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A guide to seed quality

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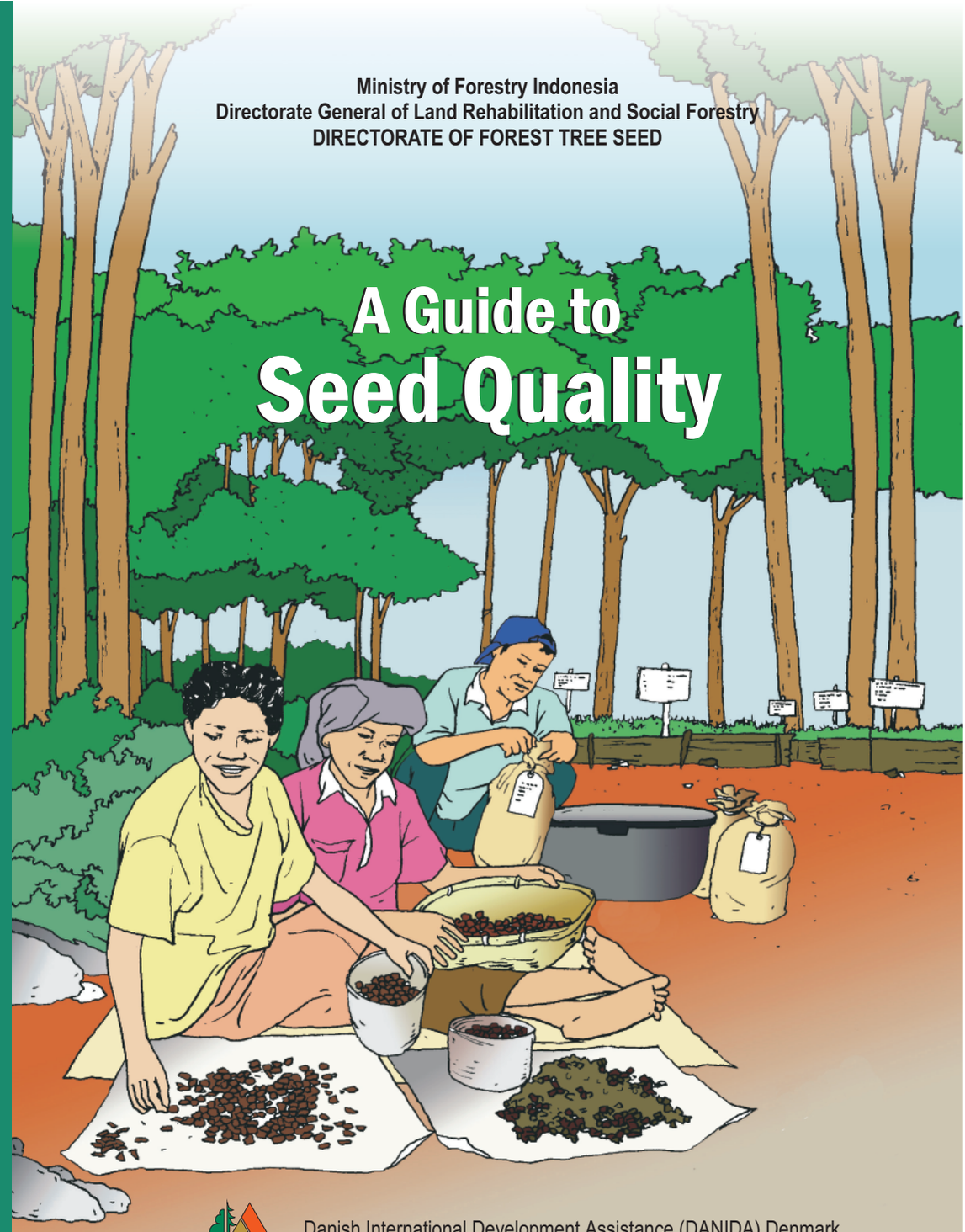
Ministry of Forestry Indonesia
Directorate General of Land Rehabilitation and Social Forestry
DIRECTORATE OF FOREST TREE SEED

A Guide to Seed Quality



Danish International Development Assistance (DANIDA) Denmark
Indonesia Forest Seed Project

A Guide to
Seed Quality

April, 2004

A Guide to Seed Quality

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FOREWORD

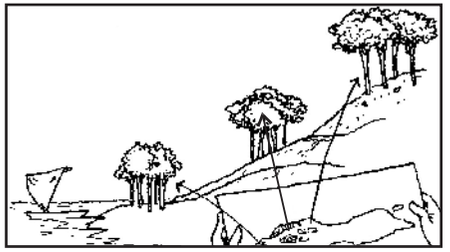
Seed quality is a key word in all afforestation. Everybody can usually agree that quality is a good thing, which we should promote, -yet there is still much confusion on what quality actually means and how to manage it. Quality is relative and we cannot use the same criteria and standards for all species in all contexts. Confusion of concepts and the non-exact standard of quality often lead to inappropriate priorities, unrealistic expectations or, at the worse, ignorance of quality aspects altogether.

