

Appendix 6

Options for the future of the OFI seed collections

Options for the Future of the OFI Seed Collections

**Report funded under the Forestry Research Programme (DFID)
Project No. R 6551**

**Evaluation of selected non-industrial tree species and development of
approaches to facilitate the utilisation of results**

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Executive Summary

Seed collection, storage, distribution and evaluation programmes have been a major research activity of the Oxford Forestry Institute (OFI) over the last 30 years. Seed has been sent to 140 different countries and to 900 recipients including academic institutions, research organisations, NGO's, government departments, and the research sections of commercial companies. The OFI seed collection forms a compilation of forest genetic resources of high value for research, development and conservation work, assembled with the allocation of considerable time, expertise and financial resources. There has been, and remains today, substantial demand for the OFI seed due in part to the research programmes and international collaboration that has been fostered during this period. However, the last 2-3 years have seen a change in the focus of research funding provided by donors, which has not favoured programmes involving seed collection and trial evaluation. OFI research projects for which seed collection was a major activity have been completed, and there have been changes in the complement of research staff who were involved in forest genetic resources research. These changes meant that an evaluation of the issues and options surrounding the future of the OFI seed collections was needed.

To ensure that the future use of the OFI seed collections is maximised, a secure and appropriate framework for the continued distribution of seed has been sought through consultation with many of the OFI staff members who assembled, worked with or distributed the collections. The future demand for OFI seed has been predicted based on the analysis of the past and current demand for OFI seed using data in the seed management database, SISTEM+. The implications of existing agreements between OFI and its seed donors are explored and possible options for the future maintenance of the collections evaluated.

The result of this consultation is that the future security and utility of the OFI seed collections can be best achieved by *a rationalisation of the whole seed collection, followed by the transfer of individual sections of the collection to more than one institution according to groups of genera.*

A plan of action has been proposed in which the rationalisation of current seed stocks and disposal of unnecessary seed is the cornerstone. Rationalisation should be followed by the transfer of seedlots to specified recipients, for example, the rationalised pine collections could be sent to DFSC, and the major 'active' legume collections to ICRAF. Small quantities of seed originally collected for experimental purposes (e.g., laboratory and glasshouse studies) should be maintained at OFI. The process of rationalisation and re-distribution of the OFI collections will require additional external funding. Costs would include research staff time to analyse and prioritise the seedlots to be discarded, viability tests, technical staff time to sort and dispatch seed to the various recipients, management of the SISTEM+ database, and freight costs. A provisional budget for the implementation of the rationalisation and re-distribution processes is given. The extent of this process should not be under-estimated given the size and complexity of the collections, and although there is a requirement for funding under this plan, this will be a one-off charge and it is hoped that OFI's forest genetic resources can be secured for future use within the seed acquisition and storage activities of the specified recipients.

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OPTIONS FOR THE FUTURE OF THE OFI SEED COLLECTIONS

1. Introduction

Seed collection, storage, distribution and evaluation programmes have been a major research activity of the Oxford Forestry Institute over the last 30 years. However, the last 2-3 years have seen:

- A change in the focus of research funding provided by donors, which has not favoured programmes involving seed collection and trial evaluation.
- The completion of OFI research projects for which seed collection was a major activity.
- Changes in the complement of research staff who were involved in seed collection and distribution, and trial evaluation.

These changes have meant that an evaluation of the issues and options surrounding the future of the OFI seed collections is needed. This document predicts future demand for OFI seed based on an analysis of the past and current demand for OFI seed using data in the seed management database, SISTEM+. The implications of existing agreements between OFI and its seed donors are explored and possible options for the future maintenance of the collections evaluated. This process has been conducted in consultation with many of the researchers at OFI who have been involved in seed acquisition and distribution activities, principally Richard Barnes, David Boshier, Jeff Burley, Stephen Harris, Colin Hughes, Alan Pottinger and Janet Stewart. The evaluation of possible options has also involved discussions with ICRAF (Tony Simons and Ian Dawson), DFSC (Bjerne Ditlevsen and Lars Graudal) and FAO (Christel Palmberg).

2. Historical background

2.1 OFI and tree seed collection and distribution

OFI's seed collection and distribution activities began in the mid-1960's with the collection of *Pinus* seed from Central America and Mexico. Over the past 30 years, OFI's seed collection and distribution activities have widened and changed focus dramatically. In the 1970's and early 80's, the majority of seed distributed was from a range of *Pinus* species, used originally for the establishment of seed production areas and for planting, and in the latter years for species, provenance and progeny trials. This reflected the work of research programmes whose focus was the widespread collection of pine seed from Central America and Mexico, and its subsequent evaluation. In the early 1980's, the focus of research at OFI widened to encompass the collection and evaluation of dry- and wet-zone hardwood tree species from the same region, e.g. *Acacia*, *Albizia*, *Caesalpinia*, *Gliricidia*, *Leucaena*, *Parkinsonia*, *Cedrela*, *Cordia* and *Liquidambar* species amongst others. This programme identified species of great potential, many of which were already in use in a number of tropical developing countries, and led to a series of research programmes that focused intensively on the taxonomy, distribution, reproductive biology and genetic improvement of a small number of species from the genera *Acacia*, *Calliandra*, *Cordia*, *Gliricidia* and *Leucaena*.

Since these seed collection activities began, over 2600 seed orders have been dispatched comprising over 2500 kg of seed. The seed has been sent to 140 different countries and to 900 recipients including academic institutions, research organisations, NGO's, government departments, and the research sections of commercial companies.

OFI's seed collection and distribution activities can be divided into two types; those carried out by OFI, and those carried out by Alice Holt, the UK Forestry Commission's seed store where OFI seed is maintained. OFI is responsible for the provision of research staff, purchase of collecting permits, seed collection transport and labour costs, freight from the donor country to the UK, handling of correspondence, provision of advice, and provision of technical personnel for the logging of seed input and output data. Occasionally, seed banks in Central America have been commissioned to collect seed on OFI's behalf and/or seed purchased from them. Alice Holt is responsible for seed handling, testing, storage and dispatch to recipients.

2.2 Cost and sources of funding for seed collection and distribution activities

The annual cost of OFI's seed collection, storage and distribution activities was originally covered by a core grant to the OFI by the UK government's Overseas Development Administration (ODA, now Department for International Development, DFID). When the core grant ceased in the early 1990's, all seed collection and distribution activities were funded by the Forestry Research Programme of ODA/DFID through individual research projects (Table 1).

Table 1: FRP-funded projects that have funded seed acquisition and/or distribution research activities at OFI.

Code	Project title	Principal Investigators
R3714	Exploration and collection of Central American dry zone hardwoods	C.E. Hughes & B.T. Styles
R4091	Intensive study of multipurpose tree genetic resources	C.E. Hughes
R4454	Evaluation of Central American multipurpose tree species for dry zones.	J.L. Stewart & A. Dunsdon
R4485	Exploration and collection of <i>Calliandra calothyrsus</i> .	D.J. Macqueen
R4524	Intensive study of <i>Leucaena</i> genetic resources in Mexico and Central America.	C.E. Hughes
R4526	<i>Acacia karoo</i> : evaluation and acquisition of genetic resources.	D.L. Filer, R.D. Barnes & L.A. Lockhart
R4583	African <i>Acacias</i> : study and acquisition of genetic resources - phase two.	C.W. Fagg, R.D. Barnes, I.D. Gourlay & L.A. Lockhart
R4584	Development of seed distribution and trial management procedures in tree improvement projects.	A.J. Pottinger
R4856	Genetic improvement of non-industrial trees with particular reference to <i>Gliricidia sepium</i>	A.J. Simons & A. Dunsdon
R5063	Systematics of <i>Parkinsonia</i> and closely related species in the genus <i>Cercidium</i> .	P.J. Kanowski, C.E. Hughes & J.A. Hawkins
R5465	The taxonomy and ecology of Latin American pines and the conservation of genetic resources.	B.T. Styles & A. Farjon
R5654	Investigation of approaches to improve effectiveness of transfer of results from OFI tree improvement programmes to the field.	A.J. Pottinger
R5728	Genetic improvement of <i>Calliandra calothyrsus</i> .	J.R. Chamberlain
R6296	<i>Leucaena</i> genetic resources: dissemination of results	C.E. Hughes
R6535	Genetic improvement of <i>Calliandra calothyrsus</i> - phase two.	J.R. Chamberlain
R6550	Genetic improvement of African <i>Acacia</i> species - phase two.	R.D. Barnes
R6551	Evaluation of selected non-industrial tree species and development of approaches to facilitate the utilisation of results.	A.J. Pottinger

In recent years, there has been a change in tropical forestry development perspectives and priorities away from the reliance on exotic species, to integrated natural forest management encouraging the use of native species, and supporting biodiversity conservation. This approach has not favoured new research programmes involving the collection and evaluation of individual tree species, and projects for which seed collection was a major activity

have now been completed. Therefore in 1998/99, funding for seed distribution came from only one project, R 6551 'Evaluation of selected non-industrial tree species and development of approaches to facilitate utilisation of results' which has also now been completed.

