

Ordering tree seed—some guidelines

In *Agroforestry Today* 9(2):6–9, **Ian Dawson** and **James Were** described a step-by-step approach to collecting germplasm, which is a key part of the process in domesticating agroforestry trees. Yet in some cases, ordering tree seed from a supplier may be the most effective way to obtain quality germplasm. But this should not be a hit-or-miss process. In this article, the same authors offer some more practical guidelines—this time for ordering tree seed. As they point out, a logical approach can help bring successful results.

Researchers working on developing improved agroforestry systems must be able to obtain appropriate tree germplasm—vegetative propagules, or more commonly, seed—with which to conduct their experiments. The same holds true for farmers: if they are to adopt and continue to use

improved agroforestry systems, they must also have reliable access to the tree germplasm that best suits their needs.

There are a number of sources from which germplasm can be obtained: it can be collected directly from local stands (native or naturalized) of a species; it can be produced by establishing

specific seed production stands of a taxa; or it can be ordered from commercial or non-commercial seed suppliers. Increasingly, on-farm seed production is also emerging as an important source. Each of these approaches has advantages and disadvantages, but in some cases, ordering seed from a supplier may be the best

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Drying tree seed in a Kenyan nursery, for distribution by a seed supplier.

approach, especially if it is more cost-effective than collection or if a supplier can provide material that is superior to that available locally. Furthermore, certain types of germplasm may not be available locally—for example, if the desired species is an exotic. In cases where an exotic species has already been introduced into an area, the germplasm from these introductions may be suboptimal, often being of unknown origin, having a narrow genetic base and not performing as well as native populations.

To help ensure successful plantings you should consider 3 aspects of the seed that you order from a supplier.

First, the *genetic quality* is important. Whenever possible, the seed source should be of a specific species and provenance that will perform well in the agroforestry system in which it is to be placed. (This information is often unavailable because the necessary species and provenance trials required to identify superior germplasm have yet to be carried out.) Second, for most tree species, seed should be of *wide genetic base*. This can help ensure that the species will adapt to the changing needs of the user as well as to variable environmental conditions, and will prevent inbreeding depression in outcrossing species (Simons and others 1994). And third, the *physiological quality* of seed is critical. Seed should be of high viability and be capable of producing vigorous seedlings upon germination. Importantly, all 3 of these aspects should be well documented.

One way to determine the quality of seed is by studying suppliers' documentation on the

germplasm in their inventory. The more information you have about a species, including provenance, source (natural, naturalized or planted stand), collection method, collector, and supplier's storage methods, the more appropriate your choice will be.

Below are some standard guidelines that will help you follow a logical approach to obtaining tree seed from suppliers. They are summarized into the appropriate steps you should take before, at the time of and after placing a seed order.

Before ordering

1. Determine the range of species and provenances (if known) available that could fulfil the purpose (such as experiments, extension or conservation) for which planting is required. This will involve considering the end products expected from planting (for example, timber, fuelwood, construction poles, fodder, gums, medicinal products, soil fertility improvement).
2. Consider whether an indigenous species could fulfil the function(s) equally as well as an exotic species. If so, consider giving preference to the indigenous species.
3. Before procuring an exotic species, check with quarantine authorities that it is legally permitted to import that taxon. Investigate the potential biosafety risks—such as pest and disease attack and potential weediness—associated with introduction by surveying literature (see Hughes paper) and asking the relevant authorities. Several agroforestry trees are known to display weedy (invasive) characteristics in certain environments and their

distribution is restricted. Reconsider ordering the taxon if it is likely to be very invasive or if it is likely to introduce or suffer from serious pest and disease problems.

4. Remember to consider cost implications for anticipated seed purchasing. Tree seed may be expensive, especially if the species or provenance is in high demand. Nevertheless, as the Australian Tree Seed Centre advertises "good seed does not cost it pays".

5. Search available literature (for example, the *Tree seed suppliers directory: sources of seed and microsymbionts* of Kindt and others 1997, which contains more than 4000 tree taxa and 100 suppliers) to determine potential suppliers of a taxon and any associated microsymbiont. Write to national tree seed centres to determine which species they may provide. Many individual suppliers will provide their seed catalogues on request. As far as possible, choose from those suppliers who provide the best documentation as this will allow you to better judge the quality of the seed you order.

6. Contact suppliers and provide them with as much information as possible to determine if they can fulfil your specific germplasm requirements. Indicate if you require a particular

- subspecies
- population or provenance
- type of collection (such as single tree collection).

If you would like the supplier to help you select planting material, provide full details on the proposed planting site and the objectives for planting. If possible, include:

- location (latitude, longitude)



Cultivating tree seedlings in a large Kenyan nursery.

- altitude
- climate (mean annual rainfall, rainfall regime, length of dry season maximum and minimum temperatures, occurrence of frost)
- soil type (broad classification, approximate soil depth, texture, drainage, pH, salinity)
- previous on-site planting of the species, including the provenance used and how it performed
- other species at the site
- the end products expected (for example, timber, fuelwood, construction poles, fodder, gums, medicinal products, soil fertility improvement).

Some of the above information—soil composition or climatic data, for example—may be obtained from existing literature.

7. Ask the supplier to provide

- confirmation that your order can be filled and the time to delivery.
- full documentation on the origin of the germplasm, including the approximate number of trees used for collection, whether the collection originated from a natural, naturalized or planted stand and the date it was collected
- seed germination percentage
- price of seed (if free of charge what conditions must be met?), method of payment (will they accept cash or cheque?) and timing of payment (is prepayment required before delivery of seed?)
- information on the availability of microsymbionts (if required)
- appropriate conditions for seed (and microsymbiont) storage so that on arrival material can be properly stored before sowing.

Placing an order

Once you have found an appropriate supplier, proceed with the following steps:

8. Order seed well in advance of the time required

- Suppliers may not have sufficient seed in stock and may need to carry out further collections. Since most tree species only produce seed at specific times of year, considerable time may elapse before the opportunity for collection arises. In addition, some trees may seed only in certain years (2–15 years).
- Consider the time required to raise seedlings before field planting. This may vary greatly between species and between different planting sites. The success of any planting

programme depends on correct timing. Off-season planting should be avoided. For most species, seed should be ordered a minimum of 6 months before the intended planting date.

9. Provide practical and relevant details that will help the supplier process and ship a seed order. Indicate
 - when material will be sown and planted
 - how many seedlings are required (as opposed to seed weight) so the supplier can more accurately judge the quantity of seed that should be sent
 - preferred delivery date: if you don't have appropriate seed storage facilities ask the supplier to delay dispatch until closer to the intended sowing date to ensure maximum viability of the seed
 - correct mailing address, name of contact person, and fax and telephone numbers (if available)
 - most reliable shipping method and routing
 - importation requirements (and importation certificate if required) of the country to which the seed will be sent.

10. Ask the supplier to send information on the following with the seed:

- any seed pretreatment that may be required for maximum germination
- the purity of the seedlot, remembering that many problematic weeds have come in as impurities
- seed treatments, such as fungicides or insecticides, that have been applied to seed before or during storage or before dispatch

- biosafety risks associated with the species, such as pest and disease attack or potential weediness
- legal and ethical restrictions on the use or distribution of supplied germplasm, particularly in relation to the Convention on Biological Diversity.

After receipt

11. Confirm receipt of seed if requested by the supplier.
12. Store seed under the conditions specified by the supplier until sowing.
13. At sowing, follow directions on seed pretreatment and biosafety guidelines provided by the supplier.
14. File and safeguard documentation provided with seed for future reference—for example, you may wish to order seed from the same source again if trials

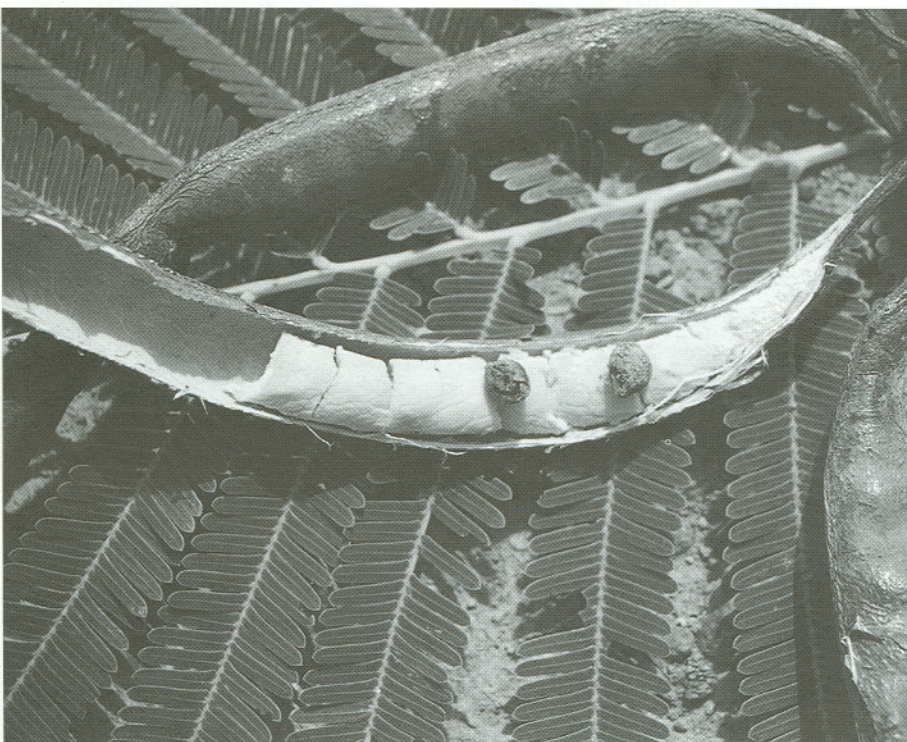
prove successful. Copy this information to everyone to whom seed is distributed.

15. Keep the supplier advised about the performance of the germplasm and about any problems that occur with germination of seed or with pests and diseases. 🌱

References

- Hughes CE. 1994. Risks of species introductions in tropical forestry. *Commonwealth Forestry Review* 73 (4): 243–252.
- Kindt R with Muasya S, Kimotho J and Waruhiu A. 1997. *Tree seed suppliers directory: sources of seed and microsymbionts*. Nairobi, Kenya: ICRAF. 411 p.
- Simons AJ, MacQueen DJ and Stewart JL. 1994. Strategic concepts in the domestication of non-industrial trees. In: Leakey RRB and Newton AC, eds. *Tropical trees: the potential for domestication and the rebuilding of forest resources*. London: HMSO. p 91–102.

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The bright yellow seeds of the African locust bean (*Parkia biglobosa*). This tree can yield timber, fodder, medicinal products and food — suppliers are listed in books like the *Tree seed suppliers directory*.