This booklet is an attempt to emphasise on the importance of seed quality and define what it means.

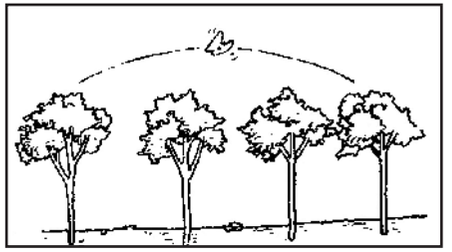
Bandung, April 2004

Djoko Iriantono, Project Manager
Lars Schmidt, Chief Technical Adviser

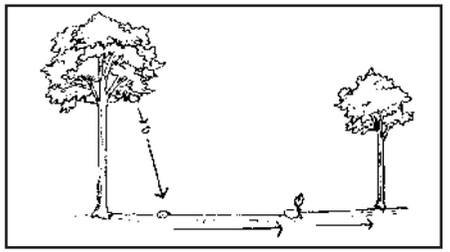
GOOD QUALITY SEED IS?



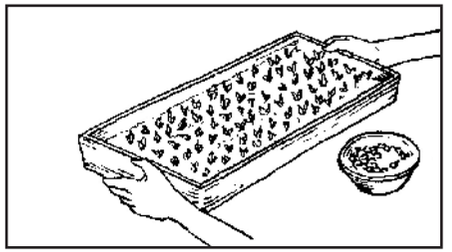
1. Seed which matches the planting site (right species and provenance).



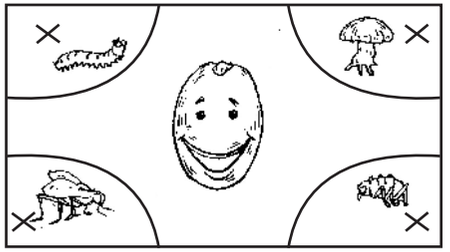
2. Seed which have been produced by out-breeding.



3. Seed with inherited traits for good growth performance, shape, product quality.

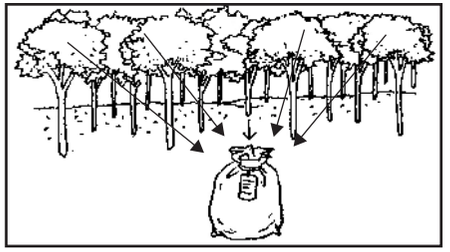


4. Seed with good germination ability.



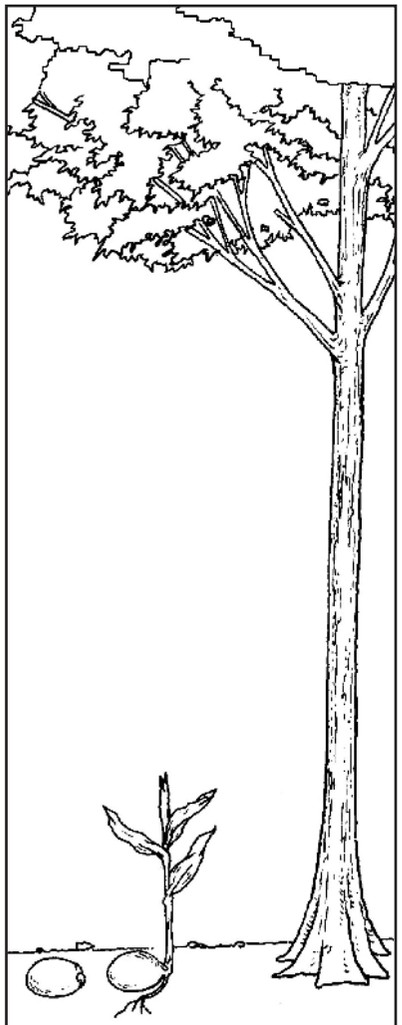
5. Seed without pest and diseases.