The annual charge for seed handling, testing, storage and dispatch to recipients levied by Alice Holt has varied over the years (see Figure 1), but in the last four years (FY 1996-1999) the cost has reduced from over £8000 to approximately £5000 per annum. The overall annual costs of OFI's seed collection and distribution activities have not been calculated, although it has been estimated that the cost of the collection of one kilogram of *Calliandra* seed is £1000. *Calliandra* seed is particularly expensive to collect as only relatively small quantities of seed are obtained from its populations, but based on this estimate all of OFI's seed collecting, storage and distribution activities may have cost in the region of £3 million over the last 30 years. In recent years, these costs have been borne largely by individual research projects as described above.

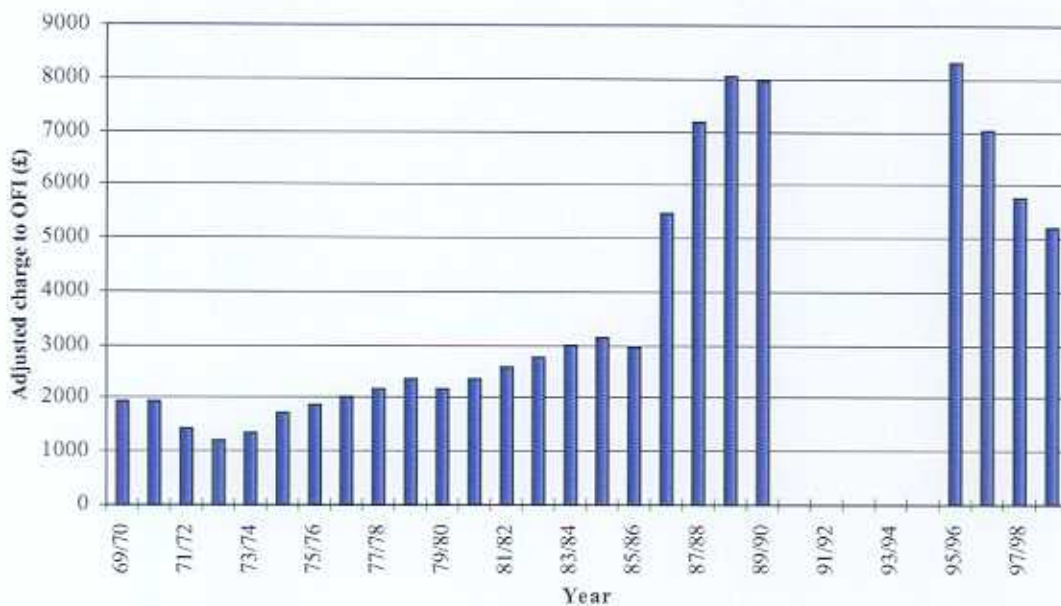


Figure 1: Change in the charge levied by Alice Holt to OFI for seed storage and distribution over a period of 30 years. A pricing change was introduced during FY 86/87 and charges were not available for FY 90-95.

3. Nature and quantity of seed collections

Two types of seedlots are available in the OFI seed collections; bulk collections from individual populations and family collections where seed was kept separate by its mother tree. The OFI collection currently comprises 56 genera representing 213 species (Table 2 and Annex 1). The collection comprises 1146 bulk seedlots and many more family seedlots, representing 956 provenances with a total weight of 1153 kg. For the majority of the genera (33), the total amount of seed available is less than one kilogram (Figure 2). For four genera, *Pinus*, *Acacia*, *Faidherbia* and *Leucaena*, there is more than 100 kg of seed per genus available.

The seed from the OFI collections is supplied for research purposes only, and the main end-uses have been for species, provenance and progeny trials, the establishment of seed production areas, laboratory studies (taxonomic and population genetics), and in recent years, for on-farm trials.

Table 2: Genera represented in the OFI seed collections (by weight).

Genera in the OFI collection	No. of bulk seedlots	Weight of seed available (kg)	No. of provenances represented
<i>Pinus</i>	290	383.661	194
<i>Acacia</i>	171	245.767	162
<i>Leucaena</i>	208	181.558	195
<i>Faidherbia</i>	83	104.226	67
<i>Albizia</i>	23	73.972	20
<i>Parkinsonia</i>	20	32.600	19
<i>Liquidambar</i>	17	26.816	17
<i>Calliandra</i>	94	13.130	70
<i>Enterolobium</i>	6	12.038	6
<i>Cedrela</i>	31	11.945	28
<i>Cordia</i>	24	11.083	18
<i>Gilircidia</i>	53	10.989	39
<i>Caesalpinia</i>	7	6.798	6
<i>Swietenia</i>	1	4.829	1
<i>Bombacopsis</i>	3	4.288	3
<i>Prosopis</i>	9	4.277	7
<i>Pithecellobium</i>	1	3.513	1
<i>Guazuma</i>	2	3.218	2
<i>Lonchocarpus</i>	19	2.264	19
<i>Sesbania</i>	4	2.166	4
<i>Heteroflorum</i>	2	2.079	2
<i>Crescentia</i>	3	1.831	3
<i>Haematoxylon</i>	2	1.790	2
<i>Myrospermum</i>	2	1.000	2
<i>Senna</i>	1	0.955	1
<i>Apoplanesia</i>	1	0.728	1
<i>Zapoteca</i>	8	0.568	8
<i>Hybosema</i>	5	0.536	4
<i>Goldmania</i>	2	0.514	2
<i>Cercidium</i>	11	0.509	10
<i>Mimosa</i>	1	0.500	1
<i>Eucalyptus</i>	2	0.473	2
<i>Desmanthus</i>	7	0.472	7
<i>Diphysa</i>	3	0.393	3
<i>Ateleia</i>	3	0.264	3
<i>Machaerium</i>	1	0.233	1
<i>Schizolobium</i>	1	0.221	1
<i>Cupressus</i>	1	0.200	1
<i>Lysiloma</i>	2	0.181	2
<i>Phyllocarpus</i>	1	0.150	1
<i>Harpalyce</i>	1	0.144	1
<i>Havardia</i>	2	0.135	2
<i>Dalbergia</i>	2	0.134	2
<i>Peltogyne</i>	1	0.123	1
<i>Toona</i>	2	0.085	2
<i>Sophora</i>	1	0.063	1
<i>Brongniartia</i>	2	0.056	2
<i>Piscidia</i>	1	0.050	1
Genera in the OFI collection	No. of bulk	Weight of seed	No. of provenances

Genera in the OFI collection	No. of bulk seedlots	Weight of seed available (kg)	No. of provenances represented
<i>Acosmium</i>	1	0.047	1
<i>Piptadenia</i>	2	0.034	2
<i>Calliandropsis</i>	1	0.030	1
<i>Schleinitzia</i>	1	0.015	1
<i>Calopogodium</i>	1	0.014	1
<i>Ramirezella</i>	1	0.010	1
<i>Peltophorum</i>	1	0.005	1
<i>Pterocarpus</i>	1	0.003	1
ALL GENERA	1146	1153.683	956

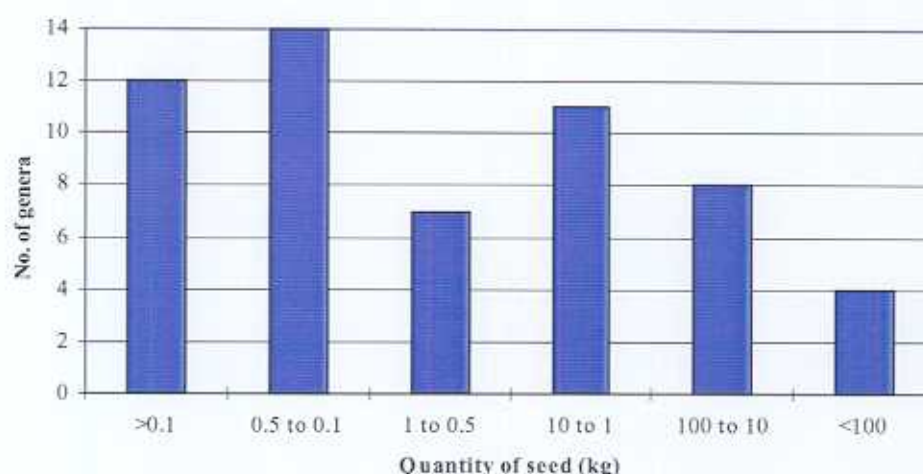


Figure 2: The number of genera in the OFI seed collections and the quantities available.

