed of high genetic and physiological quality for afforestation programmes has furthered the requirement for well-equipped and authorised seed centres, which can guarantee both high seed quality and reliable supply. Forest seed supply has different status in different countries. It may be part of the established governmental forestry department, subsections of large forest industries or independent private enterprises. Often a country's supply of forest seed is a mixture of all three categories. Where forest departments carry out seed procurement, seeds are often not priced according to their total procurement cost, since administrative costs, transport etc. are part of the forest service. For independent private suppliers, the total cost of seed procurement from establishment and management of seed sources to ultimate marketing and administration is covered entirely by sale of seed.

Trade in forest seed is a growing business in some countries, where there is an awareness that high seed quality can be a cheap short cut to higher wood productivity and quality. Domestic and international sale of seed has been taken up by several seed centres traditionally only involved in local seed supply.

For a seed centre to operate efficiently and profitably, it is important that the supplier is able to deliver the required quantity of seeds with the desired high quality and with all the information on source and quality required. Where seed supply is part of the established forestry department, there is an institutional linkage between seed supplier and user. Where seed suppliers are institutionally independent of the seed users, they must be currently active in marketing e.g. by advertising and distribution of seed catalogues to all potential customers. Once a seed order is received, seed must be delivered safely and without unnecessary delay.

Dispatch of seed, whether it is for sale or part of the operational system within the forestry sector or forest industry, involves measures to ensure that the seed reaches its destination safely. Domestic and international transfer differ not only by distance, but more seriously because of a substantial amount of administrative issues and legislative constraints, when seed crosses national borders. It is important

that seed transfer is arranged so that the seed is protected as much as possible during shipment, and that delay in ports is minimised by effective pre-arrangements. Shortening of transit time is particularly crucial for sensitive seeds such as recalcitrant seeds.

15.2 Trade of Forest Seed

Trade in forest seed is quite similar to trade in any other product, and it contains basically the same elements such as marketing analysis, product development, price setting, advertising, order administration, shipment and customer service. However, seed trading implies several particular constraints. One of the strong arguments used by seed suppliers is that their seed has high genetic quality. Yet, it is difficult to prove anything but physiological quality of a seed lot. Many customers may be unwilling to pay for the particular measures taken to secure high genetic quality, e.g. seed source establishment and management and individual tree selection as the result may only show in some distant future. The confidence of customers has to be extremely well established since the (genetic) quality can rarely be proven. On the other hand, advertisements strongly arguing superior genetic quality may easily create expectations beyond what is reasonably realistic.

15.2.1 Seed pricing

The pricing of seed should reflect the costs of collection, processing, storage and distribution for each species (Pedersen 1994). Records on man-days/man-hours during handling, plus other costs related to the seed lot will facilitate accounting for the actual procurement cost (chapter 14). The actual cost of seed procurement obviously varies with species, seed source, treatment etc. Collection costs of seed from seed orchards are often lower than from natural forests because of shorter distances, easier accessibility and operation in the seed orchard. On the other hand, improved seed from a seed orchard is normally priced higher than seed collected from a local plantation, since the cost of seed-orchard seed must cover the entire establishment, maintenance and previous selection programme, whereas seed from a plantation is a by-product. Similarly, seed collected by expensive climbing and subject to complicated processing and storage must be more expensive than seed collected in abundance from the ground where the cost of collection is low. The cost of processing mainly involves labour cost, but may also include e.g. seed dressing and storage material. Where seed is stored in cold rooms, the actual cost of storage will depend on storage period. A breakdown of storage costs to individual seed lots and species can only be estimated. An example of species-wise procurement costs from a number of Central American species appear in appendix A15.1.

Seed-procurement costs are different for individual seed lots. In general, the cost per unit of large seed lots is smaller than for relatively small seed lots, because the individual procurement processes contain a number of fixed expenses (see section 3.4.3). The cost of seed testing is usually fairly similar regardless of species and seed lot size. In addition to costs directly connected with seed procurement, seed supply involves a wide range of overhead costs like equipment, building and vehicle procurement and maintenance, as well as basic

administration. These costs may be broken down to individual species according to their relative importance. Seed that deteriorates or for other reasons is not sold involves procurement costs, which must be covered by the seed that is sold. New investments and profit are other items that must be considered in the total price setting.

Where seed procurement costs are calculated per seed lot or species, it forms a useful guideline for price setting. However, since procurement cost varies for each seed lot and from one year to another, some average must be decided upon in order to avoid too large fluctuations. For administrative purposes it may be cumbersome to handle too many prices; hence species may preferably be compiled into price groups. The Australian Tree Seed Centre's pricing system operates with 4 main price classes, based on rarity of the species, ease of collection, relative abundance of seed (these three relate to procurement costs), and the demand for particular species or provenances. The relative cost is reduced according to seed quantity ordered (ATSC 1995).

The cost of administration and processing of documents in connection with shipping are usually the same no matter whether the seed order is large or small. Therefore seed suppliers usually add a fixed handling fee to each invoice together with the individual freight cost (ATSC 1995).

Seed pricing may in some instances be regulated by external factors such as supply and demand of the species or political or strategic considerations. 'Supply and demand' implies that rare and highly demanded species and provenances may be priced relatively high (and with high profit), while other species may be sold at prices just covering the procurement expenses. Political or strategic considerations may include low (and subsidised) prices for species that are to be promoted.

15.2.2 Marketing

Species choice and quantity of seed needed differ from one customer to another and the market strategy must be adjusted accordingly. Seed marketing does not differ significantly from marketing any other product. It can therefore be dealt with according to the same principles as general business:

1. **Identifying customers**
2. **Adjusting the product**
3. **Presenting the product**

Re. 1. Customers or end users of seed are any tree planters from local farmers to large projects or research institutions, within the country or abroad. The first part of a customer analysis is to identify potential customers, i.e. all those that might be likely to purchase seed from the particular seed supplier. In the analysis are included factors such as:

a) Geographical area of seed supply. There would normally be a connection between the area where seeds are collected and the area where customers live. For example,

if seeds are collected entirely or mainly within one seed zone, it is unrealistic to expect customers from outside the particular seed zone, unless special seed sources (provenances) have been tested and found promising in other areas.

b) Categories of end users. An optimistic initial approach will count all tree planters or potential tree planters as potential customers. A certain grouping, e.g. forest department, private nurseries and NGOs, is appropriate. The number of persons, institutions etc. and the potential consumption in each group are estimated.

c) Species choice. Different groups of end users are likely to plant trees for different purposes and consequently use different species. In a basic market analysis the species choice of present planting activities must be known in order to be able to supply seed of the desired species.

d) Present seed supply. Those already planting trees must be purchasing seeds from somewhere. Besides planters collecting their own seed, there may be other smaller or bigger suppliers in the area, e.g. NGOs, farm suppliers and women's groups. There are several considerations to be made in connection with already established suppliers. Firstly, it must be considered whether there is a need for alternative (additional) seed supply. Secondly, there may already be an established relationship between customer and supplier, a relationship that may be sensitive to touch. Thirdly, taking a market share from local seed suppliers may undermine the local economy of several individuals.

The result of a general survey or market analysis of customers and present seed supply should end up with an estimate of market share i.e. how much of the present market that is likely to shift to a new seed supplier. In this should also be included the likelihood that tree-planting activities may increase or change character in case a new seed supply becomes available (Raae and Christensen 1997).

Re. 2. Analysis of present tree-planting activities with breakdown to species will tell how much seed is actually needed of various species. A simple adjustment would be procurement of the most frequently planted species. However, in order to make a new supplier successful, he/she must usually present something new and better than what was already available. The seed supplier may influence tree planting by making seed of new species and provenances available plus by assuring a generally high seed quality. Suppliers must be aware that cost of seed does influence some customers strongly. Genetically improved seed harvested in seed orchards is most likely too expensive for most local farmers. As the selection and

improvement criteria for plantation species, for which an improvement programme may have been launched, are mostly different from farmland condition, small planters may not even gain the full benefit of genetically improved seed-orchard seed. On the other hand, distant customers and in particular overseas ones are likely to go only for particular provenances or genetically improved seed and are usually willing to pay an increased price for such seed. Therefore, seed type made available may be adjusted not only to customers' need but also to their economic ability.

Re. 3. The aim of the marketing strategy is to make the whole range of potential customers aware that seed is available for sale. The information is disseminated via advertising that may take different forms. Different customers are reached by different means of information and advertisement. Some examples of advertising seed are mentioned here:

a) Seed catalogues. These provide the essential information about each species, normally listed in columns informing on provenance, geographical co-ordinates of seed source, altitude, purity, viability, quantity in stock and seed price or price group (fig. 15.1). This information is all that is essential for the end user in order to estimate the right quantity of seed and determine the best seed source (provenance). The catalogues or seed lists are usually only distributed and updated annually and the figure of quantity of seed in stock is thus subject to current change. Recalcitrant seeds are usually not kept in stock for long periods and seed catalogues would rather state that seeds of the particular species are available on request during a specific period.

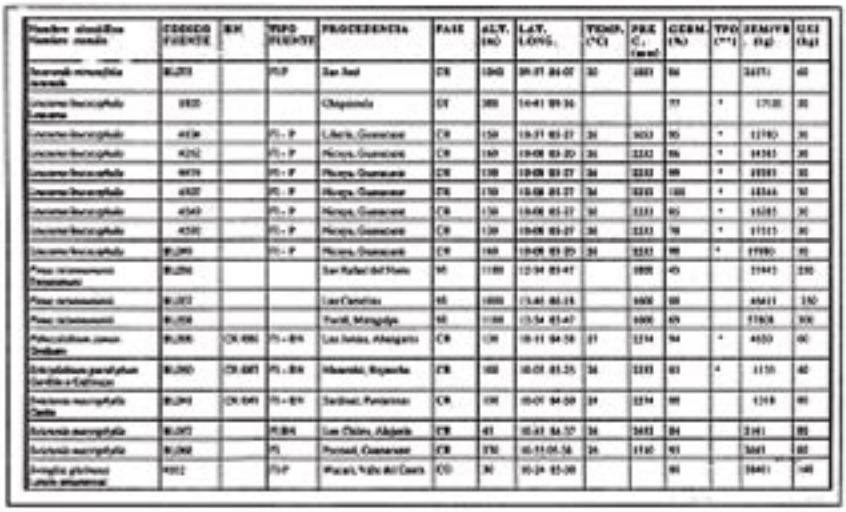

Figure 15.1
Example of a page from a seed catalogue from Costa Rica. (CATIE 1997-98).

Seed catalogues are distributed to all major customers such as large nurseries, large private tree planters e.g. wood industries, donor-funded projects plus former customers. Potential overseas customers should also receive catalogues. A disadvantage of cata-logues is that they are relatively expensive both to print and distribute. Some catalogue information like stock and viability may also be outdated quickly after distribution. A relatively recent but expanding way of distribution is via the international electronic information system, internet. This way is especially valid for reaching distant international customers.

b) Direct communication. For main customers it may be advisable to keep regular contact in order to assure planting targets, species, time etc. Two-way communication allows mutual adjustment of plans, schedules etc. by both customer and supplier.

c) Advertisements. Advertisements in papers, publications, radio, TV etc. are designed to gain attention to the topic rather than provide specific information. It must be followed up by requests from those listening to or seeing the advertisement. The messages in advertisements are normally short and rather inexact. For example, it may state that high-quality seeds are available at XXX, but there is not time and space to provide information on which seed, which provenance, why they are high quality etc. However, particular and detailed information may be announced in specific publications like the example in fig 15.2.

SEED OF EUCALYPTUS GLOBULUS

Seed of Eucalyptus globulus from the Dennison Valley in Southern Tasmania will be available at the end of the 1979/1980 collection season. The trees growing in the Dennison Valley are described as being of exceptional form and vigour, as well as highly cold resistant.

The details of the collection site is as follows:

- Latitude: 42°59'
- Longitude: 146°46'
- Altitude: 450 m a.s.l.
- Total area of stand: 50 ha
- Number of trees collected from: 50-100 over a 5-year collecting period. Seed will be collected from selected trees, felled for sawlogs.
- No accurate climatic data are available. The area is located 60 km from the coast. The mean annual precipitation is about 1,300 mm; part of it falls as snow.

For further information please write directly to: T.G. Walduck, 'Summerleas Farm', Kingston, Tasmania 7150, Australia

Figure 15.2. Example of an announcement of seed in an international scientific publication (FGRN 1979).

Design of advertisements and other PR-material to specific target groups implies both a consideration of details and the language used. For example, catalogues distributed to overseas customers must be in English, French, Spanish or other widely spoken language, and botanical (latin) species names should be used rather than local names. Further, in international catalogues prices should be indicated in convertible currencies like US$. These basics obviously also hold for internet distribution. Information addressed to local communities, NGOs etc. should use local species names, language and currency.

15.2.3 Managing seed stock and sale

Seed stock and dispatch records have already been mentioned in connection with seed documentation (section 14.4). Several computer-based programmes for handling stock and sale are available. Computer registration becomes a great help when many species, seed lots and orders are handled.

The seed stock serves as a buffer from which seeds are removed when demand is high (around sowing time), and where seeds are stored when supply is high (harvest) and demand is low. Seed lots should generally be dispatched in the same order as they enter (first-in - first-out), but obviously dispatch of seed should primarily attempt to meet customers' preference for particular provenances. Further, for long-lived orthodox seeds, in which there is no significant difference in viability of fresh and stored seed, it will often be more appropriate to deliver freshly harvested seed and hence avoid storage altogether, rather than to prepare all seed for storage by reducing the moisture content drastically.

15.2.4 Seed orders

Orders should be made as precise as possible to assure the right seed is delivered. Orders may refer directly to the seed lots listed in the seed catalogues, or they may indicate location of planting site and conditions. In the latter case it is left with the seed supplier to find the most appropriate seed lot suited for the planting site. Customers may indicate the exact quantity of seed in their order, or they may indicate proposed planting area or number of seedlings required, from which the seed supplier should calculate the quantity of seed required based on purity, viability etc. as outlined in table 3.5. A seed order may also state the time the seed is wanted. The latter is important where orders are placed a long time in advance and where collections are made according to orders. In some cases a customer may prefer to receive the seed consignment as close as possible to sowing time, e.g. where storage facilities are not available, or where fresh seed is preferred. In such cases where orders are not dispatched immediately, it is important that confirmation of orders are submitted to the customers and reservations made to the ordered quantity. Orders should be listed according to the dates of their receipt. In case the supply is short (e.g. due to poor seed setting) customers who have submitted their orders first must be given priority.

15.2.5 Labelling and shipment documents

Proper labelling is part of the basic seed documentation system as outlined in chapter 14. It is a good routine to use double labels for any seed lots. One label is fixed outside the bag, the other is put inside. This also holds for consignments of several species: a copy of the invoice may be fixed to the packet and another copy put inside.

Most seed suppliers use carbon copies or copy blocks of 3-4 different colours for invoices e.g. white copy kept with the accountant, blue colour mailed to customers in advance of the consignment and yellow (plus red) submitted with the seed. Labelling of seed lots and information to the customer include basic information such as species, provenance, country, date of collection, seed testing results (date indicated). See forms and labels in the appendix to chapter 14.

15.3 Dispatch and Shipment of Seed

In addition to price and availability, the appropriate type of packing material and mode of packing for shipment depend on e.g. species, quantity of seed to be dispatched, mode of shipment (air /road), and expected conditions and duration of transport and transit (Lauridsen *et al.* 1992).

15.3.1 Packing material

Packing should protect the seed from both mechanical and environmental damage. For most species the seed-coats yield sufficient protection against pressure damage to the seed itself. It is more likely that mechanical damage will cause tearing and other damage to the package with the result that the seeds fall out. Packing material must be strong enough to resist damage during ordinary handling. Moisture and temperature cause environmental damage. Moisture damage is prevented by packing seeds in moisture-proof material such as sealed polyethylene bags. However, since moisture penetration is restricted both ways, the seeds must be sufficiently dried before packing in such material. Otherwise the moisture content may rise inside the package because of water produced by respiration, which can be significant when seeds with high moisture content are transported at ambient temperatures. Recalcitrant seed should generally not be packed in completely moisture proof material. Temperature inside transparent plastic bags can rise dramatically if exposed to direct sunlight because of the so-called green-house effect: short wave solar rays will pass through the material easily, whereas long ray heat waves pass slowly. This source of heating is prevented by storing transparent bags in any light proof material e.g. paper. Special temperature insulation of seed consignments is rarely practised but lined material such as double lined envelopes and corrugated cardboard yield some protection against harmful temperatures.

For shipment the individual seed sample is packed in a sales package (inner package), and the individual samples (if more than one) are packed and shipped together in a transport package, for small lots e.g. lined envelopes, for larger consignments in cardboard boxes (fig. 15.3). The sales packages protect the individual seed samples against moisture, fungi, insects, and loss (tearing). The transport package yields further protection against damage to sales packages and, if several samples are shipped to the same customer, eases handling and reduces price of shipment.

Seeds stored in small portions in laminated plastic bags with CO2 (chapter 8) may be shipped without repacking. This packing type may also be used after weighing out desired quantities of seed according to seed orders. The CO_2 in laminated sealed plastic is absorbed by the seeds and hence functions as a vacuum packing. It is very convenient to handle and resistant to damage, but is only practical for relatively small seeds and quantities (see chapter 8). Large seeds and large quantities of seed may be packed in gunny bags, wooden boxes, metal tins, drums or the like. Volume and weight of packing material may be worth considering especially for air shipment.

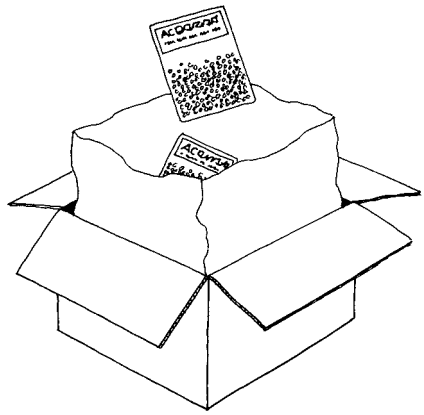

Figure 15.3.
Packing for shipment of seed. Individual seed samples are packed in sales packages of moisture-proof material. The total consignment is packed together in a large plastic bag and shipped in a cardboard box (transport package).

15.3.2 Seed treatment

Use of pesticides should be minimised as it could cause health risks for the receiving customer, and legislation on the use of pesticides differs between countries. Treatment of seed with a compound banned in the receiving country may cause importing problems. Seed treated with special dangerous and environmental damaging chemicals such as DDT and other chlorinated hydrocarbons (section 7.5.5 and 7.6.5) are likely to be rejected in many countries with strict environmental legislation. If pesticides are used, the customer should be informed on the particular remedy (Willan and Barner 1993).

15.3.3 Transport conditions

Conditions comparable to those of cool storerooms are unlikely to be met during seed transport. Orthodox seeds dried to low moisture content may resist most storage environments normally encountered during transport. For recalcitrant seed, the particular shipping agent used (airline, transport company etc.) should be made aware of its sensitive nature and requested to adjust conditions accordingly. During international transfer, the environmental conditions are often better during transport than in transit, and the effective transport time is usually short in comparison with transit time. Deterioration in transit is often experienced during unaccompanied road transport where seed may lie in border transit stores for weeks or months, subject to both adverse climatic conditions and rodents (Campbell 1983). Also slow and bureaucratic procedures in airports may delay release of cargo in the importing country.

Conditions during transport and transit are largely beyond control of both the supplier and the customer. However, the following precautions should be taken to minimise the risk:

1. Sensitive seeds should be packed especially properly and well protected from adverse conditions.
2 Transport and transit time should be reduced as much as possible. Air transport would normally be appropriate for any distant shipment of relatively small quantities. Within shorter distance road or rail may be appropriate and considerably cheaper for large quantities. The customer should be advised on shipment details prior to arrival of the seed. Seeds should be collected from the shipping or transport company as soon as possible after arrival.
3. Shipping companies should be notified of the contents of the consignment and whether the seeds need special conditions during transport (away from high or low temperature etc.). Most transport companies are experienced in dealing with 'special material' but obviously they will need notification.

As for recalcitrant seeds, special attention should be paid to any accompanying inoculants of microsymbionts, which are often extremely sensitive to storage environment (see chapter 13).

15.4 Export - Import Regulations and Constraints

In most countries, seed export is subject to the same general requirements of clearance as holds for any goods for export. However, special legislative restrictions on seed export exist in some countries. Campbell (1983) mentions with regards to India that any seed leaving a state has to be officially cleared, stating that it is surplus seed to the needs of the state in question. Although so far only few countries have passed national laws as a follow up of the Convention on Biological Diversity (Glowka et al. 1994), a likely export restriction in the future may relate to the issue of protection of forest genetic resources. Seed exporters should be aware of any national restriction and legislation. Normally any exported consignment has to be inspected and cleared by official authorities before export. This is to assure that the consignment does not contain illegal items like drugs or protected goods. Export agencies or authorities (postal service, airlines, freight companies etc.) will in addition require appropriate documentation as demanded by the importing country, most commonly a Phytosanitary Certificate (see below), in order to avoid problems at the point of delivery.

Most international transfer of seed is subject to restriction and legislation in the importing country. The most common type is phytosanitary legislation, which is valid in most countries. The purpose of phytosanitary rules is to avoid the risk of introducing dangerous seed-borne pests and pathogens into a country where they are not already found. Such pests may easily find their way to e.g. related native species, which do not have any resistance against the disease. In other cases the purpose is to keep exotic species free from pests found in the native country, but not in the country in which the trees

are to be grown (see discussion in section 7.8). In most countries a Phytosanitary Certificate will be required for import of forest seed. The certificate is issued by an accredited authority in the exporting country and states that the seeds have been examined and found free from pests and diseases (see section 11.7.2). It is thus an official guarantee from the exporting to the importing country. The certificate will also state whether the seeds have been subject to fumigation or chemicals, and which type (see example of a phytosanitary certificate in appendix A15.2).

Custom authorities in the importing country may or may not accept phytosanitary certificates as a guarantee of freedom from pests and pathogens. If not, the seed consignment will be required to go through the quarantine regulation which implies that the seeds are re-examined and/or re-treated with a pesticide. Import treatment is unfortunately pure routine in many countries, and serious delay may occur on that account. In addition, application of seed pesticides in both exporting and importing country may be highly damaging for the seeds as most seed dressings are phytotoxic in large dosages and the effect is cumulative (Willan 1993).

General import restrictions imposed on any commercial product may also affect forest seed. Some countries require particular import permits. In addition, the importing party may need to pay duty on the consignment upon arrival. The duty is normally calculated as a certain percentage of the invoice amount (where freight and handling fee is normally excluded). However, small non-commercial seed lots e.g. for research or trials which are sent free of charge are normally exempted from custom dues, which usually makes clearance and release from ports much quicker (Willan 1995).

Import regulations can cause serious delay to delivery, which may ultimately lead to reduced seed quality because of deterioration in transit. Bottlenecks vary from one country to another. Frequent trade and transfer with the same customer, through the same ports and using the same shipping agent will often help speed up the procedures of clearance. It is advisable that seed suppliers keep a file of country regulations of import and necessary arrangement for shipment. For neighbouring countries, various alternative transport modes and routes may be considered, e.g. ship, air, road or rail. Freight companies specialised in international transfer of goods often make efficient arrangements. Both exporting and importing part can take measures to facilitate clearance and shorten transit time:

1. Several administrative issues may be cleared without (i.e. before) the physical presence of the seed. For example, the importing part should make necessary pre-arrangement for settling particular import restrictions before the seed is submitted. A letter of confirmed order, including price (and type of currency) may be submitted by the supplier before the seed is shipped (at this point some suppliers claim part of the payment). The confirmation letter may help the importing part to obtain the necessary clearance.

2. The seed supplier should provide the necessary documents required by the importing country. Copies of e.g. phytosanitary certificate and freight letter may be faxed or mailed to the customer prior to shipment. Freight letter should state specification of transport (e.g. airline and flight number) and expected arrival date.
3. The consignment should be properly labelled indicating addressee, contents, quantity, date, possible treatment etc. Copy of phytosanitary certificate should follow the seed where required.
4. A short message addressed to shipment and custom authorities may state 'sensitive to high temperature', 'urgent expedition' or the like to help to draw the attention to the sensitive nature of the content and hence avoid unnecessary delay or transit damage.

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Appendix A15.1
Example of breakdown of procurement costs for individual species (CATIE 1998)

Código	Especie	Procedencia	No. Personas	Horas/ día	Periodo	Distancia km	Costo Transp. $	No. Sacos	Peso frutos	Peso semillas	Costo rec. $	Costo proc. $	Costo equipo $	Costo adm. $	Costo total $	Costo kg $
068/97A	*Swietenia macrophylla*	Pocosol Guanacaste	2	8	7-10/01	845	228.15	14	379.0	25.7	172.00	67.65	210.74	128.5	806.64	31.38
070/97A	*Cedrela odorata*	Turrialba	2	6	6,7/02 24/3	307	82.89	2.5	57.4	3.3	129.00	10.70	27.06	16.5	266.15	80.65
012/97C	*Gliricidia sepium*	Naranjo	2	12	8-10 y 23-25/4	712	192.24	11.2	234.3	22.0	258.00	33.88	180.4	110.0	774.52	35.20
009/97D	*Erythrina berteroana*	Dota	2	8	29,30/04 5-7/05	477	250.83	8	37.9	6.1	172.00	35.99	50.02	30.5	539.34	88.41
072/97A	*Cedrela odorata*	Abangares	3	9	31/03-4/4	670	180.9	7	170.0	8.0	169.59	19.43	65.6	40.0	475.52	59.44
006/97D	*Pithecelobium saman*	Abangares	3	6	31/03-4/4	149	40.23	7	126.8	8.2	113.06	143.07	67.24	41.0	404.60	49.34
073/97A	*Tabebuia rosea*	Abangares	2	4	8-12/04	119	32.13	11	158.6	17.9	86.00	56.00	146.8	89.5	410.43	22.93
074/97A	*Tabebuia crysanta*	Abangares	2	2	8-12/04	50	13.50	1	15.3	0.88	43.00	23.47	7.21	4.4	91.58	104.07
013/97B	*Enterolobium cyclocarpum*	Abangares	2	4	8-12/04	788	212.76	11	190.0	47.5	86.00	21.97	389.5	237.5	947.73	19.95
071/97A	*Cedrela odorata*	Matambú	2	4	18-21/03	807	217.89	4	97.1	5.2	86.00	18.30	42.64	26.0	390.83	75.16
008/97D	*Erythrina poeppigiana*	San José	3	6	15,16/04	312	84.24	2	34.0	14.6	113.06	7.18	119.72	73.0	397.20	27.20

Codico: seed lot code
Especie: species
Procedencia: provenance
No. personas: number of persons
Horas/ dia: hours / days
Periodo: period
Distancia km: distance, km
Costo Transp.: transport cost
No. sacos: number of sacs
Peso frutos: weight of fruits
Peso semillas: weight of seed
Costo rec.: cost of collection
Costo proc.: processing costs
Costo equipo: cost of equipment
Costo adm.: cost of administration
Costo total: total [procurement] costs
Costo kg.: Cost per kg

Appendix A15.2
Example of phytosanitary certificate

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
PLANT PROTECTION AND QUARANTINE

PHYTOSANITARY CERTIFICATE

TO: THE PLANT PROTECTION ORGANIZATION(S) OF

FOR OFFICIAL USE ONLY

PLACE OF ISSUE: NEW ORLEANS, LOUISIANA

NO.: FPC 134236

DATE INSPECTED:

CERTIFICATION

This is to certify that the plants or plant products described below have been inspected according to appropriate procedures and are considered to be free from quarantine pests, and practically free from other injurious pests; and that they are considered to conform with the current phytosanitary regulations of the importing country.

DISINFESTATION AND/OR DISINFECTION TREATMENT

1. DATE	2. TREATMENT
3. CHEMICAL (active ingredient)	4. DURATION AND TEMPERATURE
5. CONCENTRATION	6. ADDITIONAL INFORMATION

DESCRIPTION OF THE CONSIGNMENT

7. NAME AND ADDRESS OF THE EXPORTER	8. DECLARED NAME AND ADDRESS OF THE CONSIGNEE

9. NAME OF PRODUCE AND QUANTITY DECLARED

10. BOTANICAL NAME OF PLANTS	11. NUMBER AND DESCRIPTION OF PACKAGES	12. DISTINGUISHING MARKS
13. PLACE OF ORIGIN	14. DECLARED MEANS OF CONVEYANCE	15. DECLARED POINT OF ENTRY

Any intentional false statement in this phytosanitary certificate or misrepresentation relative to this phytosanitary certificate is a violation of law, punishable by a fine of not more than $10,000, or imprisonment of not more than 5 years, or both. (18 U.S.C. s1001)

ADDITIONAL DECLARATION

16. DATE ISSUED	17. NAME OF AUTHORIZED OFFICER (Type or Print)	18. SIGNATURE OF AUTHORIZED OFFICER

No liability shall attach to the United States Department of Agriculture or to any officer or representative of the Department with respect to this certificate.

PPQ FORM 577 (SEP 92) Previous editions may be used

PART 1 - SHIPPER'S ORIGINAL