6. Seed with good storability *(Note: Some species have seed, which are always difficult to store)*.

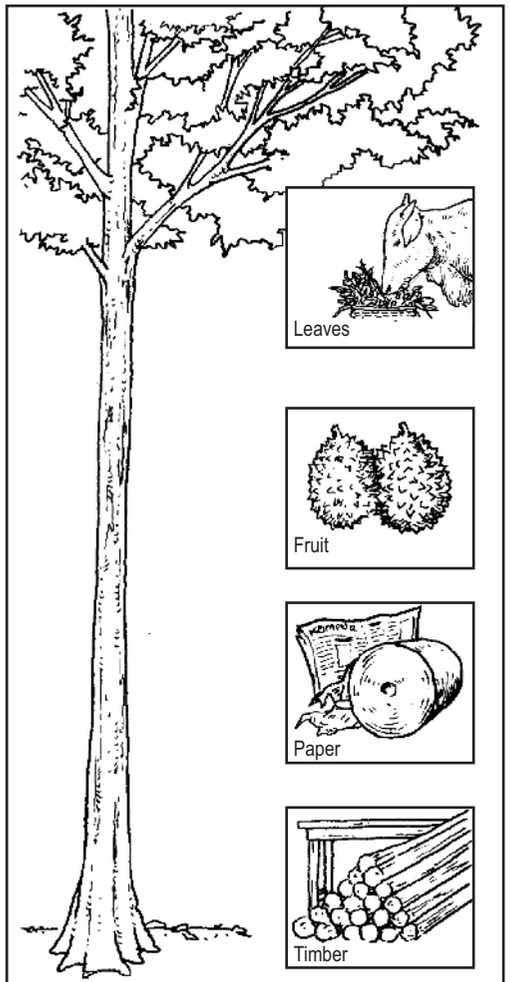


7. Seed collected from a number of un-related mother trees (normally > 25).

WHAT IS SEED QUALITY ?

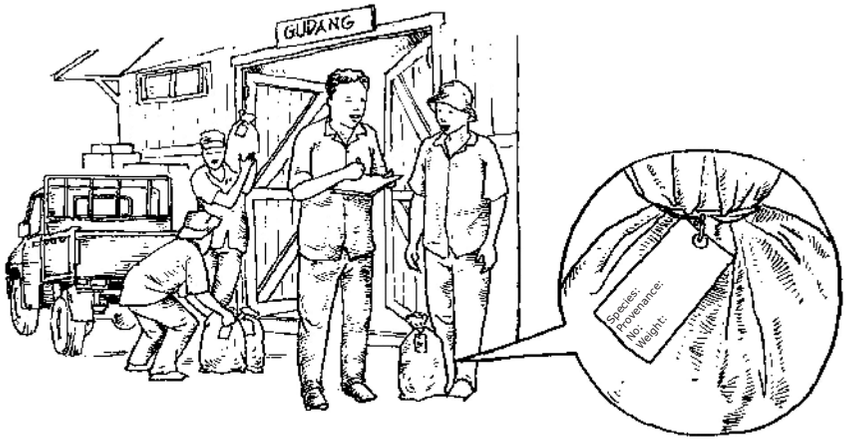


A good seed is a seed that will produce a good plant, which under normal conditions will grow fast into a good tree.



A good tree is a tree with good properties like timber, fruits, leaves or other end product.

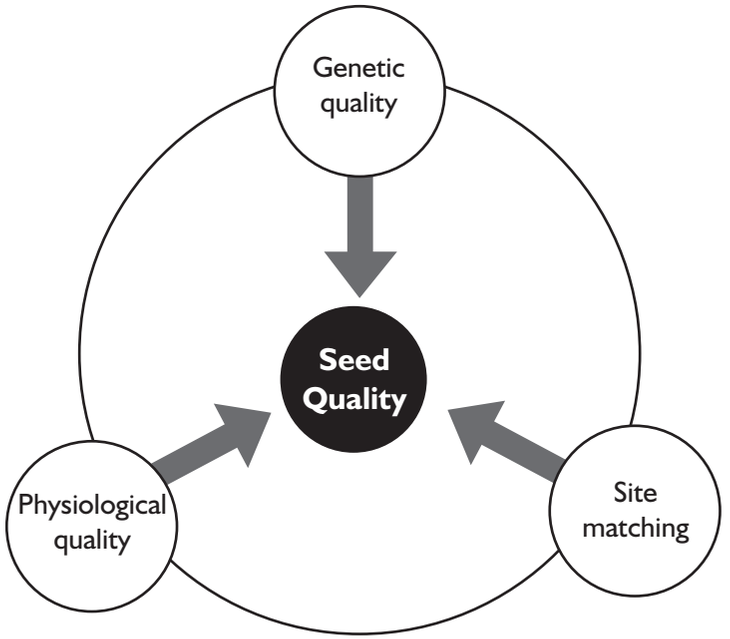
Seed Documentation is a Quality Assurance



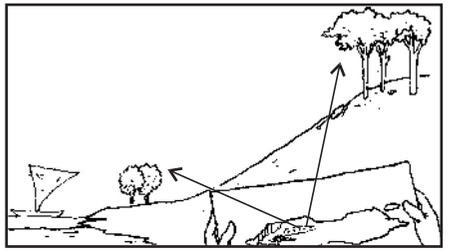
Seed without documentation may be good or bad but often the latter.