4. Value of and demand for OFI seed

4.1 Past value and demand

In order to assess the past and current demand for OFI's seed, data was extracted from the seed management database, SISTEM, through which the vast majority of OFI's seed collected, stored and distributed has been managed. From this data, a number of trends relating to changes in demand can be observed.

Overall, demand for seed as measured by the total number of seed orders distributed per year has been variable (Figure 3). However, the total number of orders per year has been declining steadily since a peak in demand during the mid-80's. This peak coincided with the distribution of a very large number of dry-zone hardwood species trials. There were a relatively smaller number of seed orders placed in 1991, 1994 and 1997.

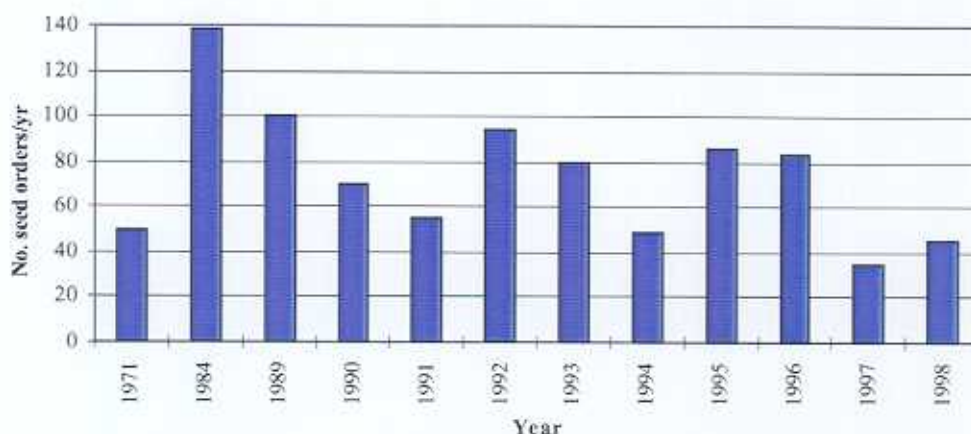


Figure 3: The total number of seed orders distributed from the OFI seed collections in the period 1971-1998.

The mean number of seedlots distributed in each seed order was at a peak during the mid-80's (Figure 4). Again, this coincided with the distribution of the dry-zone hardwood species trials that were typically composed of 26 different provenances, with one or two provenances per species. A more recent peak can be observed in the mid-90's when relatively large numbers of seed orders were distributed for *Calliandra* and *Leucaena* species and provenance trials.

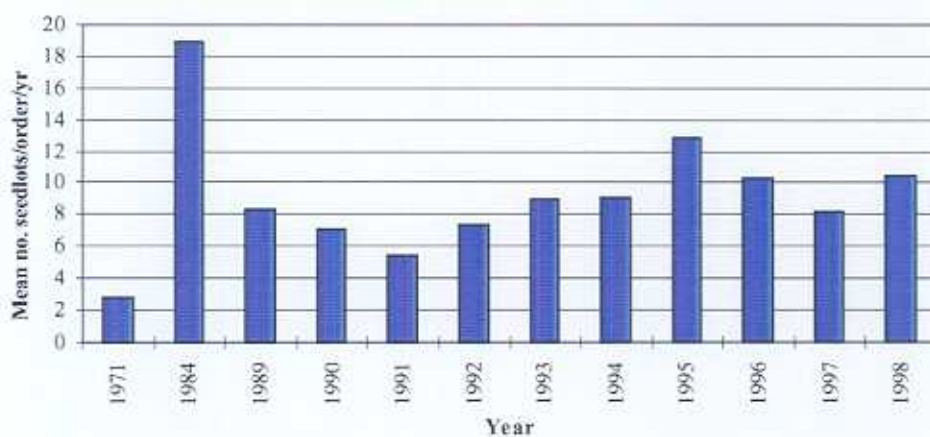


Figure 4: The mean number of seedlots comprising each seed order in the period 1971-1998.

The mean seed weight per order has increased substantially in recent years and probably reflects the trend towards seed orders being placed for the purposes of establishing seed orchards and for on-farm work with relatively heavy legume seed, and a move away in demand for the relatively lighter *Pinus* seed (Figure 5). Mean seed weight per order was also high in the mid-80's, again reflecting the distribution of seed for dry-zone hardwood species trials.

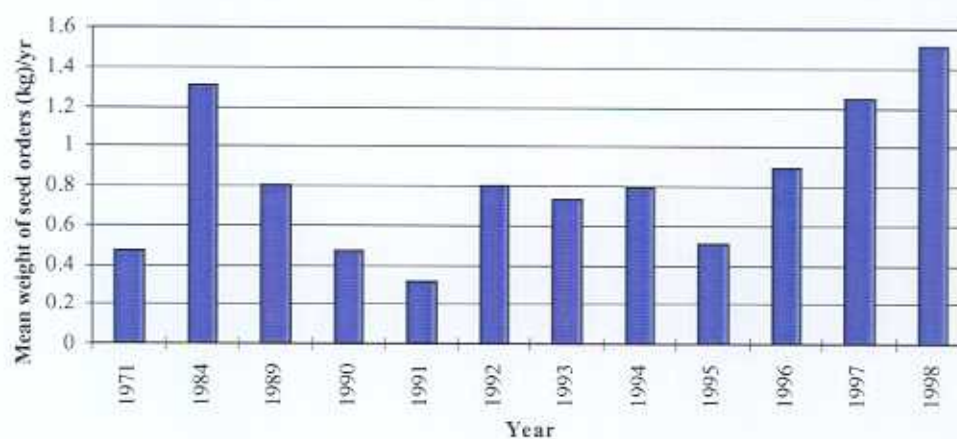


Figure 5: The mean weight (kg) of seed distributed per order in the period 1971-1998.

The total weight of seed per order has varied widely over the years, reflecting changes in demand for seed type and the purpose to which it is put (Figure 6). The total weight of seed per order also reflects the reduction in demand for seed in 1997, 1994, 1991 and 1990 when a relatively small total number of seed orders were distributed, and the peak in demand during the mid-80's.

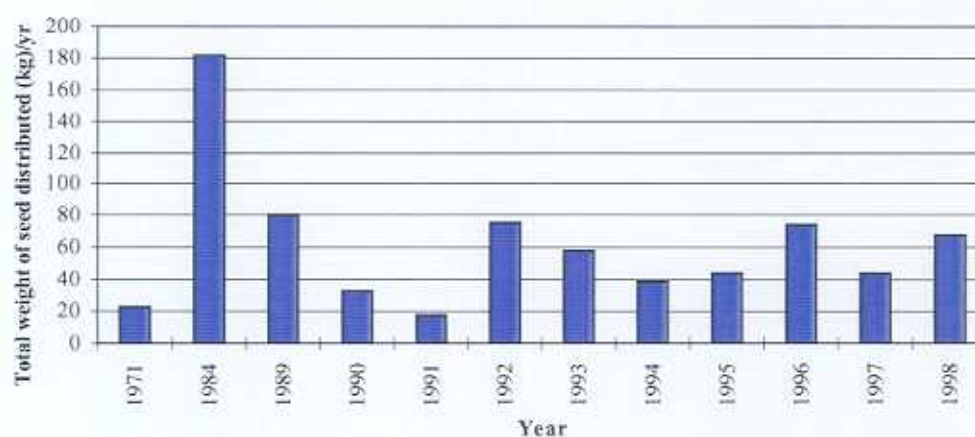


Figure 6: The total weight (kg) of seed distributed per order in the period 1971-1998.

The purpose to which seed from the OFI collections has been put has remained relatively constant over the last ten years (Figure 7). The major use of the seed has been for species or provenance trials. The use of seed for laboratory-based experimental work has been great with a peak during 1991-1994. The provision of seed for seed orchard establishment has been significant over the years, and the last four years have seen the provision of seed for on-farm research work, e.g. with the Forages for Smallholders Project (FSP) in south-east Asia. There has also been a decline in the number of seed requests for the establishment of progeny trials which probably reflects the change in demand for species from industrial (e.g. *Pinus*) to non-industrial (e.g. the legume genera). Overall, the change in demand reflects the continuous process of collection, evaluation and multiplication that has occurred for many species.

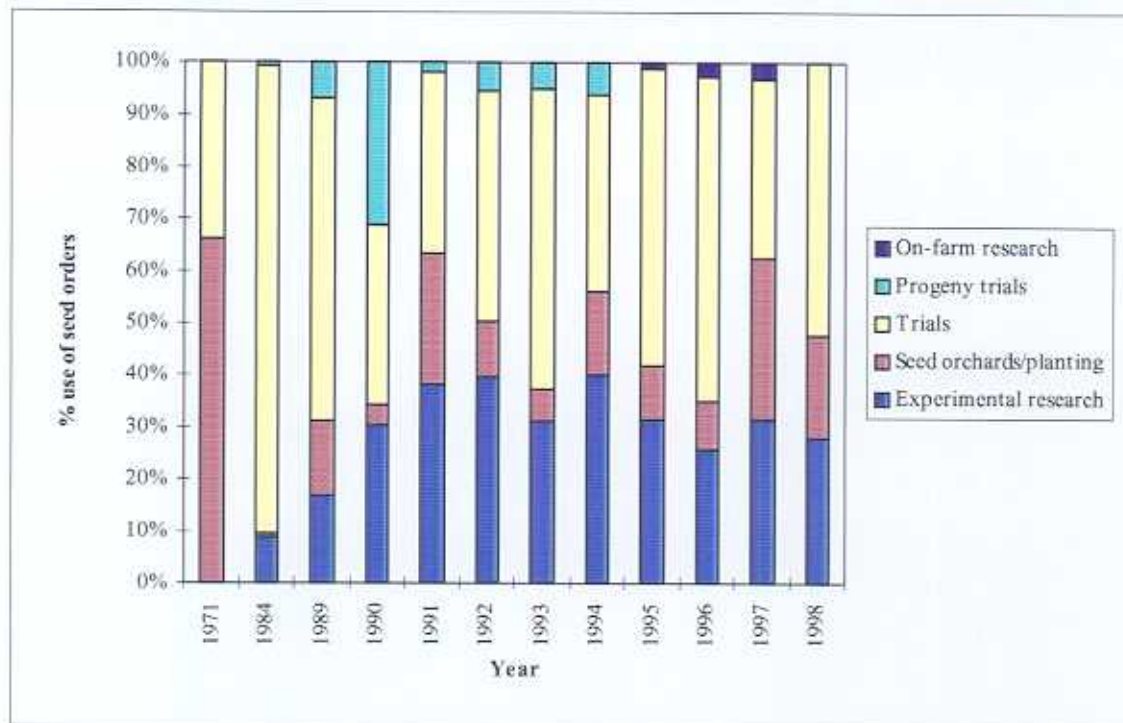


Figure 7: The percentage of seed orders requested each year and categorised by end-use in the period 1971-1998.

In the 70's, requests for *Pinus* species formed the majority of the seed orders, along with mixtures of species per order that would have been used to establish species evaluation trials (Figure 8). In the mid-late 80's, requests for dry-zone hardwood species dominated the seed orders. However, in recent years the focus has altered dramatically with requests for *Acacia*, *Calliandra*, *Gliricidia* and *Leucaena* forming around 90% of the seed orders.

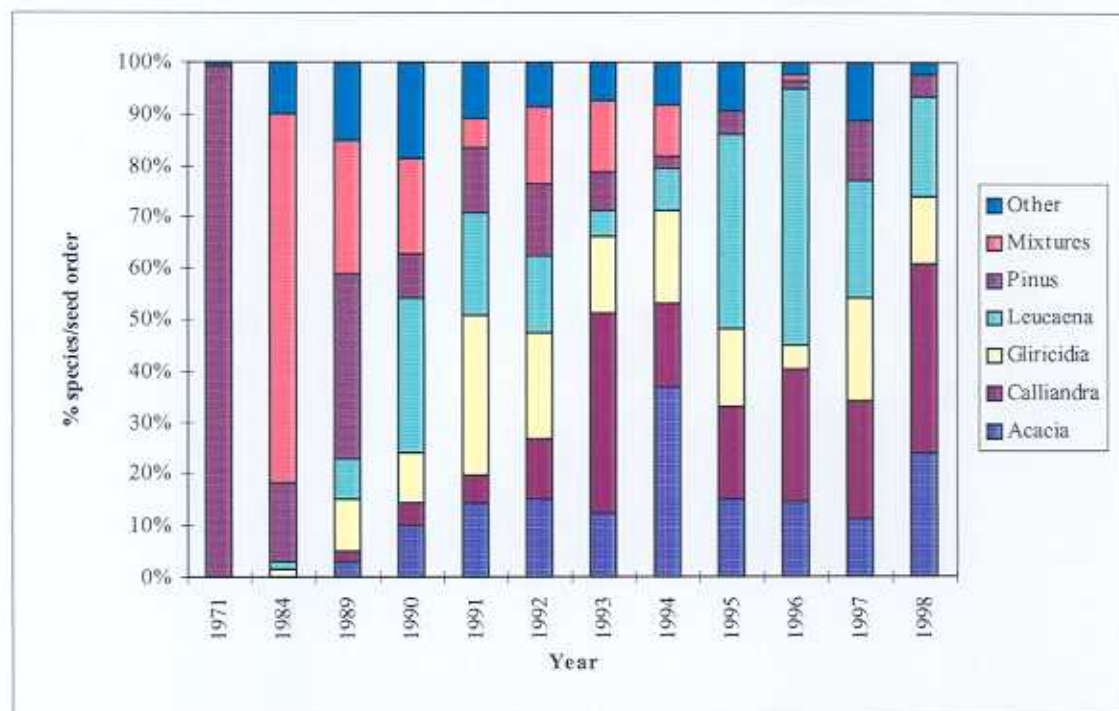


Figure 8: The percentage of seed orders requested per year and categorised by species in the period 1971-1998.

4.2 Future demand

It is clear from the patterns of demand described in section 4.1, that there has been a trend away from seed distribution for species and provenance trials towards seed distribution for the establishment of seed production areas and for on-farm research with farmers. Distribution activities have moved away from the evaluation of *Pinus* species and species mixtures, towards work with the non-industrial tree species that OFI has done much of its work with this decade, namely *Acacia*, *Calliandra*, *Gliricidia* and *Leucaena*.

It can be predicted that the future demand for seed from the OFI collections will continue to focus on these non-industrial genera, and that there will be requests for relatively large quantities of seed of species and provenances that have performed well in trials, particularly from the genera *Acacia*, *Calliandra* and *Leucaena*. It is likely that this seed would then be used for the establishment of seed production areas and for on-farm work.

5. Agreements with seed donors and recipients

OFI has acquired seed mainly through its own collecting activities, although sometimes seed banks have been specially commissioned to collect seed on OFI's behalf and freight it to the UK. OFI has mainly collected seed in accord with specific agreements set up between OFI and the donor country and/or counterpart organisation in Africa, Central America and Mexico. As a result, the OFI seed collection can be viewed to be 'held in trust' on behalf of both donors and recipients, a position clarified by, but not explicitly stated in the OFI Material Transfer Agreement (MTA). It will be important that seed from the OFI collection is distributed according to the conditions laid out in the OFI MTA, and in accordance with the spirit under which it was collected. For this reason, the MTA's of other organisations with seed collection and acquisition programmes are also considered.

5.1 Agreements with seed donors

5.1.1 Africa

No formal agreements were entered into for the collection of *Acacia* species from Africa. All collecting activities were done through personal contacts with officials in the relevant government departments, seed banks or research institutes. Sometimes seed collection trips were conducted in collaboration with representatives of the counterpart organisations who collected for their own seed stores at the same time. Donor countries in Africa have always understood that when they co-operate with OFI seed collection activities, the provenances from other countries will be available to them for research purposes.

5.1.2 Central America and Mexico

Agreements between OFI and seed donors in Central America and Mexico are generally of three types:

- Specific agreements between OFI and a counterpart organisation.
- Agreements between OFI and a government body of the donor country.
- A research permit granted for specific activities carried out within a set time period.

In Honduras, an agreement was formalised between OFI and ESNACIFOR, the Forestry School of Honduras who have responsibility for the National Forest Seed Bank. In more recent years, project related agreements have been established between OFI researchers and the forestry research project, CONSEFORH, as representatives of the state forest service, COHDEFOR. Both the project and the researcher had specific obligations to meet to ensure the exchange of services and benefits. In Guatemala, an agreement was drawn up between OFI and the Ministry of Forestry outlining the conditions under which seed could be collected and exported from the country. In this case, a payment was made to the Forest Seed Bank according the amount of seed to be exported, a proportion of which had to be deposited with the seed bank. In Mexico, research permits were obtained, usually valid for a 12-month period, during which specific activities could be carried out in collaboration with the relevant national organisations, e.g. the Herbarium at UNAM.