'Use Always Documented Seed'

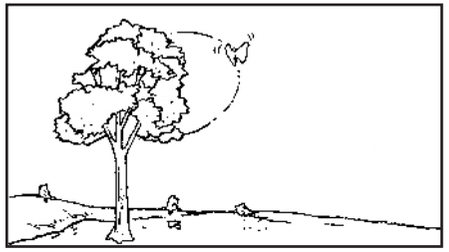
Quality is a Combination



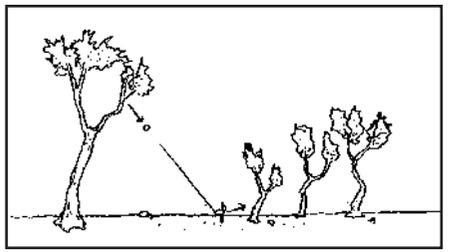
Poor Quality Seed is



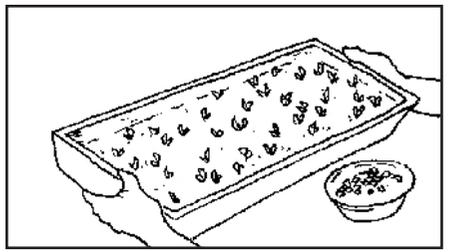
1. Seed which does not match the planting site (wrong species or provenance).



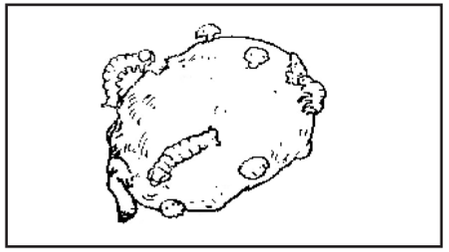
2. Seed which have been produced by inbreeding (mating within or between related individuals).



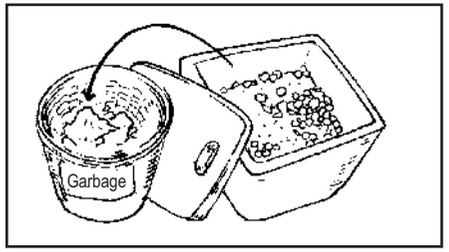
3. Seed with inherited traits for poor growth performance, shape, product quality.



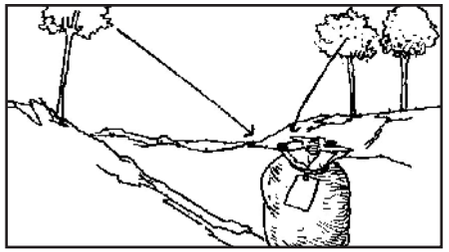
4. Seed with poor germination ability.



5. Seed infected by pest and diseases.

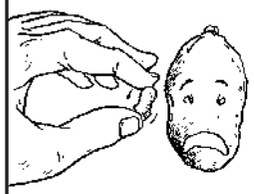
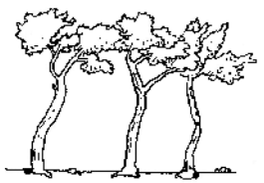
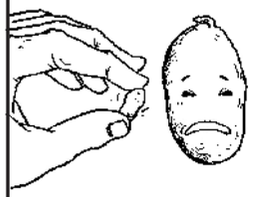
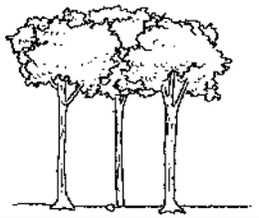
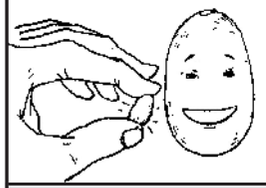
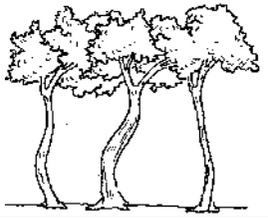
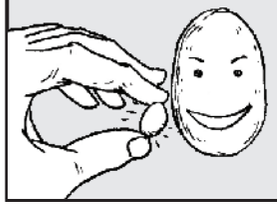
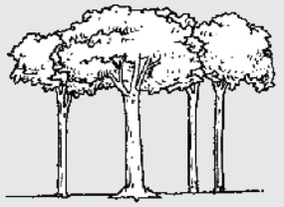