5.2 OFI's Material Transfer Agreement (MTA)

The establishment of the Convention on Biological Diversity (CBD) in 1993 led to considerable debate on access to genetic resources and the rights and obligations of both seed donors and recipients. In the light of this debate, OFI felt it was pertinent to develop a standard formal agreement with seed recipients to clarify their responsibilities in relation to access to genetic resources and their utilisation. The outcome was the OFI Material Transfer Agreement (MTA) which was designed to promote scientific exchange and recognise the responsibilities of seed recipients towards the countries that donated seed for experimentation. The key element of the document is that the seed recipient organisation agrees:

- Not to claim ownership over the seed received or its progeny, nor to seek intellectual property rights or plant variety rights over that genetic material or information produced from work in which it is involved.
- To ensure that any person or institution to whom it makes samples subsequently available is bound by the same provision.
- To manage the seed and any trees grown from it in such a way as to minimise as far as possible any potential threat from the species becoming an invasive weed.
- That the OFI does not accept liability for any consequences resulting from the use of the seed.

The MTA has been sent out to all researchers requesting seed since 1995, and it is necessary for it to be signed and returned prior to the seed being dispatched.

5.3 MTA's of other organisations

5.3.1. *International Undertaking on Plant Genetic Resources*

In 1994, the Consultative Group on Agricultural Research (CGIAR) signed an agreement with the FAO placing germplasm collections maintained by the CG centres under the auspices of the FAO as part of an international network of *ex situ* collections provided for in Article 7 of the International Undertaking on Plant Genetic Resources. The materials covered by the agreement are listed as 'Designated Germplasm' and is indicated as such on the shipment notice and on each packet of seeds. The CG centres agreed not to claim legal ownership over the designated germplasm, or to seek any intellectual property rights over that germplasm or related information. The CG centres have also agreed that any subsequent recipients of designated germplasm are to be bound by the same conditions. The aim of this and any future agreements is to ensure that the exchange and utilisation of global genetic resources is facilitated, and that there is fair and equitable sharing of the benefits derived from the commercial, or other utilisation of the germplasm.

5.3.2. *Royal Botanic Gardens, Kew*

In 1997, the Royal Botanic Gardens, Kew (RBG Kew) developed a policy document on access to genetic resources and benefit sharing. The policy covers the acquisition and supply of genetic resources, the fair and equitable sharing of the benefits arising from their use, the commercial use of genetic resources and the further development of their strategy. RBG Kew will supply genetic resources subject to material transfer agreements between RBG Kew and the recipients. The recipients are obliged to share benefits arising from their use of the genetic resources and their derivatives fairly and equitably with RBG Kew, not to commercialise the genetic resources or their derivatives without the prior written agreement of RBG Kew, and not to pass the genetic resources or their derivatives onto third parties without ensuring that the third parties enter into similar agreements. Material acquisition agreements between RBG Kew and the source country, and their policy on benefit sharing aims to ensure that any benefits arising from access to genetic resources should be shared fairly and equitably with the source country and appropriate stakeholders within it.

5.3.3. *DANIDA Forest Seed Centre, Denmark*

The DANIDA Forest Seed Centre (DFSC) supplies seed in research samples, e.g. for species trials or for research on seed biology and technology. The DFSC will also supply seed in semi-bulk samples for the establishment of seed stands, conservation stands and pilot plantations. Seed is supplied free of charge, but is not supplied in

commercial quantities for general planting. Such supply criteria are similar to those at OFI, but/and the DFSC does not have/has an MTA covering its seed supply activities.

6. Options for the future

OFI has a high profile both nationally and internationally in terms of its forest genetic resources research and associated seed collection, management and distribution activities. It is recognised as a high quality source of seed of *Pinus* species and various legume genera, both in terms of the collections themselves and the expertise and knowledge concerning these genetic resources. Comprehensive collections of a small number of genera have been assembled and maintained over many years. However, the assembly of the collections has not been part of a long-term strategy for forest genetic resource development and conservation. The collections have largely been assembled in response to the focus of specific research projects at OFI, and ultimately in response to the research priorities of funding agencies. This lack of a long-term strategy for the maintenance of OFI seed has precipitated the present need to look at the options for the future of the collections.

The maintenance of seed collections at OFI would continue to build on the significant effort and care taken in assembling high quality, range-wide seed collections. It would allow the maintenance of the national and international profile OFI has in this field, and the continued recognition of OFI as a centre of excellence for the use and conservation of forest genetic resources. However, in order that this could be achieved, a long-term funding commitment is required. OFI does not have the financial resources available to support on-going seed distribution activities (seed storage costs currently running at approximately £5000 per annum), and may not have staff in permanent employment with the interest and willingness to be responsible for these activities. Funding for tropical forestry research has changed direction radically over the last few years with the emphasis being on multidisciplinary work involving the sociology, economics and policy of forest resources as well as the biology. This change in the funding climate and the phasing out of core funding for research institutions that has traditionally supported such research activities, makes the maintenance of seed acquisition and distribution activities at OFI very insecure (see Annex 2).

6.1 Options

The following options for the future maintenance of the OFI seed collections were evaluated (see Annex 3):

1. Maintain all the collections at OFI
2. Rationalisation of the collections and transfer to another institution(s), e.g. DFSC, ICRAF, Kew.
3. Close the collection completely.

6.2 Evaluation of options

The constraints to the first option involve funding and a potentially reduced level of service to seed recipients. External funding is required to maintain the collections in storage at Alice Holt and personnel are required to process the seed requests responsibly and effectively. FAO have been approached to determine if they have the funds to support the storage of the OFI collections. Due to a decrease in financial resources for forest genetic resources, and the focus of FAO's research in this area being the collection, conservation and evaluation of *Azadirachta* and *Swietenia* spp., as well as the provision of assistance with the organisation of workshops on forest genetic resources, they are unable fund seed storage costs (see email from Christel Palmberg, Annex 4).

The DANIDA Forest Seed Centre (DFSC), the International Centre for Research in Agroforestry (ICRAF) and the seed bank of the Royal Botanic Gardens at Kew have been identified as institutions with a possible interest in the maintenance of OFI's seed collections. Of the three institutions, Kew is likely to have the least interest in the collections because their priority is long-term genetic resources conservation rather than the routine provision of seed for research. In 1996, seedlots representing 89 provenances in four genera from the OFI collections were

deposited in Kew's long-term seed storage facility at Wakehurst Place. In view of this and Kew's focus on genetic resources from the UK and drylands, they are unlikely to want more seedlots from OFI.

The DFSC and ICRAF are more likely to have an interest in maintaining and distributing seed from the OFI collections. However, both institutions are likely to only want restricted parts of the collections, e.g. Tony Simons at ICRAF has expressed an interest in taking seed of the major genera it is working with, i.e. *Acacia*, *Calliandra*, *Gliricidia* and *Leucaena* (currently 48% of the collection by weight (555 kg)). The DFSC may have an interest in taking part or all of the *Pinus* collections (currently 33% of the collection by weight (384 kg)).

Closing the collection completely is the least desirable option, as it would result in the loss of extremely valuable forest genetic resources, and would be a waste of the time, expertise and financial resources that has gone into collecting, maintaining and distributing germplasm over the last 30 years.

6.3 Recommended plan of action for the future of the OFI seed collections

The aim of this document is to identify ways in which the use of the seed collections can be maximised within an appropriate funding framework. It will be important that the terms and conditions under which OFI seed was donated, and is currently stored and distributed are maintained. It would also be desirable if violations of the MTA could be followed up by the institution(s) responsible for the management of the collections.

It is likely therefore that the above can be best achieved by *a rationalisation of the whole seed collection followed by the transfer of individual sections of the collection to more than one institution according to groups of genera.*

6.3.1 Rationalisation

Old and obsolete seedlots were last discarded from the OFI collections in 1994. There is now a clear need for further rationalisation of the collections that would mean the volume/weight of seed could be sensibly reduced. A rationalisation process would allow a number of redundant collections to be discarded which might either be of poor viability, e.g. *Liquidambar*, or have been under-utilised for many years, e.g. some of the *Pinus* collections. There is also scope for significant rationalisation based on what we know about the field performance of many seedlots. For example, there is little justification for the continued routine distribution of *Leucaena* species/provenances for the establishment of trials. Substantial information is available on what species, and to some extent provenances, have potential for further testing, development and seed orchard establishment. The same can be said of both the *Calliandra* and *Gliricidia* seed collections. A significant proportion of the extant legume seedlots, could therefore be greatly reduced in weight, and a small residue kept for specialist research applications (i.e. not routine field trials). Furthermore, it can also be argued that the days of seed distribution for trial establishment on demand are over, given the increasing awareness of risks associated with species introductions, and the need for a more parsimonious approach to plant introduction.