6. Seed with poor storability (relative to the species).

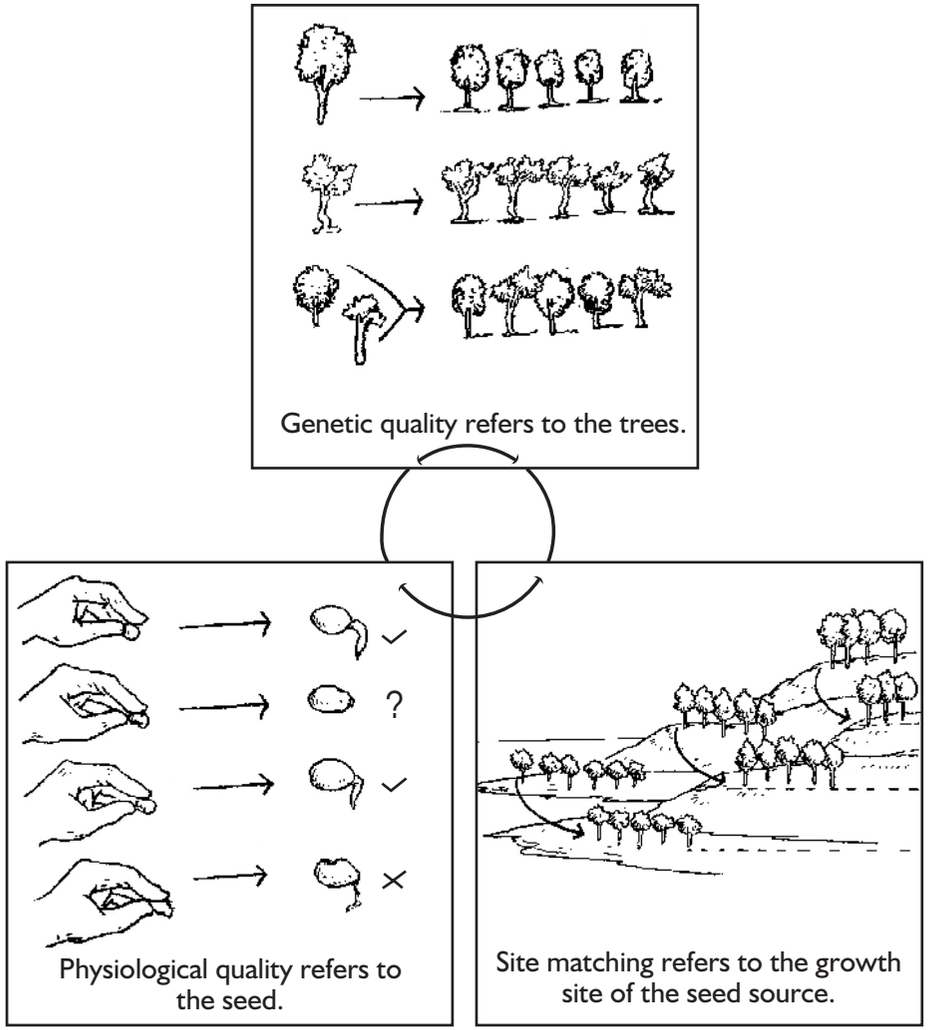


7. Seed collected from isolated or few mother trees.

THE BEST QUALITY IS THE BEST COMBINATION

Physiological quality	Genetic quality	Example
Poor 	Poor 	Old deteriorated, infested or immature seed from a poor seed source, or inbred seed.
Poor 	Good 	Old deteriorated, infested or immature seed from a good seed source.
Good 	Poor 	Healthy and viable seed from a poor seed source.
Good 	Good 	Healthy and viable seed from a good seed source that match the planting site.

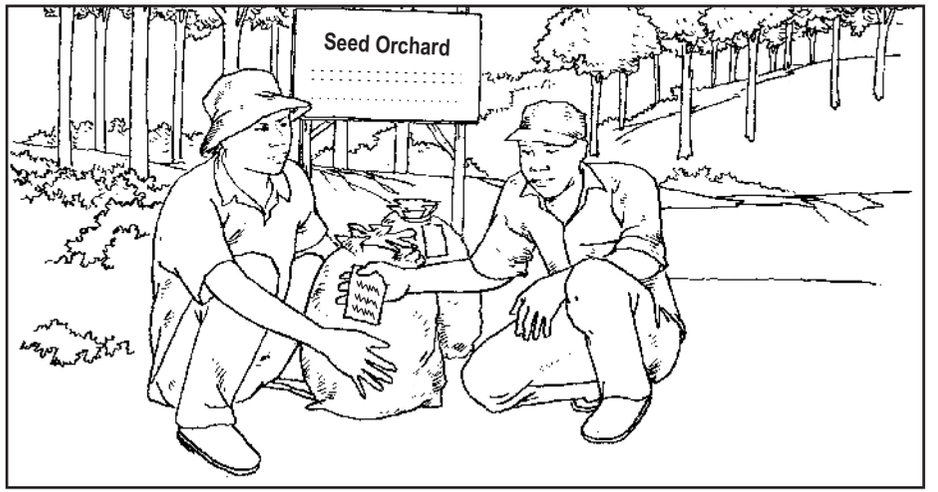
Quality seed must be good both in physiological and genetic quality and match the planting site.



If any of the three quality parameters is poor, the overall result will be poor.

Quality is Relative!

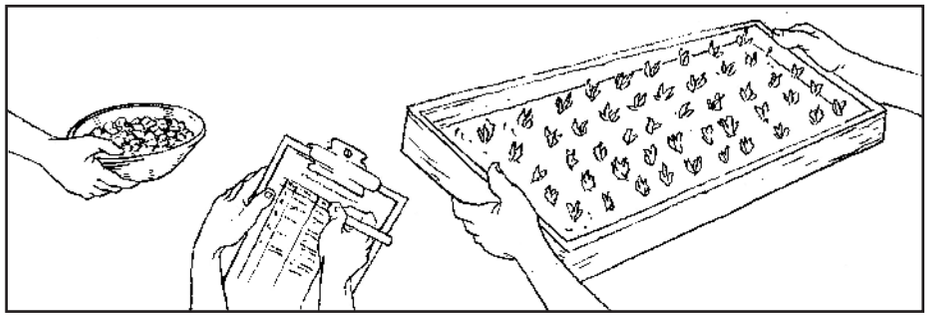
Quality is relative, good quality is the best available, which may be:



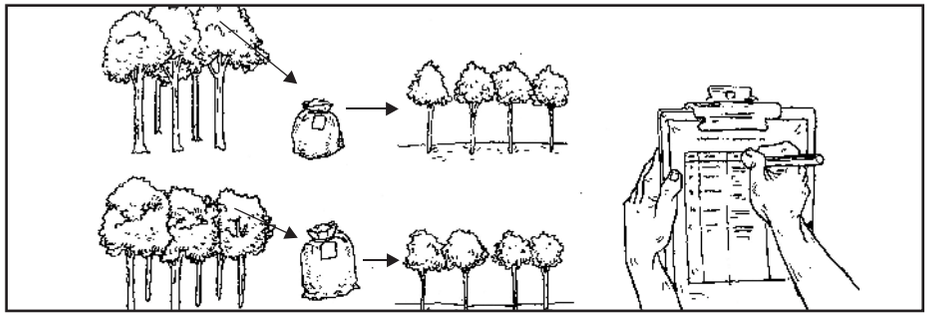
Advanced bred seed with all documentation for superior performance (improved quality seed).

Seed from a good local source with good health and germination.

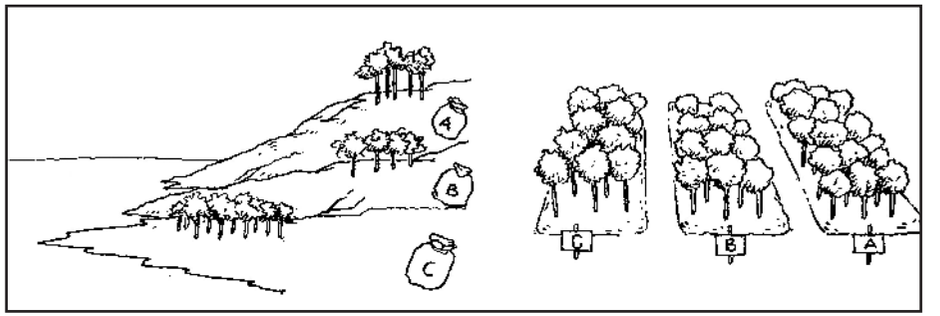
Quality can be Tested



A physiological quality test indicates the viability and vigour.



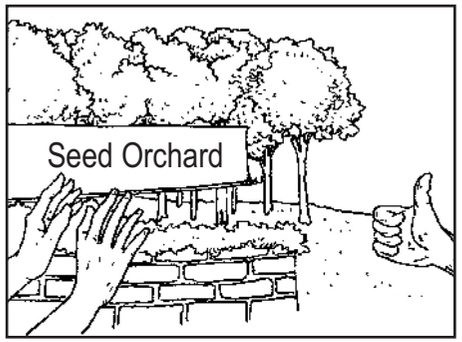
A genetic quality test indicates the inherited performance of the offspring provenance test on population level; progeny test on family level.



A site matching test indicates the inherited growth ability of different seed origin on a particular planting site.

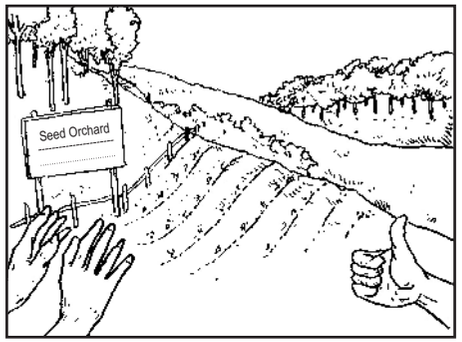
Use preferably tested seed!

Some Misconception about Seed Quality



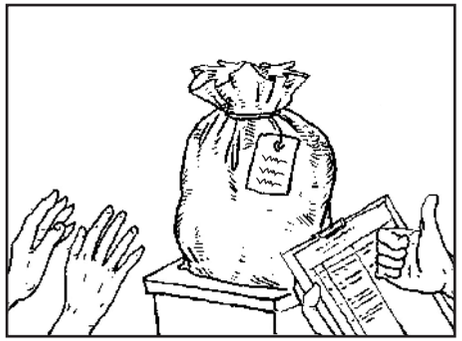
1. Seed orchard seed is always good.

Restriction: To yield superior quality seed, seed orchards must be isolated from poor trees or stands and genetically upgraded by genetic thinning after tests.