The scope of such a rationalisation process should not be under-estimated. The overheads associated with the maintenance of seed collections that are no longer in demand are high. Hence, the desirability of the collections to another organisation is likely to be greater post-rationalisation. There is also a tendency to assume that because seed was expensive to collect, it has continued 'value'. The value of many of the older OFI seedlots may have been fully realised many years ago, and hence they have served their purpose. The rationalisation of seedlots could largely be an internal decision, although for some seedlots (e.g. the pine species) external consultation may be required. Clearly, however, this rationalisation process should be an essential precursor to subsequent plans for the maintenance of the collections.

A large body of written information and computer data on the OFI seedlots is also maintained, and a simultaneous rationalisation of this resource would also be required.

6.3.2 Maintenance

Once a rationalisation process has been completed, it can be assumed that the seedlots of maximum utility will be preserved and the size of the collection reduced significantly. The collection can then be divided into the major genera and seedlots collected for special purposes (i.e. seedlots generally assembled for specific laboratory/greenhouse studies). In order to maximise the use of and access to the seed collections through to the end of their utility, the following genera might best be placed with the following institutions:

Seedlots collected for laboratory/greenhouse studies	To OFI (maintained in cold room)
Rationalised pine collections	To DFSC, Zimbabwe Seed Centre?
Major 'active' legume collections	To ICRAF

Seedlots collected for laboratory/greenhouse studies

A large number of seedlots were collected in small quantities solely for laboratory/greenhouse-based experimental research. These collections include many miscellaneous genera, but also a significant number of *Leucaena* seedlots, some *Calliandra* seedlots and all the *Parkinsonia/Cercidium*. The best option for their maintenance is to transfer their storage to a cold room in the Department of Plant Sciences, with stock control managed internally as an activity of the herbarium/molecular systematics lab.. No external funding would be required for this activity, and the maintenance of several hundred seedlots would be assured.

Rationalised pine collections

Decisions regarding the future of the pine seed collections will depend on the extent of the collections after rationalisation. If there is a residue of seedlots that need to be maintained for on-going work, these should be transferred out of OFI. The most logical and appropriate organisation would be the DFSC given the previous interest and involvement in pine seed storage and distribution and the establishment of *ex situ* conservation stands. This conclusion is prompted by several factors:

- Seed provided under similar conditions as at OFI, i.e. seed is provided for research purposes only, not general planting.
- Storage, distribution and advisory services are good.
- Seed collections placed within the context of a larger seed collection programme set to continue into the future.
- Previous involvement with OFI pine seed collection, storage and distribution.

Major 'active' legume seed collections

After rationalisation, the legume seed collections that are 'active', i.e. those that should be maintained for on going work, primarily for seed orchard establishment and on-farm research (*Albizia*, *Calliandra*, *Gliricidia*, *Leucaena* and *Acacia/Faidherbia*) could be transferred to the Germplasm Resources Unit of ICRAF. This conclusion is prompted by a number of factors:

- The testing, storage, and distribution of agroforestry tree seed is an integral part of ICRAF's research and development activities.
- Research on *Leucaena*, *Gliricidia*, *Calliandra* and *Acacia* genetic resources and breeding is a strong component of ICRAF's work.
- Germplasm is held in trust by ICRAF under the auspices of the FAO, and as such is compatible with the framework of collecting permits and research agreements signed by OFI with authorities in Mexico and Central America under which the seed was collected.
- Germplasm maintained under the auspices of the FAO is protected by a Material Transfer Agreement (MTA) similar to OFI's.
- Seed collections are placed within the context of a larger seed collection programme that is growing and set to continue into the future.
- Compatible data management system.
- There are good prospects for negotiating an agreement with ICRAF that might include the following conditions:
 - Recognition of the seed as OFI, or OFI/DFID seed.
 - OFI staff would have access to the seed for their research purposes.
 - Continuation of the OFI policy on seed distribution, including implementation of the MTA.
 - Maintenance of and open access to the SISTEM+ database.

6.3.3. Implementation

The process of rationalisation and re-distribution of the OFI collections will require some external funding. Costs would include research staff time to analyse and prioritise the seedlots to be discarded, viability tests, technical staff time to sort and dispatch seed to the various recipients, management of the SISTEM database, and freight costs. The extent of this process should not be under-estimated. There are currently over 1000 bulk seedlots. If the family seedlots are included, this figure rises substantially. For example, there are 208 bulk seedlots of *Leucaena*, and this figure rises to 1374 if family lots are included. Although there is a requirement for funding under this option, it will obviously be a one-off charge and not a recurrent cost as in the case of the collections being maintained by OFI/Alice Holt. A provisional budget for the implementation of the rationalisation and re-distribution processes can be found at Annex 5.

7. Conclusions

The OFI seed collections form a compilation of forest genetic resources of high value for research, development and conservation work. The collections were assembled over a period of many years and involved the allocation of considerable time, expertise and financial resources. There has been, and remains today, substantial demand for the OFI seed due in part to the research programmes and international collaboration that has been fostered during this period. To ensure that the future use of the OFI seed collections is maximised, a secure and appropriate framework for the continued distribution of seed has been sought through consultation with many of the OFI staff members who assembled, worked with or distributed the collections. It was felt, therefore, that the future security and utility of the seed can be best achieved by a rationalisation of the whole collection followed by the transfer of individual sections of it to more than one institution according to groups of genera.

A plan of action has been proposed in which the rationalisation of current seed stocks and disposal of unnecessary seed is the cornerstone. The extent of this process should not be under-estimated given the size and complexity of the collections, and although there is a requirement for funding under this plan, this will be a one-off charge and it is hoped that OFI's forest genetic resources can be secured for future use within the seed acquisition and storage activities of the specified recipients.

Annex 1

Details of seed collections by species

Species in the OFI collection	No. of seedlots	Weight of seed available (kg)	No. of provenances represented
<i>Acacia abyssinica</i>	2	0.446	2
<i>Acacia angustissima</i>	8	4.236	8
<i>Acacia arenaria</i>	1	4.644	1
<i>Acacia auriculiformis</i>	1	0.020	1
<i>Acacia bussei</i>	1	0.015	1
<i>Acacia caven</i>	2	3.430	2
<i>Acacia deamii</i>	3	2.318	3
<i>Acacia drepanolobium</i>	1	0.052	1
<i>Acacia erioloba</i>	13	35.049	11
<i>Acacia farnesiana</i>	3	4.063	3
<i>Acacia galpinii</i>	1	0.028	1
<i>Acacia haematoxylon</i>	1	0.381	1
<i>Acacia jacquemontii</i>	1	0.096	1
<i>Acacia karroo</i>	23	34.999	21
<i>Acacia mangium</i>	2	0.013	2
<i>Acacia nigrescens</i>	1	0.439	1
<i>Acacia nilotica</i>	6	1.218	4
<i>Acacia nilotica adstringens</i>	1	0.060	1
<i>Acacia nilotica cupressiformis</i>	1	0.497	1
<i>Acacia nilotica indica</i>	2	0.810	2
<i>Acacia nilotica kraussiana</i>	15	36.068	14
<i>Acacia nilotica leiocarpa</i>	1	1.924	1
<i>Acacia nilotica nilotica</i>	1	0.209	1
<i>Acacia nilotica subalata</i>	3	1.832	3
<i>Acacia nilotica tomentosa</i>	4	0.680	3
<i>Acacia pennatula</i>	2	0.321	1
<i>Acacia polyacantha campylacantha</i>	1	0.036	1
<i>Acacia rhemaniana</i>	1	0.111	1
<i>Acacia schaffneri</i>	1	0.076	1
<i>Acacia senegal leiorhachis</i>	2	0.110	2
<i>Acacia senegal senegal</i>	5	5.412	5
<i>Acacia seyal fistula</i>	1	0.207	1
<i>Acacia seyal seyal</i>	1	0.191	1
<i>Acacia sieberana</i>	1	0.288	1
<i>Acacia sieberana woodii</i>	3	4.736	3
<i>Acacia tortilis</i>	5	2.137	5
<i>Acacia tortilis heteracantha</i>	22	52.917	22
<i>Acacia tortilis raddiana</i>	4	2.910	4
<i>Acacia tortilis spirocarpa</i>	4	2.465	4
<i>Acacia tortilis spirocarpa crinita</i>	4	1.473	4
<i>Acacia tortilis spirocarpa spiro.</i>	10	37.601	10
<i>Acacia tortilis tortilis</i>	1	0.280	1
<i>Acacia villosa</i>	1	0.037	1
<i>Acacia xanthophloea</i>	3	0.844	3
<i>Acacia xpolyacantha campylacantha</i>	1	0.088	1
<i>Acosmium panamense</i>	1	0.047	1
<i>Albizia ? hybrid</i>	1	7.163	1
<i>Albizia adinocephala</i>	1	4.803	1
<i>Albizia guachapele</i>	5	15.579	4
<i>Albizia lebbekoides</i>	1	0.014	1