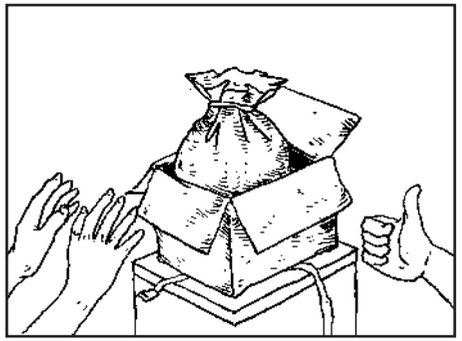
2. Advanced bred seed is always better than average seed.

Restriction: The source must primarily match the planting site a less advanced source may be better if it fits better the planting site.



3. Documented seed is better seed.

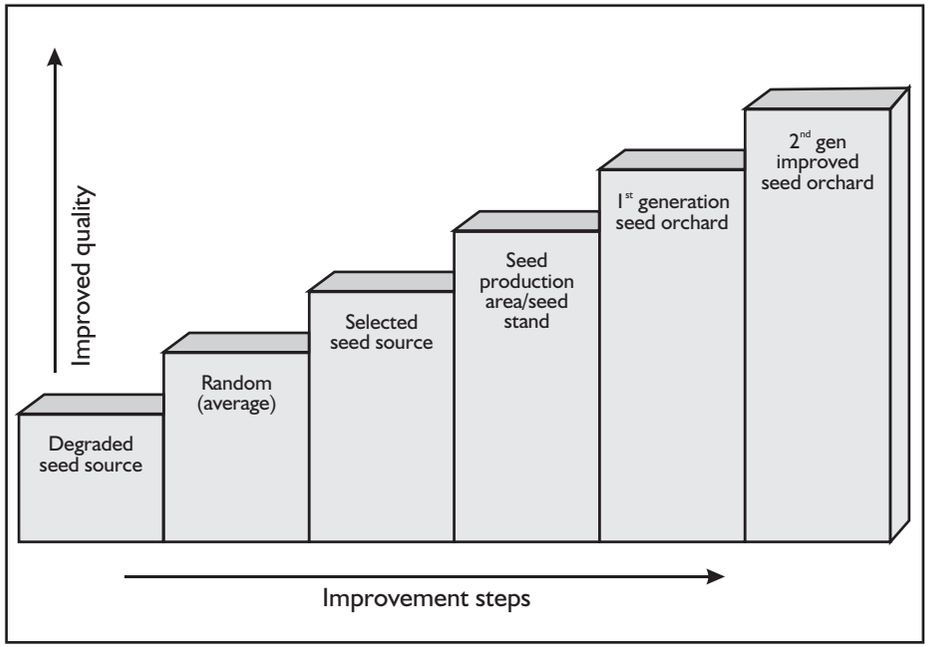
Restriction: The document doesn't improve the seed, - the document must prove that the seed is better (but in practice un-documented seed is often poor).

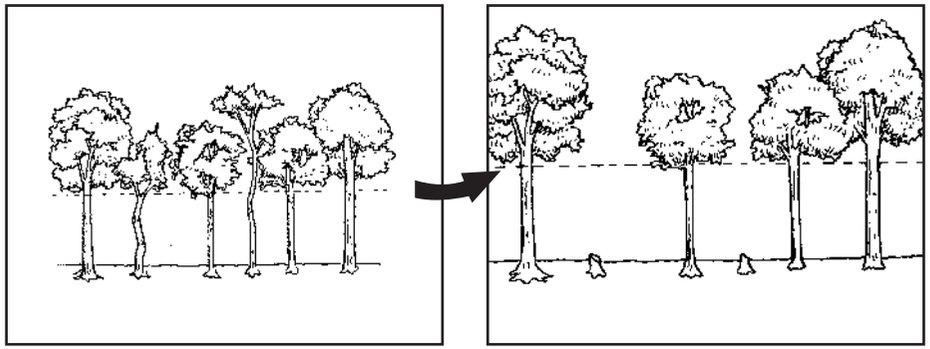


4. Imported seed is better than local seed.

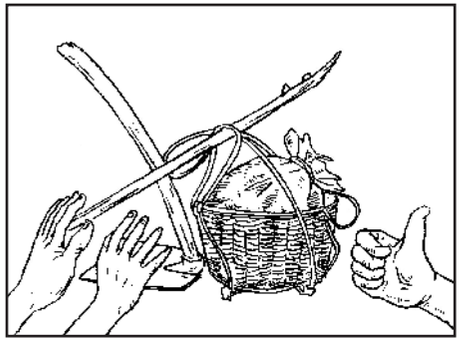
Restriction: Imported seed can be from poor and non-matching seed sources; - quality of imported seed must be documented.