Species in the OFI collection	No. of seedlots	Weight of seed available (kg)	No. of provenances represented
<i>Albizia niopoides</i>	3	10.911	3
<i>Albizia occidentalis</i>	2	5.467	2
<i>Albizia plurijuga</i>	2	3.358	1
<i>Albizia purpusii</i>	1	2.199	1
<i>Albizia saman</i>	5	16.962	4
<i>Albizia sinaloensis</i>	1	0.516	1
<i>Albizia tomentosa</i>	1	7.000	1
<i>Apoplanesia paniculata</i>	1	0.728	1
<i>Ateleia herbert-smithii</i>	1	0.100	1
<i>Ateleia</i> sp	1	0.073	1
<i>Ateleia</i> spp.	1	0.091	1
<i>Bombacopsis quinatum</i>	3	4.288	3
<i>Brongniartia</i> spp.	2	0.056	2
<i>Caesalpinia coriaria</i>	1	0.046	1
<i>Caesalpinia eriostachys</i>	2	1.220	2
<i>Caesalpinia mexicana</i>	1	0.007	1
<i>Caesalpinia sclerocarpa</i>	1	0.328	1
<i>Caesalpinia velutina</i>	2	5.197	1
<i>Calliandra acapulcensis</i>	4	0.022	4
<i>Calliandra calothyrsus</i>	69	11.017	47
<i>Calliandra grandiflora</i>	3	0.013	3
<i>Calliandra houstoniana</i>	6	1.674	6
<i>Calliandra juzepczukii</i>	4	0.106	3
<i>Calliandra longepedicellata</i>	1	0.025	1
<i>Calliandra physocalyx</i>	2	0.019	1
<i>Calliandra</i> spp.	5	0.254	5
<i>Calliandropsis nervosus</i>	1	0.030	1
<i>Calopogodium</i> sp	1	0.014	1
<i>Cedrela angustifolia</i>	1	0.458	1
<i>Cedrela fissilis</i>	6	2.232	6
<i>Cedrela montana</i>	1	0.021	1
<i>Cedrela odorata</i>	22	9.230	19
<i>Cedrela salvadorensis</i>	1	0.004	1
<i>Cercidium -x sonora</i>	3	0.027	2
<i>Cercidium floridum floridum</i>	3	0.408	3
<i>Cercidium floridum peninsulare</i>	1	0.007	1
<i>Cercidium praecox</i>	4	0.067	4
<i>Cordia alliodora</i>	23	8.843	17
<i>Cordia gerascanthus</i>	1	2.240	1
<i>Crescentia alata</i>	3	1.831	3
<i>Cupressus lusitanica</i>	1	0.200	1
<i>Dalbergia</i> sp	2	0.134	2
<i>Desmanthus balsensis</i>	1	0.008	1
<i>Desmanthus bicornutus</i>	2	0.280	2
<i>Desmanthus fruticosus</i>	1	0.021	1
<i>Desmanthus pumilus</i> var	1	0.008	1
<i>Desmanthus virgatus</i>	2	0.155	2
<i>Diphysa robiniodes</i>	2	0.388	2
<i>Diphysa</i> sp	1	0.005	1
<i>Enterolobium cyclocarpum</i>	6	12.038	6
<i>Eucalyptus grandis</i>	1	0.463	1
<i>Eucalyptus saligna</i>	1	0.010	1
<i>Faidherbia albida</i>	83	104.226	67
<i>Gliricidia maculata</i>	3	0.668	3
<i>Gliricidia sepium</i>	50	10.321	36

Species in the OFI collection	No. of seedlots	Weight of seed available (kg)	No. of provenances represented
<i>Goldmania foetida</i>	2	0.514	2
<i>Guazuma ulmifolia</i>	2	3.218	2
<i>Haematoxylon brasiletto</i>	1	1.789	1
<i>Haematoxylon dinteri</i>	1	0.001	1
<i>Harpalyce arborea</i>	1	0.144	1
<i>Havardia confine</i>	1	0.038	1
<i>Havardia</i> sp	1	0.097	1
<i>Heteroflorum</i> sp	2	2.079	2
<i>Hybosema ehrenbergii</i>	3	0.524	3
<i>Hybosema</i> sp nov	2	0.012	1
<i>Leucaena collinsii collinsii</i>	3	12.053	2
<i>Leucaena collinsii zacapana</i>	4	6.193	3
<i>Leucaena confertiflora adenotheleidea</i>	5	0.350	4
<i>Leucaena confertiflora confertiflora</i>	4	0.291	4
<i>Leucaena cuspidata</i>	4	0.481	3
<i>Leucaena diversifolia</i>	15	34.637	15
<i>Leucaena esculenta</i>	2	6.659	2
<i>Leucaena greggii</i>	2	6.921	1
<i>Leucaena hybrid</i>	84	1.090	84
<i>Leucaena involucrata</i>	2	0.024	1
<i>Leucaena lanceolata lanceolata</i>	4	10.96	4
<i>Leucaena lanceolata sousae</i>	2	6.769	2
<i>Leucaena lempirana</i>	2	4.040	2
<i>Leucaena leucocephala glabrata</i>	21	20.638	18
<i>Leucaena leucocephala ixtahuacana</i>	1	0.003	1
<i>Leucaena leucocephala leucocephala</i>	3	0.114	3
<i>Leucaena macrophylla</i>	1	0.120	1
<i>Leucaena macrophylla istmensis</i>	3	6.780	3
<i>Leucaena magnifica</i>	3	11.792	3
<i>Leucaena matudae</i>	1	0.217	1
<i>Leucaena multicapitula</i>	2	1.927	2
<i>Leucaena pallida</i>	7	0.789	6
<i>Leucaena pueblana</i>	3	0.064	3
<i>Leucaena pulverulenta</i>	3	9.275	3
<i>Leucaena retusa</i>	1	0.509	1
<i>Leucaena salvadorensis</i>	4	8.653	3
<i>Leucaena shannonii</i>	5	7.783	4
<i>Leucaena trichandra</i>	10	11.318	10
<i>Leucaena trichodes</i>	2	10.675	2
<i>Leucaena xspontanea</i>	5	0.433	4
<i>Liquidambar styraciflua</i>	17	26.816	17
<i>Lonchocarpus andreuxii</i>	1	0.476	1
<i>Lonchocarpus castilloi</i>	1	0.006	1
<i>Lonchocarpus caudatus</i>	1	0.193	1
<i>Lonchocarpus emarginatus</i>	1	0.112	1
<i>Lonchocarpus guatemalensis</i>	1	0.356	1
<i>Lonchocarpus hidalgensis</i>	1	0.104	1
<i>Lonchocarpus hughesii</i>	1	0.002	1
<i>Lonchocarpus lanceolatus</i>	2	0.118	2
<i>Lonchocarpus minimiflorus</i>	1	0.004	1
<i>Lonchocarpus morenii</i>	1	0.003	1
<i>Lonchocarpus obovatus</i>	1	0.069	1
<i>Lonchocarpus phaseolifolius</i>	2	0.254	2
<i>Lonchocarpus phlebophyllus</i>	1	0.099	1
<i>Lonchocarpus rugosus apricus</i>	1	0.003	1

Species in the OFI collection	No. of seedlots	Weight of seed available (kg)	No. of provenances represented
<i>Lonchocarpus santarosanus</i>	1	0.183	1
<i>Lonchocarpus</i> sp	1	0.126	1
<i>Lonchocarpus spectabilis</i>	1	0.156	1
<i>Lysiloma divaricatum</i>	1	0.014	1
<i>Lysiloma tergemina</i>	1	0.167	1
<i>Machaerium</i> sp	1	0.233	1
<i>Mimosa tenuiflora</i>	1	0.500	1
<i>Myrospermum frutescens</i>	2	1.000	2
<i>Parkinsonia aculeata</i>	14	32.414	13
<i>Parkinsonia aculeata</i> x <i>cercidium microphyllum</i>	1	0.106	1
<i>Parkinsonia africana</i>	1	0.003	1
<i>Parkinsonia</i> hybrid <i>Paculeata</i> x <i>Cpraecox</i>	3	0.073	3
<i>Parkinsonia raimondoi</i>	1	0.004	1
<i>Peltogyne mexicana</i>	1	0.123	1
<i>Peltophorum dubium</i>	1	0.005	1
<i>Phyllocarpus septentrionalis</i>	1	0.150	1
<i>Pinus brutia</i>	1	0.249	1
<i>Pinus caribaea bahamensis</i>	28	18.227	1
<i>Pinus caribaea caribaea</i>	2	0.213	1
<i>Pinus caribaea hondurensis</i>	59	107.724	38
<i>Pinus caribaea</i> x <i>oocarpa</i>	1	0.201	1
<i>Pinus chiapensis</i>	2	3.921	2
<i>Pinus elliottii</i>	11	1.511	Unknown
<i>Pinus kesiya</i>	46	48.531	38
<i>Pinus maximinoi</i>	15	22.055	13
<i>Pinus merkusii</i>	1	0.087	1
<i>Pinus occidentalis</i>	3	0.384	3
<i>Pinus oocarpa</i>	85	145.252	74
<i>Pinus patula</i>	6	1.153	Unknown
<i>Pinus patula tecunumanii</i>	9	23.490	5
<i>Pinus sabiniana</i>	2	1.062	2
<i>Pinus taeda</i>	5	0.979	Unknown
<i>Pinus tropicalis</i>	2	0.870	2
<i>Pinus yunnanensis</i>	12	7.752	12
<i>Piptadenia obliqua</i>	1	0.028	1
<i>Piptadenia viridiflora</i>	1	0.006	1
<i>Piscidia mollis</i>	1	0.050	1
<i>Pithecellobium dulce</i>	1	3.513	1
<i>Prosopis juliflora</i>	5	1.483	4
<i>Prosopis</i> sp	4	2.794	3
<i>Pterocarpus</i> sp	1	0.003	1
<i>Ramirezella</i> spp.	1	0.010	1
<i>Schizolobium parahybum</i>	1	0.221	1
<i>Schleinitzia novo-guineensis</i>	1	0.015	1
<i>Senna atomaria</i>	1	0.955	1
<i>Sesbania grandiflora</i>	2	1.000	2
<i>Sesbania sesban</i>	2	1.166	2
<i>Sophora secundiflora</i>	1	0.063	1
<i>Swietenia humilis</i>	1	4.829	1
<i>Toona australis</i>	1	0.007	1
<i>Toona ciliata australis</i>	1	0.078	1
<i>Zapoteca</i> spp.	2	0.063	2
<i>Zapoteca tetragona</i>	6	0.505	6
ALL SPECIES	1146	1153.683	956

Annex 2

SWOC analysis on the seed collection, distribution and management activities at OFI

	Strengths	Weaknesses	Opportunities	Constraints
Seed collection, distribution and management activities at OFI	<p>High profile at national and international level.</p> <p>Substantial expertise with legume genera and <i>Pinus</i> spp..</p> <p>Large, comprehensive collections of a small number of genera.</p> <p>Good seed distribution and advisory services.</p> <p>Reliable source of well-documented seed.</p> <p>Extensive contacts with scientists world-wide.</p>	<p>No strategy for seed collection, distribution and management developed over time.</p> <p>No long-term funding available for seed storage and distribution activities.</p> <p>Many collections currently under-utilised.</p>	<p>OFI has an advantage over other seed banks in terms of the type and quality of the seed collections it maintains.</p> <p>Maintenance of national and international profile of OFI.</p>	<p>Changes in funding priorities for research and development.</p> <p>No funding currently available for seed storage and distribution activities.</p> <p>Changes in OFI staff with an interest in, or responsibility for, seed activities.</p> <p>Other seed banks able to provide a better service.</p>

Annex 3

SWOC analyses on options for the future of the OFI seed collections

	Strengths	Weaknesses	Opportunities	Constraints
Maintain the collections at OFI	OFI seed collection retains its identity. Management structures remain the same. Activities of Alice Holt supported.	Insecure funding in the long-term. No advisory service to complement the distribution service.	Collaboration with other research organisations maintained. International profile of OFI maintained in the short-term. Utility and use of the collections maintained.	Poor funding opportunities. Reduced level of service to collaborators.
Rationalise the collection by genera/seedlot, and transfer to other institution(s), e.g. ICRAF, DFSC and Kew.	OFI seed collections secured for the long-term. Seed provided under the same conditions as at OFI, i.e. seed is provided for research purposes only, not general planting. Storage, distribution and advisory services within recipient organisations good. OFI seed collection could retain its identity by being identified as 'OFI', or 'DFID/OFI' seed.	Requires external funding for rationalisation and re-distribution process. Administrative burden on OFI in passing on requests for seed. Reduction in OFI external activities. Complex to administer.	Greater collaboration between a number of organisations. May allow more effective follow-up of violations of the MTA. Greater availability of OFI staff resources. Utility and use of the collections maximised. No long-term funding commitment required by OFI.	Source of external funding required for rationalisation and re-distribution process. Source of funding available within recipient organisations. Each organisation may only be willing to receive a limited proportion of the collection. Kew's priorities restricted to long-term <i>ex situ</i> genetic conservation.
Closure	Resources currently used for seed activities made available for other purposes.	Loss of valuable forest genetic resources. Reduced opportunity for collaboration with other organisations. Reduction in OFI external activities. Administrative burden on OFI in dealing with requests for seed.	Greater availability of OFI staff resources.	Objections from DFID who have principally funded the seed collecting and distribution activities.

Annex 4

Email from Christel Palmberg, FAO in relation to potential funding

Date sent: Tue, 06 Apr 1999 07:58:05 +0200
From: "Palmberg, Christel (FORM)" <Christel.Palmberg@fao.org>
Subject: Re: OFI seed collection
To: Richard.Barnes@plant-sciences.oxford.ac.uk
Copies to: "Sigaud, Pierre (FORM)" <Pierre.Sigaud@fao.org>,
"Hald, Soren (FORM)" <Soren.Hald@fao.org>, FO-Registry <FO-Registry@fao.org>

Dear Richard,

Thank you for your below e-mail last week regarding a possible FAO contribution towards the storage of seedlots collected within OFI programmes, and stored by the UK Forestry Commission.

While the seed has been collected following (I believe, largely) advice and recommendations of the FAO Panel of Experts on Forest Gene Resources, there is unfortunately no possibility for us to commit ourselves to what in essence would be a long-term commitment to yearly (or biennial) contributions to the UK. In fact, it would not be possible even if FAO financial contributions had been provided towards the seedlots in question, which I believe is not the case.

As you would know, FAO Regular Programme funds for forest genetic resources have decreased over the past years in real terms. At the same time the field to be covered has expanded manifold. The Panel, of which you are a member, has recommended that we concentrate our funding and contributions on (i) collection, conservation, evaluation of 1-3 top priority species each biennium (presently, *Azadirachta* spp. and Latin American/Caribbean mahoganies), and (ii) on assistance in the organisation of regional workshops on forest genetic resources, of which we have to date held one (Sahel 1998), and are about to hold another one this month (S. Pacific), and will organise a third one towards the end of the year (SADC countries). The organisation of the workshops cum expert meetings does not come cheap in funds nor time and manpower... We are practically bankrupting our budget doing so. We still consider it worthwhile to continue. Thus even in the best of cases, we have no "flexibility" in funding (as we may have had in the "Golden Years of the 1980s"!), and the situation is not likely to change to the better over the coming biennia.

Apart from the above we have no precedence at all for paying for seed storage costs, even of "FAO seedlots", collected using direct financial contributions from FAO. Such seedlots are stored, maintained and distributed by some developed countries such as Denmark and Australia as in kind support to the FAO programme, and even a small number of developing countries have over the years done the same, as part and parcel of their overall programme (e.g. Burkina Faso). Even in the case of crop genetic resources stored by the International Agricultural Research Centres of the CGIAR, which have since a few years back officially been "placed under the auspices of the FAO", there is no funding contribution from FAO to the Centres, which - again - store, maintain and distribute such seedlots as an in kind contribution to FAO work and programmes.

Richard, I thought it was best to get this reply out to you asap, even if written in some hurry (I am off today, on zero notice, to a 4-day Forest Plantation Meeting related to IFF to be held in Chile!). I will be quite happy to further clarify if needed; and we can also take up the issue, in more general terms, at the 11th Session of the Forest Gene Panel at the end of September this year, if you wish. However, unfortunately, for reasons outlined above, there are really no possibilities for us to financially help. We could possibly do so in moral terms (e.g. through sending an official letter pointing out the importance of the collections, possibly?).

Best regards,

Christel Palmberg-Lerche
Chief FORM
Forest Resources Division
Forestry Department
FAO
Rome (Italy)

Annex 5

Budget for the rationalisation and re-distribution of the OFI seed collections.

Salaries (research & technical staff)

Colin Hughes, David Boshier, Alan Pottinger, Richard Barnes, Joanne Chamberlain - rationalisation of seed files and individual seedlots (30 days @ £315 per day)	9450
Denis Filer - data management (5 days at £315 per day)	1575
Ian Gourlay - technical support for rationalisation process (4 months salary)	6876
Overheads	3440
Seed testing and storage costs at Alice Holt	6000
Freight	3000
Information sent out to previous seed recipients regarding future location of seed collections - publication and distribution costs	2000
Total	32341