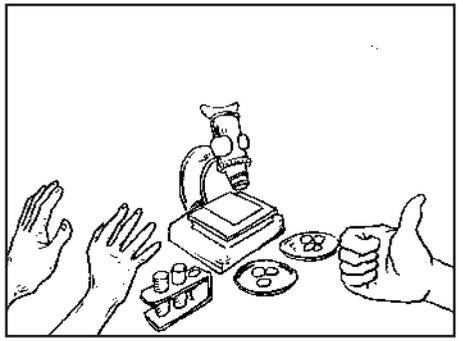
Tree Improvement Ladder





Remember: Average minus poor → better.



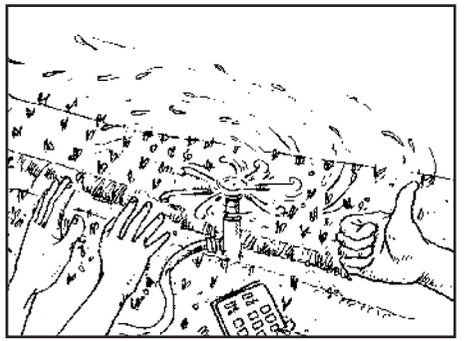


5. Local seed is better than imported seed.

Restriction: Local seed can be from a degraded, inbred source, which may undermine the possible advantage of local adaptation.

6. Plants from tissue culture (TC) are better than plants from seed.

Restriction: Tissue culture is a propagation method not an improvement method. TC plants can never be better than the mother trees only TC plants derived from highly improved and tested material are high quality.



7. Seed and seedlings produced by high technology is the best.

Restriction: Technology of seed procurement and nursery does not improve the genetic quality.

It doesn't pay to save on quality

Some Good Reasons to Use Good Quality Seed and Plants

1. **A good quality tree gives economic return faster than a poor quality one.**

   All forestry is long-term investment and the time span from sowing to harvest is often limiting. Improved growth rate gives faster return, and for relatively slow growing species, shorten the rotation to an acceptable level.

2. **A good quality tree has higher value than a poor quality one.**

   For timber trees, the value of the wood is closely connected to quality criteria such as straightness and branching habit.

3. **The labour involved in using good quality material is not higher than poor quality.**

   Labour cost in the nursery, in planting and in maintenance make up the highest cost in plantation establishment. It doesn't pay to spend all this investment on poor material.

4. **A good tree takes up the same space as a poor tree.**

   Where land resources are limited, the productivity of each unit of land is important.

5. **Maintenance of good quality plantations is often lower, as the trees grow faster and are more competitive.**

   The highest labour cost in plantation establishment is maintenance and weeding. The faster the establishment, the quicker the crowns will close and shade out the weed, the shorter the necessary weeding.

6. **Plantations of good genetic quality can make good seed sources in the future.**

   Production plantations can often be used as seed sources. The better the genetic quality of the plantation, the higher is the genetic quality of the seed harvested from them.

7. **Use of quality material encourages improvement and develop-ment of even better material in the future.**

   Quality improvement is a process linked with planting the higher the demand for improved material, the higher is the improvement effort.

Some Poor Reasons for Not Using Quality Seeds and Plants

1. **Good quality seed is not available.**
   For a number of species improved material from good Seed Orchards is available from authorised suppliers. Most suppliers can provide seed from the best available seed sources, which is often far better than randomly collected, un-documented seed.

2. **Good quality is too expensive.**
   The extra cost of using good seed is often already gained in the nursery by better growth compared to the ultimate value of the trees, the cost of seeds and plants is usually very small.

3. **There is no extra benefit for the planter to use improved material.**
   Even if the planter is different from the plantation owner, he should be compensated for use of better quality material.

4. **Good quality is not good for the environment.**
   Often wrong; a quickly establishing plantation is also quickly to establish an environment for animals, protect against erosion and regulate water flow.

5. **Fast growing trees produce poor quality wood.**
   Often wrong. Many fast growing trees produce good wood and often more uniform than poorer quality.

6. **There is too much cheating in quality we can never be sure we really get a better quality.**
   For a number of species, certified seed can be obtained, where the quality is documented by a certifying institution.

7. **We can never be sure that even documented quality seed will grow better than other seed.**
   Growth is influenced by many factors of which the genetics of seed is only one. A seed or plant certificate guarantee that the best seed procurement methods have been used for the best available genetic material. The documentation assures that there is a good chance that the seed will grow better than average.

8. **Seed quality is irrelevant for plantings for non-production forest e.g. plantations for environmental purposes such as in watershed areas.**
   Most plantations, -even those where the main purpose is not wood production, can be used as wood resources in the future. Production and environmental planting is often integrated.

Where Do We Get Good Quality Material?

1. Documented seed can be obtained from authorised seed suppliers in most of Indonesia. Regional Seed Centres (BPTHs) can assist in identifying the best seed suppliers and best seed sources in the region. They can also often help getting seed from other regions or from abroad.
2. Demand the best insist to get the best. Buy only seed which has a documentation for quality (origin, germination and, if possible, genetic quality).

'Quality seed cost, but it pays'

Note:

Note: