



Demand and supply of native seed and seedlings in community revegetation – a survey.

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FloraBank

FloraBank aims to improve the availability and quality of native seed for revegetation and conservation purposes in Australia. We want people to be better informed about collecting, storing and using native seed, to exchange information and share ideas about native seed. FloraBank encourages practices that protect Australia’s biodiversity. The project is funded by the Bushcare program of the Commonwealth’s Natural Heritage Trust and supports effective delivery of the Program. Greening Australia administers the project in partnership with CSIRO Forestry and Forest Products through the Australian Tree Seed Centre, and the Australian National Botanic Gardens.

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Introduction

The survey

This report presents the results of a national survey conducted by FloraBank and Greening Australia in May 1999. The survey focused on the use of native seed and seedlings¹ by people directly involved in revegetation at the community level and their expectations of demand and supply. It builds on the results of previous consultation and survey work by FloraBank to complete the picture about native seed as it is collected, stored and used for revegetation work in Australia.

Specifically, the survey attempted a broad regional analysis using qualitative indicators of demand and supply for seed and seedlings and especially those indigenous to the local area.

The survey was undertaken at very low cost outside the agreement between FloraBank and the Commonwealth. It began when Greening Australia asked FloraBank to prepare a telephone survey questionnaire about demand for native seed and seedlings in revegetation work. Greening Australia regional staff in offices across Australia later conducted the survey on a sample of revegetation practitioners in their respective region. Subsequently, FloraBank distributed the same questionnaire by post nationally to a second sample of people involved in the native seed sector through existing mailing lists. FloraBank conducted analysis of responses and prepared this report.

Context of this survey

Problems in the availability of native seed were reported for some regions by FloraBank (Mortlock, 1999a) based on consultation in 1998 with people in key extension roles in Bushcare, Greening Australia, government and landcare, who promote, facilitate and resource revegetation. Without exception, everyone

consulted by FloraBank believed that the general trend for increased use of native seed would continue. Many of those consulted believed that there would be even greater increases in demand from mining, landcare, and agroforestry and greenhouse carbon credit initiatives.

There was increasing demand for native seed from the local area of the user, which some of those consulted found difficult to obtain. The use of local plants from natural populations is usually the best source of seed for revegetation. Most observers welcome the trend to use local plants for their many benefits. How many revegetation practitioners actually use local plants was unknown, as was:

- the importance they place on the use of local plants;
- how prepared they are to substitute non-local plants;
- whether shortages of local plants was a widespread concern or one limited to specific areas; and
- the effect of local plant use on considerations of demand and supply.

Worrying reports of planting programs curtailed for lack of local seed were received from: the south-western, central, western and the north coast regions of New South Wales; north-west Victoria and north-central Victoria. Some people considered that the local seed and seedling requirement could not be met in their region, even for revegetation projects already allocated funding under Commonwealth programs. Some considered that sufficient seed was no longer available in their 'local' bush or that the resource for harvesting was declining. Anticipated planting projects were scaled down or held over to the next season in response to shortages. Many were concerned about increasing pressure on the local seed resource and the consequences of using non-local seed. For example, the use of 'local' plants is an important requirement of funding under the Bushcare Program.

Certain findings of the survey questionnaire conducted by FloraBank in 1998 appeared to

¹ All references to 'seed' and 'seedlings' are to native plant seed and seedlings unless otherwise stated.

support the findings of consultation. For example, among community respondents nationally²:

- 93% collect seed, but only 45% buy seed from commercial suppliers and for most this was less than 10% of the total seed they use.
- 35% collect of all their seed and a further 33% collect most of it in the local area;
- 14% usually and 43% sometimes have difficulty in obtaining local indigenous seed;
- 43% considered that commercial suppliers rarely or never provide sufficient information about the origins of seed;
- more respondents were able to source local seed in South Australia than in the Northern Territory and Queensland.

Factors affecting seed availability

A major consequence of the increasing use of local plants is that 'native seed' as a raw material for revegetation is actually many thousands of separate commodities partitioned firstly by genus and species, and further by geographic origin.

For some practitioners these commodities are not exchangeable and only plants raised from seed collected in their local area will do. Yet what constitutes a 'local plant' is not defined and is different for each species; giving rise to considerable debate and differences of opinion. While users are uncertain about how far afield they should go to obtain seed³, many are increasingly unwilling to use seed of unknown or far off geographic origins. The concept of 'provenance' just adds to the confusion and gains little. In many cases, quite small 'local' collection areas have emerged. Unfortunately, over such small areas, species sought for revegetation may now be poorly represented, occurring in small and isolated or fragmented remnant patches, or as isolated individual plants in cleared land. Dieback, salinity or other environmental pressures may

affect them. Growth may be poor and the survival prospects bleak. Seed crops may be negligible due to (often fickle) seasonal climatic factors, seed predation, poor pollination, irregular seed set, over-harvesting, and seed attack by insects and fauna, etc. It can be difficult to find any seed locally of a certain species and if found, it may be difficult to collect sufficient seed.

There is no practical way to determine seed origins or their genetic quality and seeds of many species look very similar. There is no native seed certification system operating in Australia to regulate or standardise seed quality or origins. Consequently, unless seed users collect seed themselves, they must trust that the seed obtained from their supplier is of the species and comes from the locality claimed.

A minority of practitioners is less concerned about such distinctions and consequently (in the extreme) the potential resource available to them is as great as the known occurrence of a species in Australia. In a few cases, it would include seed of Australian natives imported from overseas.

All of these factors make understanding and planning for seed (and therefore seedling) supply difficult. In concert, they create great complexity and uncertainty. There would be few if any natural resources that are harder to define, locate, quantify, and wisely harvest and use than 'local seed'.

Commercial availability

Native plant seed of many species is of course readily available on the commercial market. Commercial seed suppliers have the potential to collect and supply seed from almost anywhere to anyone. It must be logistically possible and profitable to do so, and there must be adequate prior notice for collectors to find and harvest seed. There may be considerable natural, logistical, and bureaucratic barriers to collection in an area: for example, arising from travel costs, remote locations, accommodation, monitoring seed set, or gaining sufficient local knowledge. In many regions, it may simply not be economic for city-based commercial collectors to harvest seed from 'local areas' for supply back

² Sample of 167 respondents

³ FloraBank has published *Guideline 5 Seed collection from woody plants for local revegetation* to provide guidance on this problem.

to **only** that 'local area'. The scale of seed use in community-based revegetation projects offers a limited commercial market for seed collected speculatively from any 'local area'. In mining and roadside rehabilitation, and for major building and development projects, seed is typically obtained through commercial collect and supply contracts. Commercial seed suppliers encourage community-based revegetation projects to plan for such collection. A fundamental stumbling block is that, in general, seed collected speculatively (rather than to order) from a specific locality attracts no premium above regular pricing for sale back to that locality, even though it is considered by many a most desirable commodity.

Seed is comparatively cheap – usually less than 5% of total plant establishment costs in revegetation. Many collectors based in rural areas comment that profit margins are small for seed collection and that they remain in the industry mainly for the lifestyle it offers. The collector's profit margin is greatly influenced by the market price for seed, generally set by the big suppliers. Pricing is complex and competitive. In most cases it refers to species and does **not** further differentiate based on geographic origins.

Most seed collectors, including smaller commercial collectors, tend to collect much of their seed in **their** local area (Mortlock: 1999a). So, the nearer a seed user is to the home base of a commercial collector or supplier, the easier it will be to obtain local indigenous seed from them. The further away a seed user is, the less likely it is that speculatively collected seed is available and the higher the cost will be for collection to order.

Many revegetation practitioners rely on good quality seed sourced from commercial collectors and suppliers. However, there are many areas where commercial collectors and suppliers simply do not operate or do not supply local indigenous seed.

It is probably not surprising that many community-based seed users do not buy seed. Their most likely motivations are that they are unable to afford the cost of seed available commercially, or that it is of unsuitable species

or origins for local use or is not available in the quantities required. Another important factor in some regions is that there is simply a lack of trust on the part of users that seed is of the species or origins claimed by suppliers.

If seed of the right species or origin is not available commercially or from other community-based collectors, the only options a person has are to place an order for its collection (well ahead of planting date) or collect it themselves. A major concern is the long lead-time required (up to 12 months or more in many cases) for greater certainty of collection. Many community revegetation projects do not get sufficient lead time from funding sources to place such orders and are sometimes required to demonstrate planting results in the field before the seed required can even be collected.

Factors affecting seedling availability

Most native seedlings are raised from seed rather than by vegetative propagation. Therefore, all of the factors that affect seed availability therefore also affect seedling availability. Seed quality considerations such as purity, viability and germinability also effect seedling availability. However, up to a point, propagators simply use more seed of lower germinability to obtain a required number of plants. Many native species cannot be germinated or propagated successfully.

Most revegetation nurseries produce seedlings to order for the coming planting season. While many do keep a small seed store, most also order seed from suppliers, buy from stock, or collect their own seed as required. Relatively small quantities of seed are needed in comparison to direct seeding. One kilogram of seed produces hundreds to many thousands of plants of those species used in revegetation.

A certain lead-time is required for nursery production of seedlings to order. The later revegetation practitioners leaves it to secure plants for the coming planting season, the less likely they are to obtain the species, geographic origins, and quantities they require.

Survey method

Sampling strategy

A very broad range of people use native seed in revegetation activities⁴, in government, in commercial revegetation enterprise, industry, organisations, as members of community groups, and as landholders or land managers. The mix varies between and within states and many are located in rural and remote areas. Never do they comprise more than a tiny percentage of the population. It was considered too difficult (and costly) to reach a random sample or to construct a widely based selected sample of revegetation practitioners.

The sampling strategy instead targeted revegetation practitioners who are clients of the Bushcare and FloraBank networks. Some 3,775 survey questionnaires were distributed in two sub-samples.

Bushcare network sub-sample

In the first sub-sample, nominated Greening Australia and Bushcare Support staff at 54 regional offices across Australia obtained 10 to 20 completed questionnaires from selected revegetation practitioners in their region. In total 1560 printed survey questionnaires were distributed. Most responses were gained by telephone (or face to face) interviews or failing this completed by respondents and returned by reply paid post or by fax. Instructions for telephone interviewers were provided.

Direct mail sub-samples

In the second sub-sample, some 2,215 survey questionnaires were distributed via direct mail using four existing mailing lists to target a wider sample of native seed and seedling users. The survey questionnaire was also placed on the FloraBank Internet web page (mostly experimental, 10 responses were

received via the web). No more than half of this distribution were considered to be revegetation practitioners. Therefore, recipients of the direct mail who 'plant native seed or seedlings in the field or in a nursery' were requested to complete the survey questionnaire for reply paid return. They were also instructed that 'All questions refer to you or whatever group, company or organisation you represent. If you represent more than one organisation, perhaps you could complete another copy of the survey. If you wish to do so, please distribute the survey to others who field plant seed or seedlings'.

About 1800 questionnaires were distributed with the second FloraBank newsletter (May 1999) to:

- people involved in native seed collection, storage and use (950);
- recipients of Bushcare funding from the Commonwealth Government in 1998 (384);
- clients of the Australian Tree Seed Centre who are native seed users (116);
- attendees of the Native Seed Biology for Revegetation Workshop held in Perth (50);
- Coastcare Coordinators in each state (50);
- Bushcare Network in SA (25);
- all local governments in NSW (177),
- people who requested FloraBank guidelines and information (100);
- others (7).

A further distribution of 415 in May/June went to:

- those requesting FloraBank guidelines (86);
- local authorities in WA (100) and NT (14);
- through the Hawkesbury Nepean Catchment Management Trust to seed users in that catchment (100);
- members of Australian Association of Bush Regenerators nationally (100).

No telephone surveys were conducted in the direct mail sub-sample. All surveys were returned by reply paid post or by fax.

The sampling strategy favours more active revegetation practitioners who are in touch

⁴ Referred to as 'revegetation practitioners' in this report.

with the Bushcare, FloraBank and Greening Australia networks. The sample is a mixture of experienced local operators, new recruits and those in between but is expected to favour the former rather than the latter. It favours community groups, non-government organisations and individuals rather than commercial or government operators. It is a sample of those who already carry out revegetation, rather than **those who might** potentially do so.

The direct mail sub-sample favours those who actually collect, store and distribute seed as well as being revegetation practitioners. There is some bias through uneven distribution nationally, for example to organisations and local authorities in only some states. Neither sample sought to avoid commercial and government operators in preference to individuals or those in community groups.

Questionnaire content

The questionnaire used in both sub-samples was to all intents and purposes identical: see Appendix 1. An introductory statement about the questionnaire and its purpose was altered slightly for direct mail recipients and a question (19) identifying the respondent's relationship to Greening Australia was deleted. Almost all questions were multiple choice (tick a box) and allowed for an 'unsure' or 'other' response.

Survey response

Survey responses were received up to the end of September and data input carried out by a small team in one location with careful attention to standardised methods and approaches.

Response through the Greening Australia/Bushcare sub-sample was about 22% (343 of 1560 surveys returned) and through the direct mail sub-sample from those considered as revegetation practitioners 20% (217 returned of 1107 surveys).

Presentation of results

Presentation of results is based on aggregated data from the two sub-samples as there is a good correlation between the two data sets ($r = 0.949568542$) indicating that an increase in the values in one data set is paired with an increase in the other. Covariance analysis (value = 410.33) also indicates that large values in one data set are associated with large values in the other data set.

The response to some questions is presented in tables and figures accompanying the text for convenience. However, the response to most questions is presented on a regional basis in Appendix 2, which is referred to throughout this report.

The size of the response (560 responses) supports interpretation at the national and broad regional levels used in this report. Response for some states was good but much smaller in others and consequently an analysis by state is not included.

Results by region

The way we collect, store and use native plant seed responds more to boundaries of major climatic zones and their influence on vegetation, revegetation and population distribution than it does to state or other administrative boundaries. The climatic classification of AUSLIG (1992) and the IBRA biogeographic regions (Thackaway et al 1995) were used to develop five (see Map 1) broad regions for analysis. The regionalisation also reflects the differences in population levels and between coastal and inland areas. These regions are larger than those recognised among revegetation practitioners for their state.

Results by categories of user

Results are presented for three categories of seed and seedling users: small, medium and big. The categorisation is based on previous consultation and survey work.

Small users are those who used up to 5 kilograms of seed or 8,000 seedlings in the last year. These figures are based on reasonable maximums that a non-commercial individual

might normally use (or collect or grow) in a year.

Medium users are those who used from 5 to 20 kilograms of seed or 8,000 to 25,000 seedlings in the last year. These figures are based on reasonable maximum amounts that a community group might need for their non-commercial use, for example for major group projects in a year.

Big users are simply those who used more than 20 kilograms of seed or 25,000 seedlings in the last year..

Results by origin of seed and seedlings

Presentation of some results distinguishes between seed and seedlings ‘in general’, ‘of the right species’ and ‘indigenous to the local area’. This distinction by geographic origin is most important in separating demand and supply issues for local indigenous from non-local seed and seedlings.

While there is widespread agreement on the benefits of using local plants in revegetation and evidence in this survey that many practitioners consider it essential to revegetation success, this is by no means always the case. One should ask **whether** local plant origin is important in revegetation in an area before assuming that supply of local plants is an issue. For example, some areas are so modified (by clearing or salinity) that non-local plants are selected in preference to local plants for salt tolerance or other qualities. There are also productive roles for plants in providing forest products, shelter, forage and water use that influence decisions about what to plant.

The term ‘local area’ is difficult to define and varies between species. It was deliberately given no more definition in the questionnaire than ‘originally grew naturally in the local area’: leaving exact definition up to the respondent. Respondents expressed little difficulty understanding these distinctions in the questionnaire though a few noted that such terms are not clear-cut.

Who were the respondents

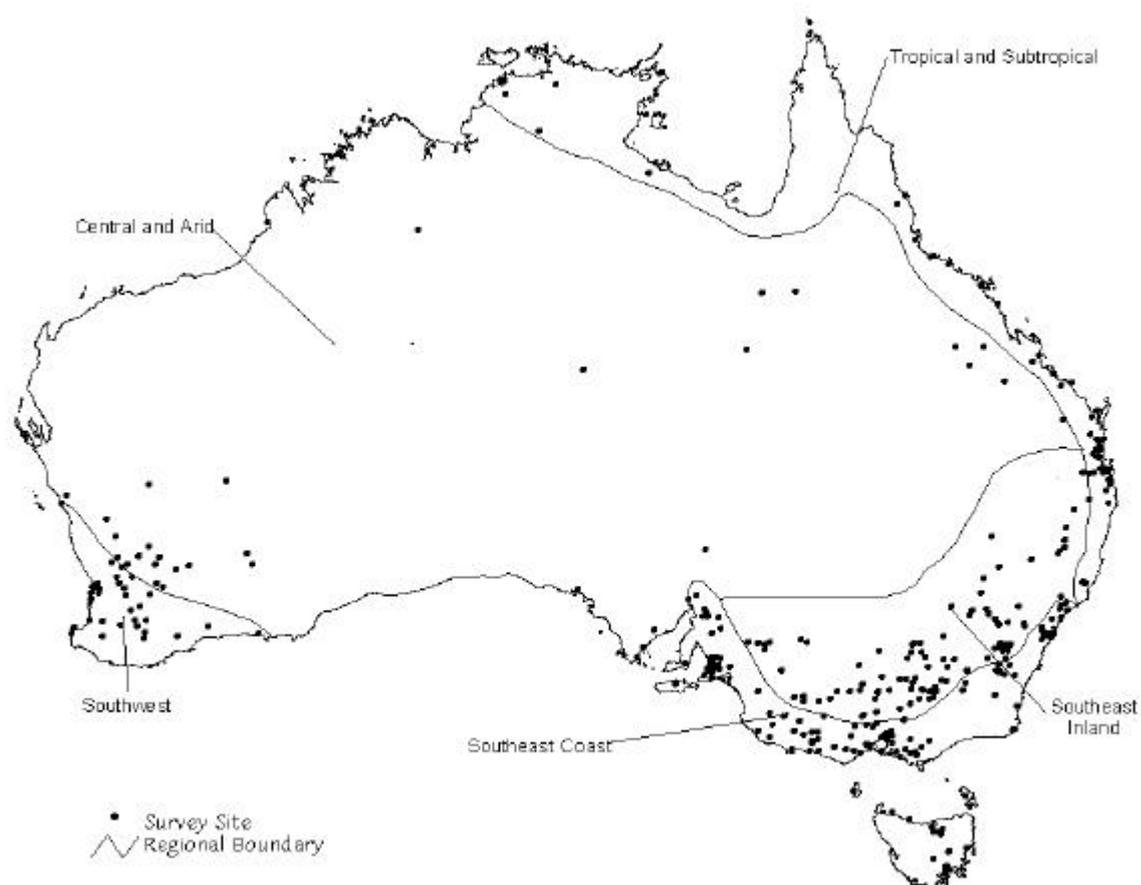
The survey was successful in attracting response from revegetation practitioners.

Almost all respondents (93%) provided information on their activities and 94% are involved in activities that directly involve the use of seed or seedlings in the field or the nursery.

Generally more respondents were individuals or landholders (31%) or representatives of a community group (30%) than were representatives of either a non-government organisation (8%), a commercial enterprise (16.5%), or a state or local government (14%): see Table 1. This pattern carries through to state and regional levels with little variation.

Response among states is as follows: Queensland (90), Victoria (93), New South Wales (163) South Australia (70), Western Australia (91), the Northern Territory (21), Australian Capital Territory (4), and Tasmania (28).

The response is biased to Southeastern and far Southwestern Australia. Further north, the largest response is from coastal areas near major population centres such as Brisbane, Darwin and Perth. This southern bias is expected and is in general a reflection of the relative levels of revegetation activity. There are considerable differences in the nature of the revegetation sector between states in scale and nature of operations, in the respective roles of the commercial, government and community sectors, and in collection and storage practices (pp 61, Mortlock, 1999a). These differences result from variation in population density, landcare activity, vegetation type, regeneration rate, and climate among other factors. In tropical areas, for example, regeneration rates are generally higher and there is less dependence on revegetation. To some extent the southern bias also reflects survey distribution bias and mirrors the location and density of Bushcare and Greening Australia offices.



Map 1: Location of response around Australia and regions used in the survey

Table 1: Who were the respondents?

	<u>Number of respondents</u>					
	Australia	Southwest	Southeast coast	Southeast inland	Tropical & sub-tropic coast	Rangelands
Affiliation of respondents (sample=522)						
Individual or landholder	192	26	101	22	15	28
Community group representative	188	25	83	26	23	31
Non-government organisation representative	49	1	23	10	4	11
Commercial enterprise representative	102	8	50	9	9	26
State or local government representative	87	19	30	6	9	23
<i>Total responses</i>	618	79	287	73	60	119
Revegetation activities of respondents (sample=522)						
Raised native seedlings from seed	289	27	122	44	38	58
Planted native seedlings in the field	406	68	161	48	46	83
Carried out direct seeding of natives	201	26	95	23	14	43
Carried out hydromulching of natives	15	3	4	0	5	3
Managed replanted areas	245	36	93	28	36	52
Managed natural regeneration	261	42	100	34	32	53

<i>Total responses</i>	1417	202	575	177	171	292
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Note: Many respondents indicated that they carry out more than one activity in revegetation.

Results

Importance of local indigenous origins

FloraBank reported the trend in revegetation toward use of seed that is indigenous to the local area (Mortlock, 1999). This was based on consultation and findings about seed **collection** and the results below widen our understanding to the **use** of local indigenous seed and seedlings in revegetation.

Nationally, and at the regional level, consistently almost all respondents **do** consider that the use of local indigenous seed and seedlings is *essential*, *very important* or *important* for success in their revegetation work.

Half of all respondents consider local origin is *essential* to success implying that for them revegetation is **dependent** on local origins: see Appendix 2. This is somewhat different to *very important* (26 %) or *important* (18 %) to success, both of which imply a lesser imperative or that failure is not necessarily the outcome of using non-local material. Only 4.8 % of respondents in total considered that this issue was *not important*, *irrelevant* or were *unsure*.

Fewer respondents in the Southwest region than those elsewhere indicated that local origin was *essential*, to success and more did so in the Southeast inland and Tropical & Subtropical Coast regions: see Fig 1.

Use of seed and seedlings

Questions on the amount of seed and seedlings used by respondents for ‘all revegetation purposes’ in the ‘last’ year were included to establish benchmarks and for interpretation of other parts of the response.

The response presented in Table 2 indicates that nationally, 354 respondents used 22,270 kilograms⁵ of seed in total in the last year.

Looking across the categories of **seed** users:

- 60% were small users who on average used 2.1⁶ kilograms;
- 21% were medium users who on average used 12.4 kilograms;
- 17% were big users who on average used 348 kilograms.

The big users account for 94% (20,878 kilograms) of all the seed used by respondents to this survey last year. Indeed, the eight biggest users account for 70 % and the 220 small users only 2% (472 kilograms) of all seed used.

Looking at **seedling** users, 461 respondents indicated that they used 23.6 million seedlings in total in the last year (see Table 2):

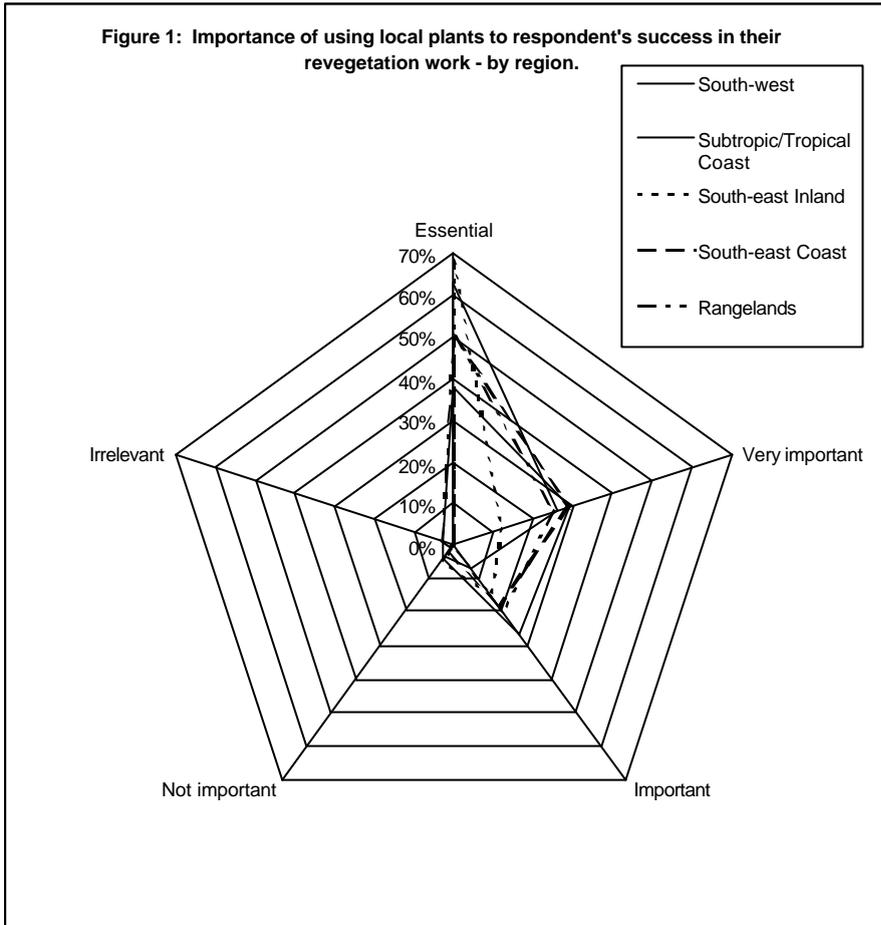
- 62.5% were small users who on average used 2,061 seedlings;
- 18% were medium users who on average used 15,605 seedlings;
- 20 % were big users who on average used 238,500 seedlings.

Again, the big users account for 93% (21.7 million) of all seedlings used in the survey last year. In continuing similarity to the situation for seed, the 12 biggest users account for 60% and the 288 small users only 2.5% of the total used.

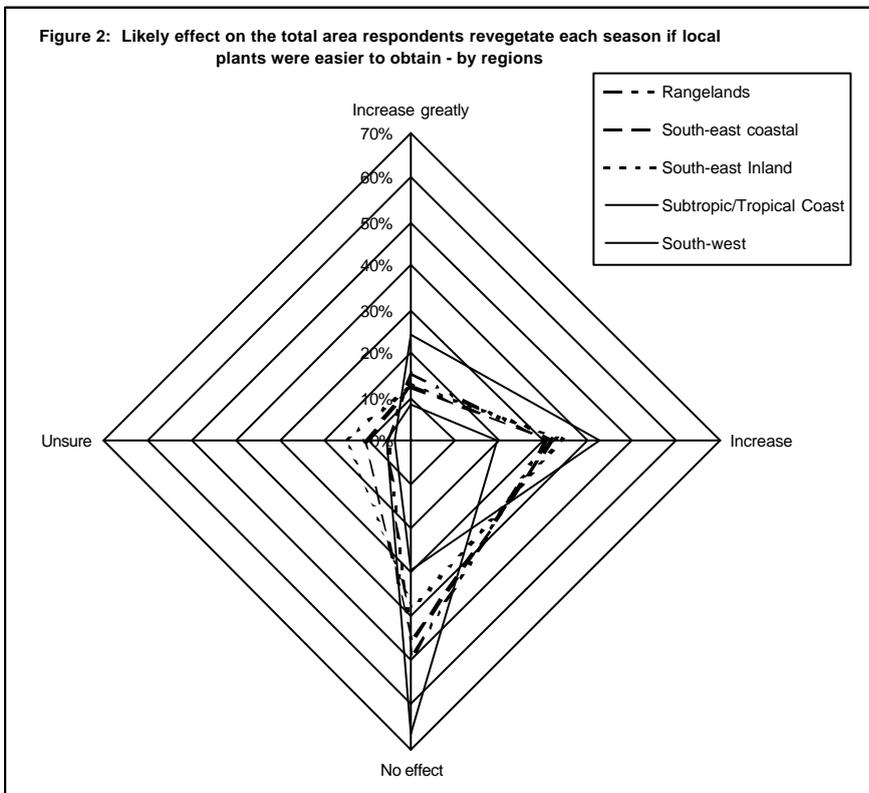
There are many more small users of seed and seedlings than medium or big users, yet collectively these small users account for very little of the total seed or seedlings used. Instead, a comparatively small group of big users account for almost all the seed and seedlings used by respondents in this survey. This is a major finding, for these big (and to some extent medium) users are likely to have far greater impact on local or regional supply and demand despite their lesser numbers.

⁵ Responses in hectares direct seeded were converted at the rate of 2 kilograms per hectare.

⁶ While this may sound like a small amount of seed, it may contain a few hundred to a couple of thousand germinable seeds per gram depending on species. Five kilograms might be used to raise many thousands of seedlings or direct seed areas as large as 5 hectares.



Note: for numerical values see Appendix 2, Question 16.



Note: for numerical values see Appendix 2, Question 18.

Table 2: Seed and seedling use by categories and regions

	Australia	Southwest	Southeast coast	Southeast inland	Tropic & sub-tropical coast	Rangelands	
Seed user categories							
Big (>20 kg last year)	No. respondents.	60	7	27	9	2	15
	Total kg seed	20,878	687	4,535	1,081	150	14,425
	Average kg seed	348	98	168	120	75	961
Medium (5 to 20 kg last year)	No. respondents.	74	12	32	8	5	17
	Total kg seed	921	164	379	90	76	211
	Average kg seed	12.4	13.7	11.8	11.3	15.2	12.4
Small (< 5kg last year)	No. respondents.	220	22	107	23	27	41
	Total kg seed	472	46	229	44	74	79
	Average kg seed	2.1	2.1	2.1	1.9	2.7	1.9
Totals	No. respondents.	354	41	166	40	34	73
	Total kg seed	22,270	897	5,143	1,215	299	14,715
	Average kg seed	63	22	31	30	9	202
Seedling user categories							
Big (>25,000 seedlings last year)	No. respondents.	91	25	37	11	8	10
	Total seedlings	21,703.84	3,836.000	11,634.50	3,268.344	1,937.500	1,027.500
	Average seedlings	238,504	153,440	314,446	297,122	242,187	102,750
Medium (8 to 25,000 seedlings last year)	No. respondents.	82	15	34	35	32	10
	Total seedlings	1,279,600	216,700	532,400	242,500	134,000	154,000
	Average seedlings	15,605	14,447	15,659	17,321	14,889	15,400
Small (< 8,000 seedlings last year)	No. respondents.	288	26	138	35	32	57
	Total seedlings	593,538	80,137	243,987	98,806	81,380	89,228
	Average seedlings	2,061	3,082	1,768	2,823	2,543	1,565
Totals	No. respondents.	461	66	209	60	49	77
	Total seedlings	23,576.98	4,132.838	12,410.88	3,609.650	2,152.880	1,270.728
	Average seedlings	51,143	59,382	60,161	43,936	16,503	51,143

Who these big users are, where they are located and what type of seed and seedlings they use may significantly impact on availability of local indigenous seed at the local and regional levels. Given this response, a small increase in the number of big (or medium) users may be expected to have far greater impact on availability than even a doubling of the number of small users.

The sampling strategy is likely to under-estimate the number of small users in proportion to medium and large. However, small users use so little seed or seedlings in proportion to others that their under-representation in the sample would be unlikely to influence the above findings.

Use across regions

The data in Table 2 provide an indication of differences between regions – although the size of response for some data is small and therefore less reliable. By far the majority of seed (by weight) was used by respondents in the Rangelands and to a much lesser extent in the Southeast Coastal and Inland regions in order. The average user in the Rangelands region used ten times as much seed as those in other regions and the 15 big users accounted for 65% by weight of all the seed used in this survey. Much of the seed used in the Rangelands would be native grasses, acacias and saltbush.

Seedling use was more uniform across regions though the Southeast Coastal and to a much lesser extent the Southwest regions account

for the largest amount used in total and by the average respondent.

Use of local material

The use of local indigenous plants in revegetation at the community level is now firmly established with the majority of respondents to this survey using *all* or *mostly* local indigenous seed and seedlings. Sampling strategy may have influenced this result in that clients of the Bushcare network are arguably more likely than revegetators in general to use local seed.

Nevertheless, about 83% of respondents⁷ nationally consider that *all* (47%) or *most* (36%) of the native **seed** they used for all revegetation purposes last year was ‘indigenous to the local area’: see Appendix 2. A very similar response regarding origins of seed collected was reported in Mortlock, 1999 (p 45).

Results were very similar in the case of **seedlings**, with 78% of seedling users nationally⁸ using *all* (38%) or *mostly* (40%) local indigenous seedlings in the last year. Not quite as many seedling users indicate *all* local origins as to seed users.

This use of local seed and seedlings was consistently high in all regions except again in the Southwest where there was less emphasis on using local seed (*all* 30%, *most* 49%, *some* 19%) and seedlings (*all* 20%, *most* 45%, *some* 30%). Use of local material is most in evidence in the Tropical & Subtropical Coast region.

The pattern was also consistent for all categories of user (small, medium and large) though more small users use *all* local seed and seedlings than medium or big users - who are more likely to use *mostly* or only *some* local seed.

Demand for seed and seedlings

The survey establishes qualitative trends in the amount of seed and seedlings that respondents expect to use in the coming year compared to the last year. This is an indicator rather than a quantitative assessment of demand and refers to seed and seedlings used

for ‘all revegetation purposes’ in the ‘next’ year. The preceding question in the survey, about revegetation activities (Q2), served to remind respondents of a full range of activities and revegetation purposes.

Overall, demand is increasing

Over half the respondents nationally anticipate that their **seed** use would *increase* (35%) or *increase greatly* (22%) in the next year. Reflecting this response, those who use **seedlings** also anticipate their use would *increase* (39%) or *increase greatly* (17%). Though 30% expect their seed and seedling use to *stay the same* as the last year, very few anticipate a *decrease* or were *unsure* see Figures 3 and 4, and Appendix 2. This response confirms the results of previous consultations that demand for both seed and seedlings is increasing among revegetation practitioners.

At the regional level, anticipated trends in use were very similar across all regions to the national trends, though more pronounced in some than others. The regions where use is greatest are also the ones in which increased use is most anticipated: for seed it’s the Rangelands, Southeast Coast and Southeast Inland regions (Fig. 3) and in the case of seedlings, the Southeast Coast, Southwest and Southeast Inland regions: (Fig. 4).

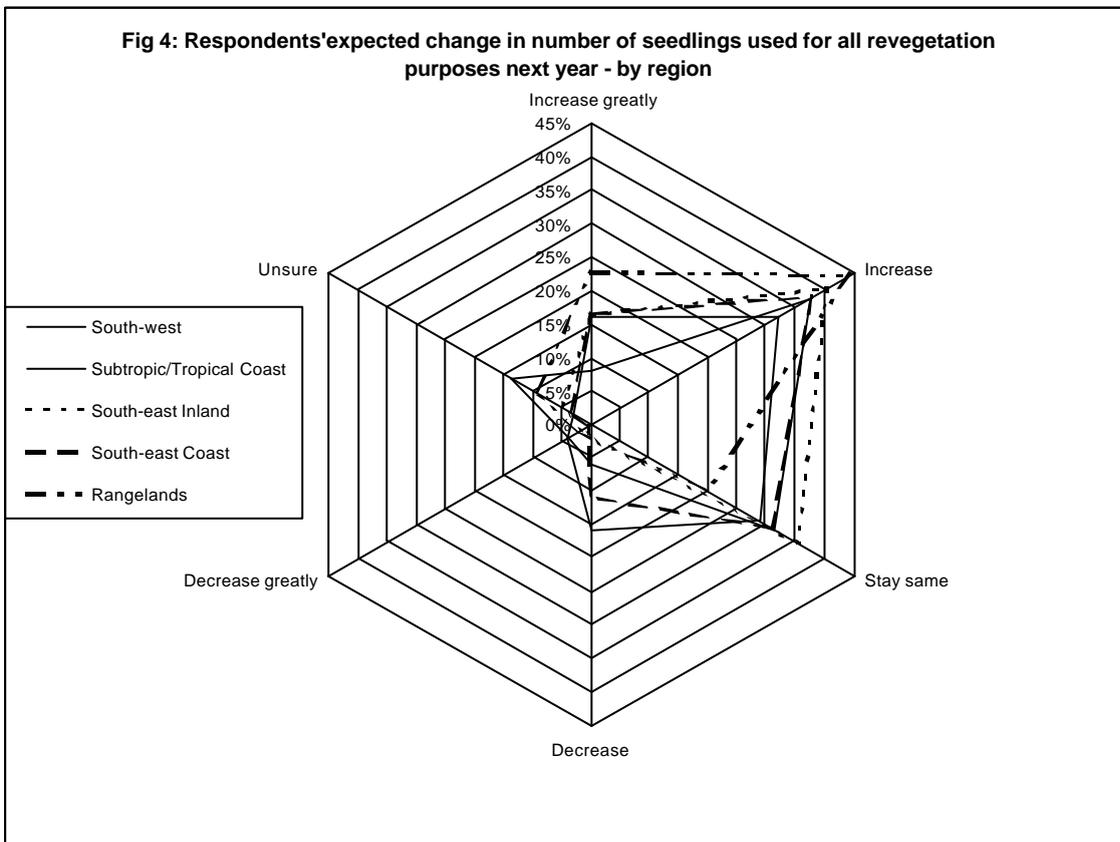
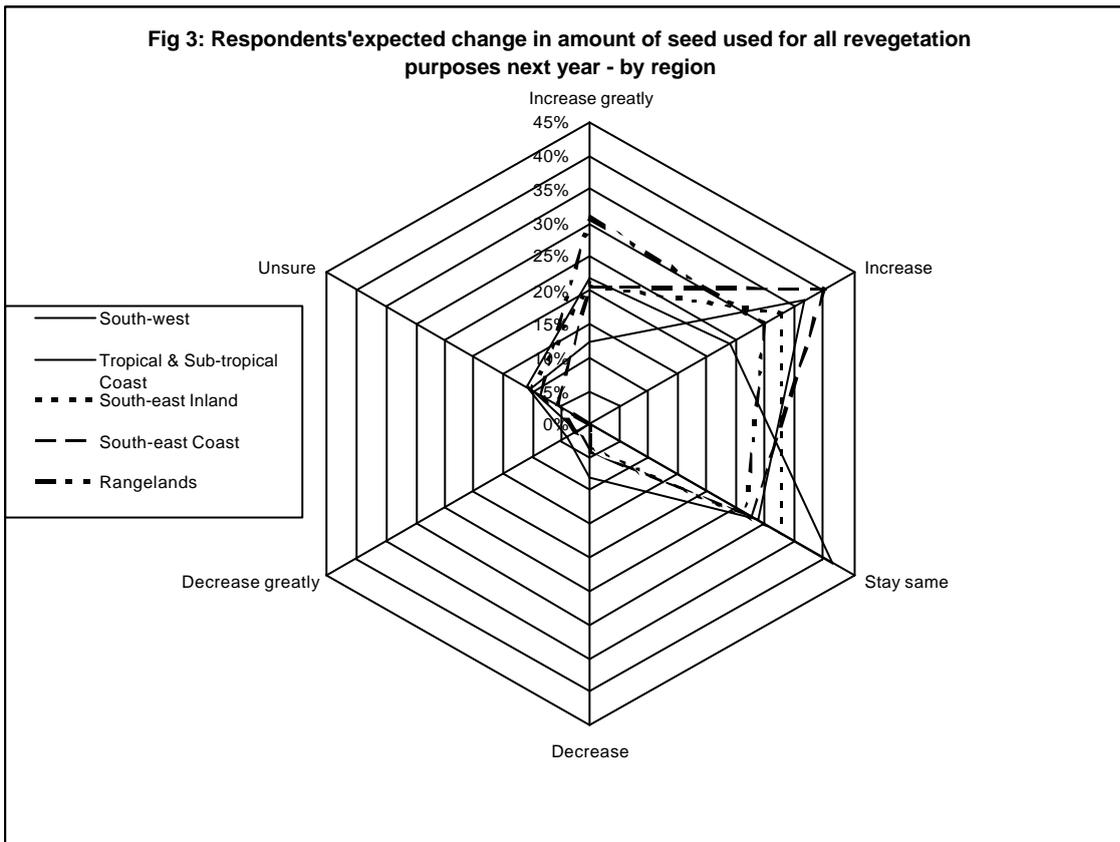
More big **seed** users (70%) anticipate increased use than small (52%) or medium users (41%): see Fig. 5. Conversely, only 15% of big users anticipate the same seed use next year as the last, whereas about 36% of small and 40% of medium seed users do. Twice as many big users (30.5%) as small users (16.5%) said their seed use would **increase greatly** next year. Among big seed users who carry out direct seeding (the biggest user of seed) the figures are almost identical to those above. These results further suggest that, in the case of seed at least, greater **levels** of use are associated with anticipation of greater **increases** in use. However, there is little difference between categories of **seedling** users: Fig 6.

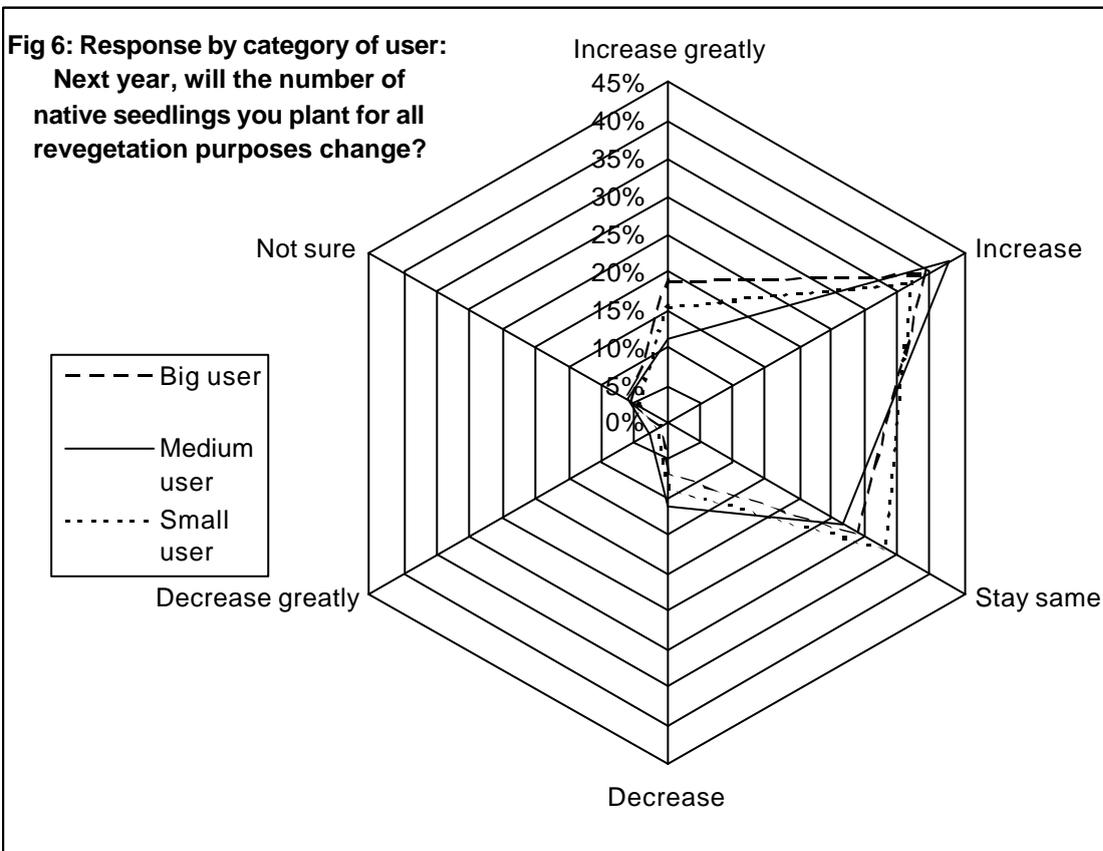
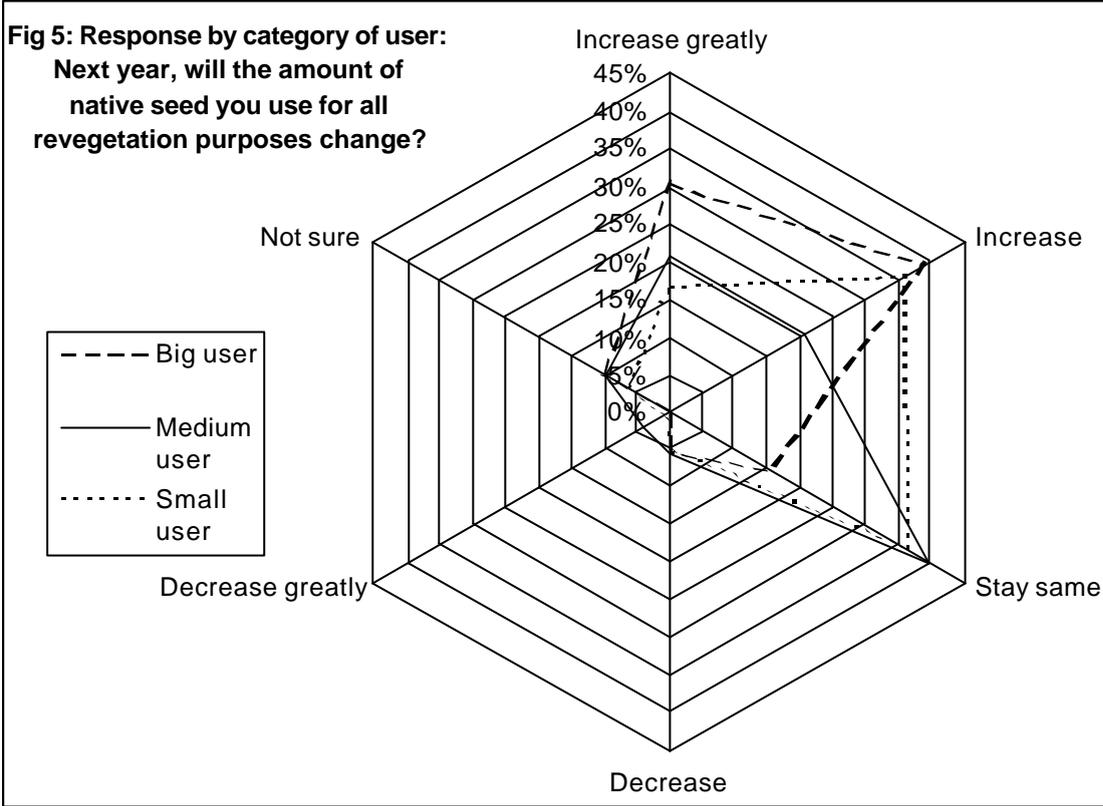
It is of great significance that demand is increasing most among the biggest users of seed who, as established above, account for almost all the seed used in this survey. Increased use is also most anticipated in those regions where most seed and seedlings are. The result is a clear indication of *escalating* demand for seed in areas

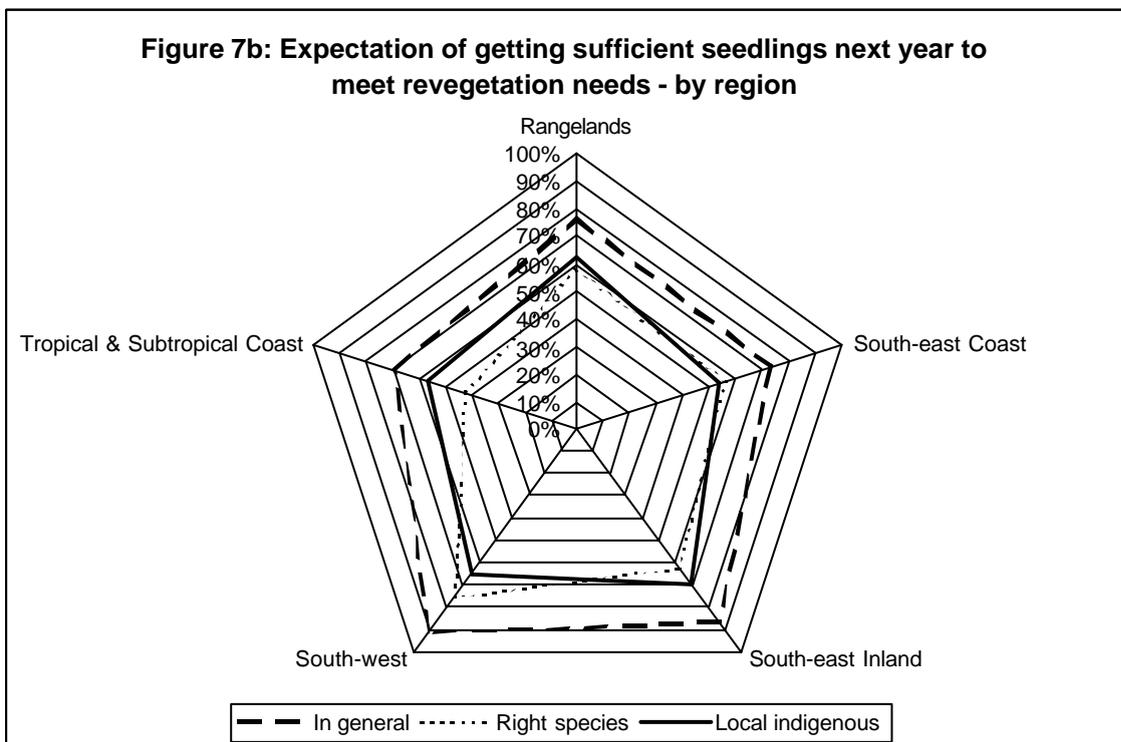
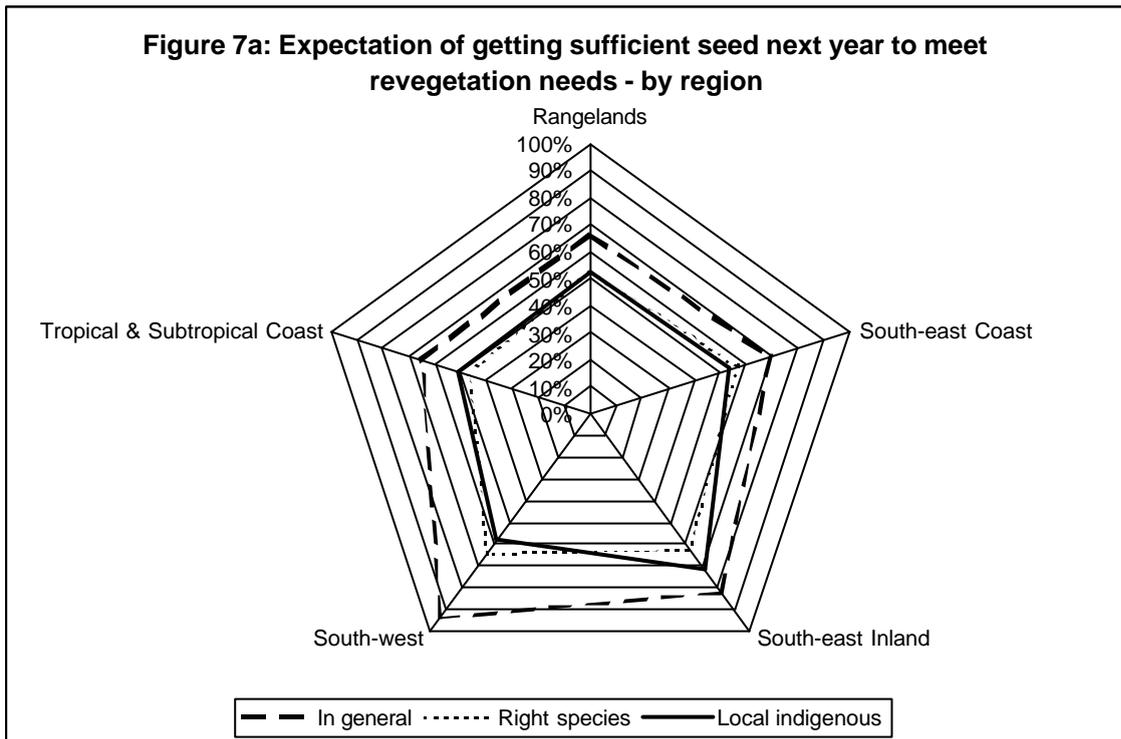
⁷ sample of 428 respondents

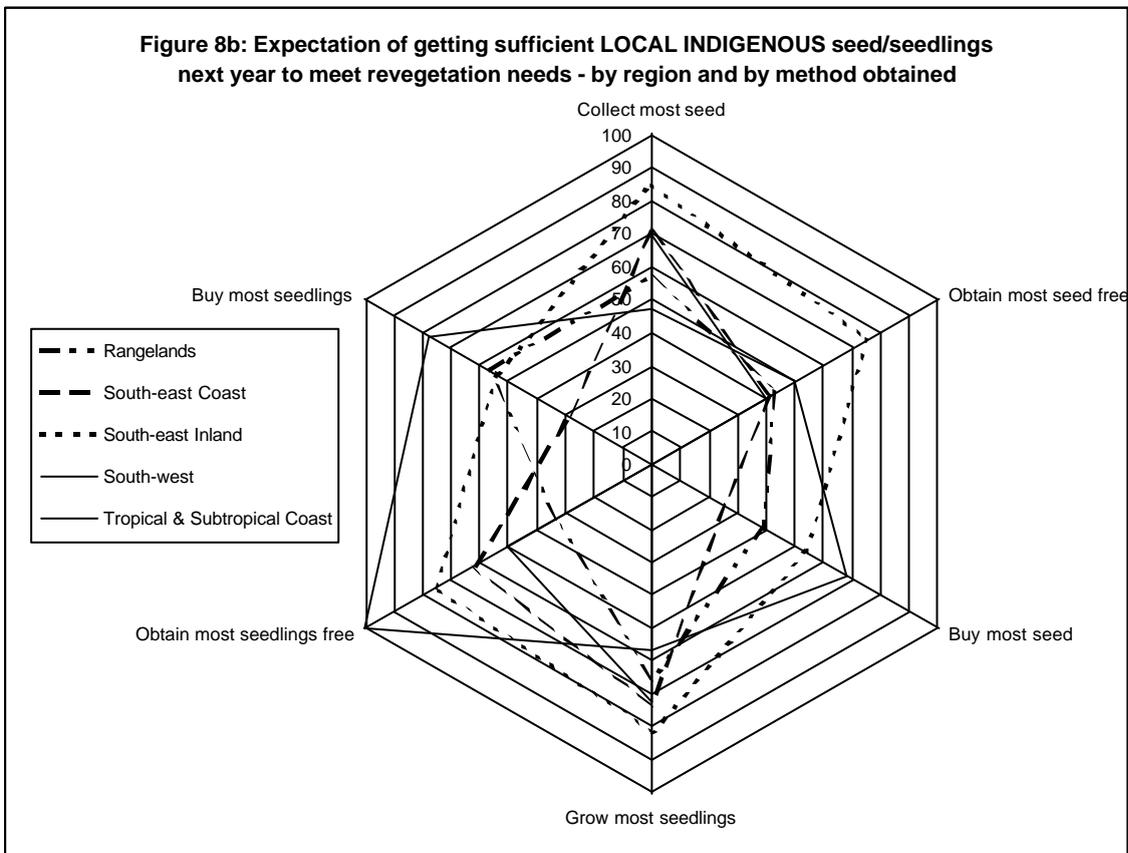
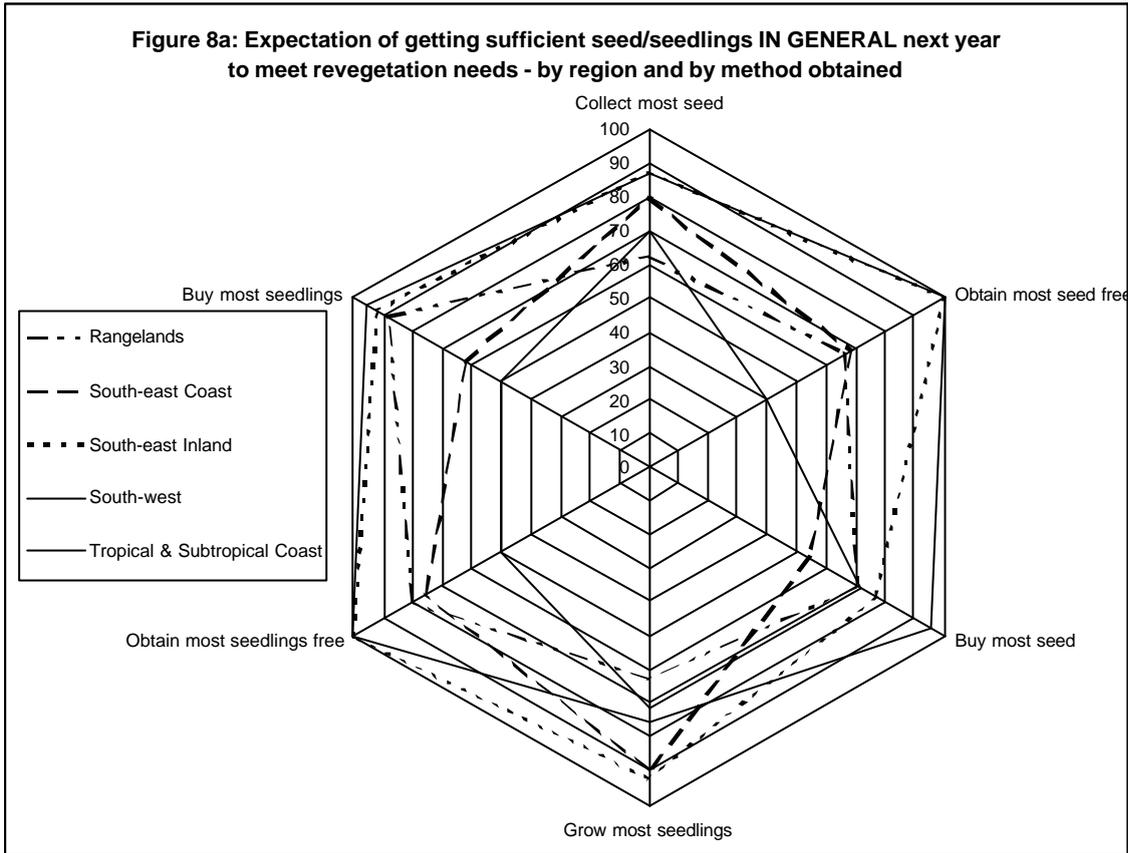
⁸ sample of 490 respondents

where revegetation activity is already well established at the community level.









Demand for local seed and seedlings

While demand is increasing generally, the proportion of demand that is for local indigenous plants is also increasing. Almost half the respondents (44%) expect the proportion of local seed and seedlings they use to increase in the coming year: see Appendix 2. This is fewer than the number of respondents who expect increased use of seed/seedlings generally (13%/18% see above).

Regional and national response is similar though more uniform for seedlings than seed. Fewer respondents expect to increase their use of local seed in the Southwest. In the Rangelands and Southeast Coast regions fewer respondents anticipate increased use of local seed than seed in general (by 22% and 15% respectively).

Looking at those all important big seed users we find that twice as many expect increased use of seed in general (70%) than do so for local seed (38%) next year.

Supply of seed and seedlings

The previous results tell us something of who responded to this survey, how much material they used last year, and the anticipated increase in use (demand) in the coming year. The following results firstly establish the main methods by which respondents obtain supply and secondly, their expectations of obtaining sufficient supply to meet their needs in the coming year. Sufficiency and method of supply are of course related.

Many cross tabulations were carried out to see who in particular may experience insufficient supply. The survey again asked for response regarding seed and seedlings ‘in general’, ‘of the right species’, and that are ‘indigenous to the local area’.

The sample is arguably biased toward those ‘in the know’ who would find it easier to source the seed and seedlings they need than many just beginning their revegetation efforts.

How seed and seedlings are obtained

Seed and seedlings are either collected or grown, bought, or obtained at no cost from other collectors, growers and suppliers. In this survey, as in the 1998 FloraBank survey, half

as many respondents buy as collect most of their **seed** (*collect 54%, buy 29%, obtain free 8%*). About even numbers grow and buy most of their **seedlings** (*grow 41%, buy 46%, and obtain free 7%*): see Appendix 2.

More collect than buy **seed** in all regions except the Rangelands where the reverse is true (*buy 52%, collect 35%*). Collection is most in evidence in the Southeast Inland (*collect 65%, buy 15%*).

There are more **seedling** growers in the Tropical & Subtropical Coast region (*grow 62%, buy 29%*) and more buyers in the Southwest (*grow 20%, buy 70%*). Very few obtain most seedlings from growers or suppliers at no cost except in South Australia where significantly, some 24% do: possibly largely through the non-profit organisation Trees for Life.

Big, medium and small seed users obtain **seed** in much the same way. However, in the case of **seedlings**, slightly more big users (53%) grow and fewer (44%) buy seedlings than medium (*grow 44%, buy 49%*) or small (*grow 35%, buy 50%*) users.

Expectations of supply

A major finding is that three-quarters of respondents nationally expect to get sufficient **seed** (72%) and **seedlings** (77%) to meet their needs *in general* in the coming year. While some respondents are *unsure*, only 10% do not expect to meet their needs. The response is also encouragingly high for seed and seedlings *of the right species* (56%/58% *yes*) and *indigenous to the local area* (56%/59% *yes*): see Appendix 2.

Across the board, respondents were less confident of obtaining seed than seedlings. They were also less confident of obtaining sufficient *indigenous to the local area* or *of the right species* than seed and seedlings *in general*. It is unlikely that respondents had difficulty in understanding the question given that other questions about local seed seemed to cause little uncertainty.

Across regions

Expectations of obtaining sufficient seed and seedlings *in general* were high across regions though they did vary (see Fig 7), as expected

based on the findings from previous consultation reported in the Introduction. Expectations of sufficient supply were highest in the Southwest (93.5%/91 %) and Southeast Inland (82%/86%) regions, lower in the Rangelands (68%/77 %), Southeast Coastal (69%/73 %) and lowest in the Tropical/Sub-tropical Coast regions (65%/69%).

In all regions, respondents were less confident of obtaining seed and seedlings *of the right species* and *indigenous to the local area* than *in general*: see Figure 7a and 7b.

By method of supply

A main finding is that those who collect seed or grow seedlings themselves are generally more confident than those who buy of getting sufficient to meet their revegetation needs: see Figure 8a and 8b. In particular, collectors are more confident of getting local indigenous seed (*collect* 68%, *buy* 38%) and growers of getting local indigenous seedlings (*grow* 74%, *buy* 48%). Those who buy are consistently more uncertain rather than indicating that they do not expect to get sufficient supply.

The relationship between the method by which seed and seedlings were obtained and the expectation of gaining sufficient supply is of some interest. The data presented by region in Figure 8a and 8b show that no two regions are alike and there are some marked contrasts. The differences are even more marked for *local indigenous* seed and seedlings than for those *in general*. A more detailed analysis is not presented as sample sizes for this cross-tabulation of the data are small and therefore less reliable.

By scale and purpose of use

Generally, the category of the user (Big, Medium, and Small) has little impact in the data on expectation of supply. However, if we look specifically at those who carry out direct seeding, grow seedlings, or plant seedlings in the field (separately from those who carry out other activities) some differences do emerge: see Table 3. Those who carry out direct seeding are on average a little less confident of getting the seed they need of all types than those who grow seedlings, or than those who plant seedlings in the field are of getting sufficient seedlings. It is

the big users who are least confident in each group.

Table 3: Percentage of respondents who expect to get sufficient supplies – by scale and type of activity.

	In general	Right species	Local indigenous
Big direct seeder	73.2%	53.8%	52.5%
Big seedling grower	80.0%	63.3%	60.0%
Big seedling planter	79.2%	66.2%	65.3%
Medium direct seeder	76.6%	57.8%	51.1%
Medium seedling grower	79.1%	64.3%	65.1%
Medium seedling planter	90.9%	68.8%	65.6%
Small direct seeder	64.5%	47.4%	51.9%
Small seedling grower	74.1%	62.7%	65.1%
Small seedling planter	79.4%	55.3%	59.3%

Nationally, half of all respondents⁹ consider that there **is** 'adequate seed for collection in the bush to meet the needs of revegetation in their region', 25% say there **is not** sufficient seed and the remaining 25% are unsure.

This response is consistent at the regional level with the exception of the Tropical & Subtropical Coast where the response (sample 55) is less confident (*yes* 38%, *unsure* 22%, *no* 40%): see Appendix 2. Respondents were asked to consider the 'needs of revegetation in your region', where all would have considered a much smaller region and **not** the five-region split used for analysis of this survey (Q 17: Appendix 1).

Expectations of supply vary little among the types of respondents whether they are individuals, or representatives of an organisation, group, commercial entity or government – with one notable exception. Representatives of commercial enterprise are considerably more confident of gaining supply of all types of seedlings (not seed) than anyone else (seedlings *in general* 93%, *local indigenous* 82% and *right species* 76%). This may be because commercial enterprise generally operates by placing orders for stock required or because they are very likely better at sourcing the seedlings they require than other respondents.

Seed resource for collection

An important consideration influencing seed availability is the extent of seed for collection in the bush. There are so many factors involved however that a quantitative assessment is unlikely. It is probably most important to determine if there is enough seed in the natural bush in the *local* area to meet the needs of revegetation in the *local* area. The previous FloraBank survey established that 31% of community respondents **collect all** and 35% *most* of their seed from natural bush and many from the local area: *all* 43% and *most* 35% (1999a: p45). However, problems of definition and the likelihood of small sample sizes put this approach beyond the current survey which instead focused on the broad regional level: See Question 18 Appendix 1.

What effect might greater availability of local seed have?

Clearly, the use of local plants in revegetation is now a fundamental requirement for many people who carry out revegetation. But, to what extent are they willing to use non-local plants? How much revegetation work is curtailed due to lack of local plants and what effect might greater availability of local plants have? These are important questions but difficult to quantify. As an indicator of the importance of such concerns, the survey asked what the effect would be on the total area revegetated each season by respondents if local indigenous seed and seedlings were easier to obtain.

It is an important finding that nationally, 45% of respondents consider they would **increase** the area they revegetate each season if local plants were easier to obtain (*increase* 31%, *greatly increase* 14%, or *no effect* 46%).

Some important (and obvious) characteristics emerge of those who are **most likely to say they would increase** (or increase greatly) the area they revegetate if there was better local supply:

- Those in the Tropical/Subtropical region (*greatly increase* 24%, *increase* 43%, *no effect* 30%) were more likely and those in the Southwest less likely (*greatly increase* 8%, *increase* 19%, *no effect* 67%) to increase the area they revegetate if local plants were easier to obtain: see Appendix 2.

⁹ sample of 552 respondents

- Those who expect to get **insufficient** local indigenous seed and seedlings next year are much more likely to increase their area: see Table 4. Conversely, many more of those who expect to get **sufficient** supplies say better supply would have no effect.
- Those who consider the use of local plants is **more important** (or essential) are also much more likely to increase their area revegetated if local supply was better. Conversely, those who consider the issue of lesser importance are more likely to say that greater availability would have no effect: see Table 5.

Small users of both seed and seedlings are slightly more likely to increase their area revegetated if local supply was better. Big users are correspondingly less likely: see Table 6.

There are many motivations and factors bearing on whether a person revegetates more or less area in a season. The survey did not test the significance of such factors in comparison to the significance of seed availability. While it may be that another factor is more important than the availability of local seed clearly, it is a limiting factor for many. The results confirm that local revegetation at the community level can be and in some cases already is driven by the supply of local seed and seedlings (rather than demand). Put another way, that the supply of local seed can and currently does restrict our community based revegetation effort **and** if this restriction were removed, it **would** make a difference to the area that many revegetate.

Table 4: Likely effect on area revegetated if local indigenous material were easier to obtain - by respondent's ability to get sufficient supply.

<i>Likely effect on total area revegetated each season</i>		<i>Ability to get local indigenous SEED req'd</i>			<i>Ability to get local indigenous SEEDLINGS req'd</i>		
		Sufficient	Unsure	Insufficient	Sufficient	Unsure	Insufficient
Increase greatly	No. respondents.	21	18	21	28	20	16
	% of column	9.2	16.2	27.6	10.3	14.9	26.2
Increase	No. respondents.	62	40	38	72	45	26
	% of column	27.1	36.0	50.0	26.5	33.6	42.6
No effect	No. respondents.	127	43	15	154	59	13
	% of column	55.5	38.7	19.7	56.6	44.0	21.3
Unsure	No. respondents.	19	10	2	18	10	6
	% of column	8.3	9.0	2.6	6.6	7.5	9.8
<i>Total respondents</i>		229	111	76	272	134	61

Table 5: Likely effect on area revegetated if local indigenous material were easier to obtain - by importance of local origins to success in revegetation.

<i>Likely effect on total area revegetated each season</i>		<i>Importance of local origins to success of respondent's revegetation work</i>					
		Essential	Very Important	Important	Not Important	Irrelevant	Unsure
Increase greatly	No. respondents.	55	15	3	0	0	0
	% of column	20.1	10.6	3.1	0	0	0
Increase	No. respondents.	87	57	23	2	0	0
	% of column	31.9	40.4	23.5	13.3	0	0
No effect	No. respondents.	110	54	65	13	2	3
	% of column	40.3	38.3	66.3	86.7	50.0	60.0
Unsure	No. respondents.	21	15	7	0	2	2
	% of column	7.7	10.6	7.1	0	50.0	40.0
<i>Total respondents</i>		273	141	98	15	4	5

Table 6: Likely effect on area revegetated if local indigenous material were easier to obtain - by category of use.

<i>Likely effect on total area revegetated each season</i>		<i>SEED user category</i>			<i>SEEDLING user category</i>		
		Big	Medium	Small	Big	Medium	Small
Increase greatly	No. respondents.	8	8	32	13	7	41
	% of column	13.8	11.4	15.0	14.8	8.8	14.5
Increase	No. respondents.	15	23	80	20	28	87
	% of column	25.9	32.9	37.4	22.7	35.0	30.7
No effect	No. respondents.	31	32	89	47	34	138
	% of column	53.4	45.7	41.6	53.4	42.5	48.8
Unsure	No. respondents.	4	7	13	8	11	17
	% of column	6.9	10.0	6.1	9.1	13.8	6.0
<i>Total respondents</i>		58	70	214	88	80	283

Comments by respondents

Respondents were asked to comment about the survey and 151 took the opportunity to do so. Most of these comments go to the heart of matters about seed availability and none were unexpected. The most frequent comments made are listed below with the number of respondents making the comment in brackets.

- Not enough seed in bush for some species, eg. understorey species; (18)
- Labour cost, disposable income of farmer and costs of fencing are factors limiting the area revegetated each season; (13)
- Species availability depends on weather and seasonal factors; (10)
- Seed is not only collected from the bush but also from plantations, remnants, and revegetation areas; (7)
- Variety and diversity in plantings will increase next year more so than the area planted; (6)
- Purchased seed/seedlings are not always indigenous it depends on the supplier; (6)
- Would prefer to use only local indigenous plants; (5)
- Planting increases if funding is increased; (5)
- Seed is present in the bush, but having enough collectors, being able to collect, and infrastructure (eg. Lack of a storage & database manager) are the problems; (5)
- Seed/seedling availability depends on people ordering ahead, notification of funding in time, good planning; (5)
- Only use local indigenous plants; (4)
- Top-up with extra seed when hard to access, or for understorey; (4)
- Concern about sustainability of collection practices and effect on ecology; (4)
- Revegetation would have improved quality rather than quantity, if indigenous seed was more available; (3)
- Local natives not always suitable (eg. Saline areas, survivability); (3)
- Enough local seed if Greening Australia seedbanks continue; (3)
- Native grass seed included; (3)
- Availability and collection not usually a problem in this area; (3)
- Planting depends on weather conditions. (3)

Discussion and conclusions

This is the first survey to provide important information about the demand for native seed and seedlings for revegetation at the community level in Australia. It was accomplished on a tiny budget and regardless of shortcomings¹⁰, it provides a snapshot of the present situation and that in the coming year (up to August 2000). The survey does not establish trends in demand or supply over time, but it does provide current benchmarks to which future surveys may return for comparison. Interpretation of the response is assisted by the findings of the previous survey and the consultation conducted by FloraBank during 1998 in focus group sessions in most states.

The following discussion draws on important findings from throughout survey, to make observations and conclusions about issues of significance for community revegetation in the future.

Demand is increasing and importantly, among the biggest users

Survey results confirm the unanimous findings of consultation that, across Australia, demand for native seed and seedlings is increasing. In the next year about half those surveyed anticipate an increase in the amount seed and seedlings they use.

¹⁰ For example, interpretation of terminology such as 'local bush', or the 'demands of revegetation' in the respondents' 'region' may vary greatly.

Four other findings indicate that demand for seed (at least) is increasing rapidly at the community level:

- greater levels of use are associated with greater demand for seed;
- increased use is most anticipated in those regions where most seed is used;
- more big users of seed anticipate increased use than others;
- expectation of increased seed use is higher among big seed users who carry out direct seeding than any others (and double those of small users).

These trends are all the more significant because it is the comparatively few (less than 20% of respondents) big users who account for almost all the seed (94%) and seedlings (93%) used nationally by those surveyed. Increased use by small users is of comparatively little significance to the demand and supply relationship as collectively they use little seed and seedlings.

In most states, the use of seed by the community sector in landcare and revegetation remains small in comparison to the mining sector. Nevertheless, the survey results suggest that there is rapid growth among the biggest users of seed in this sector in areas where revegetation activity is already well established.

These are significant findings for revegetation planning and have profound ramifications for supply and demand in the near future. Non-commercial collection and supply operations at present largely service the level of demand. Twice as many respondents collect their own seed as buy seed. The capacity of such operations and their ability to guarantee supply is more limited than is the case with commercial operations. Big users of seed may play a key role in attracting commercial collectors and suppliers to this market sector. At the local or regional level, a few big users will very likely have a far greater impact on seed and seedling demand and supply than all the small users combined. Indeed, a doubling or trebling of the number of small users might have less impact than increasing by one the number of big users (or large-scale collect and supply contracts). Where these big users are located, the characteristics of their

operations and (very likely) the amount of direct seeding they undertake are therefore crucial planning considerations at the regional level.

Local origins are of increasing importance

The use of local indigenous species in revegetation at the community level is now firmly established, with the majority of seed and seedling users in this survey using all or mostly local indigenous material. Almost all consider it essential or important to the success of their revegetation work that they use local indigenous plants. We know this is a relatively recent practice. Its uptake in the community is still in progress and that more than one third of respondents expect to increase the proportion of local indigenous seed and seedlings they use next year, indicates that this trend is of increasing importance. From a biodiversity viewpoint, at least, this is welcome news. However, it does mean that revegetation practitioners have rapidly partitioned 'native seed' as a raw material commodity not only at the species level but into many thousands of separate commodities, which (for many) non-interchangeable geographic origins.

Availability in general is good, but...

Overall, three-quarters of those surveyed are confident of getting sufficient native seed and seedlings *in general* to meet their revegetation needs – and the rates are higher in some regions. However, since most seek and use local plants, the situation for plants in general is of (increasingly) less importance than the situation for plants of local origins. The comments and findings about increasing demand (above) mostly relate to plants of local origins.

Local plants are a different matter

An encouragingly high number of respondents (over half) expect to obtain seed/seedlings *of the right species* and *indigenous to the local area*.

At first glance, these results seemed to contradict the shortages reported through consultation in 1998, in particular with Bushcare Support and Greening Australia

regional extension staff. However, the results are as much a cup half empty as one half full. Almost half the respondents **do not** expect to obtain sufficient local seed and seedlings (or are unsure about supply). There are also complex considerations about extent to which respondents may be pitching their level of use at what they know is available – the level of supply. Across the board, respondents are less confident of obtaining sufficient seed and seedlings *indigenous to the local area* than *in general*.

It is also important to keep in mind that the selected sample used in this survey targeted people who carry out revegetation and who may be considered the clients of the Bushcare Support and FloraBank initiatives. The sample is biased toward those who are active in revegetation rather than those who might be encouraged to revegetate or who curtailed planned work in the last year. In this sense, the response does not reflect the **potential** for revegetation. Regional extension staff, on the other hand, do have the potential for revegetation foremost in mind. More recently, at forums and through the FloraBank support and network services, regional extension staff have again reported shortages of seed during the planting season in 1999 and gave instances where revegetation work was curtailed due to the lack of local seed.

The analysis in this report (based on five bioregions) appears too coarse to pick up such shortages. Indeed such variation is probably best determined at the local level or at the level of (10 or so) land management regions recognised for each state.

Local plant supply restricts revegetation

An important indicator of revegetation potential to emerge from the survey is that some 46% of those surveyed **would increase** the area they revegetate each season if local seed and seedlings were easier to obtain.

There are many motivations and factors affecting whether a person revegetates more or less area in a season. The survey did not compare the significance of such factors and while other factors may be more important than the availability of local seed, it is clearly a limiting factor for many people. Against a background of increasing use of local seed and seedlings, it is a concern that almost half

of all respondents are unsure or pessimistic about getting such raw material for revegetation next year. So too is the finding that anticipated increase in use next year is considerably lower in three regions for local plants than for those in general.

The results confirm that local revegetation at the community level can be, and in some cases already is, driven by the supply of local seed and seedlings (rather than demand). Put another way, the supplies of local seed can, and currently does, restrict our community based revegetation effort **and** if this constraint were removed, it **would** make a difference to the area that many revegetate.

The clear implication is that, at the least, there is considerable potential for increasing the area revegetated in the next year through improving the availability of local seed and seedlings. Looking to the future, any increase in the pace or scale of the community revegetation effort, appears highly and increasingly dependent on local seed availability.

Increasing local seed supply may be difficult

Broadly, there are two requirements for increased seed supply: the seed must be available to collect, and there must be the capacity to collect, store and distribute that seed. Yet, as indicated in the Introduction, these are not simple requirements to meet. They are heavily influenced by natural and seasonal variables, market forces, and land use and population dynamics.

It is encouraging that half of those surveyed think there is enough seed available for collection in their local bush to meet the needs of revegetation in their region. The other half of those surveyed either were unsure (25%) or thought there was not enough seed available (25%). Again, this is a cup half full and it is very likely an overestimate. Seed collection is a difficult and demanding task if one is to collect a wide range of species each season. While some respondents do collect large amounts of seed themselves, many do not and we know little about just how competently or how widely they collect seed.

Unfortunately, the limits to the local seed resource are clearest when there is no more

seed to be harvested. The reports are that we have reached this point in some areas and that when this happens, some of those who were intending to revegetate no longer continue with their project in that season.

Direct seeding – a giant in waiting

Consultation points to increased direct seeding in community revegetation as a major cause of local seed shortages. Direct seeding operations are among the biggest if not the biggest clients for several Greening Australia/Bushcare Support Seedbanks. The survey finding is that slightly more direct seeders anticipate increased seed use than seedling growers or planters. Among big users, the difference is even greater.

Regardless of debate about relative efficiencies, direct seeders typically use much more seed than those who raise seedlings do. They strike shortages at the local level ahead of their counterparts in seedling production. They may create those shortages where they are the major users of seed.

Regional analysis

The broadest regionalisation (larger sample sizes) that would yield meaningful results was chosen. Due to some considerable cultural, agronomic, and environmental differences, the level of revegetation activity is not the same in each state. National trends tend to follow those of the Southeast regions from which the majority of respondents come.

Differences between regions have emerged from the data; the defining differences are summarised below. In other ways, the regions are similar and follow the national pattern of response.

Southwest

The Southwest is unique in its response. Local origin of plants is least important in this region. The use of local seedlings is least in evidence and the expectation for increased use is slightly lower than for other regions. Comparatively fewer respondents consider their total area revegetated would increase to some extent (and comparatively more consider there would be no effect) if local seed and seedlings were easier to obtain.

Respondents are more confident of getting sufficient seed and seedlings *in general, indigenous to the local area or of the right species* than those in any other region. In particular, this is the case for those who buy rather than collect seed. Unlike other regions, in the Southwest the majority of respondents expect to buy seed and seedlings next year rather than grow them. Seedling use was higher than in all but the Southeast Coast

Tropical & Subtropical Coast

In contrast to the Southwest, local origins is a more important issue in the Tropic and Sub-tropical coast region. Indeed only in the Southeast Inland are respondents more likely to consider local origins *essential* rather than simply *important* to success in revegetation. The use of local seed and seedlings is most in evidence in this region and unusually, the expectation for increased use of local seed is as high as for seed in general. Further, respondents here were the most likely of all to consider the total area they revegetated would increase to some extent if local seed and seedlings were easier to obtain. However they are also the least confident of getting the seed and seedlings they need *in general, indigenous to the local area or of the right species*. They are among the most likely to collect seed themselves rather than buy it, and the most likely to grow their own seedlings. Considerably fewer respondents in this region than any other consider there is adequate seed for collection in the bush to meet the needs of revegetation in their region and more say there is not.

Rangelands

Respondents in the Rangelands used by far the majority of seed (by weight). Here the average respondent used ten times as much seed as those in other regions. Here, the 15 big users accounted for 65% by weight of all the seed used in this survey. Anticipated increases in seed and seedling use were more pronounced. Like the Southwest, many more respondents buy seed than collect it themselves. Respondents here (as in the Tropical & Subtropical Coast) have lower expectations of getting the seed and seedlings they need of all types. This region has the largest margin of difference between the fewer respondents

who expect to increase their use of local seed and the greater number of those who expect to increase their use of seed in general.

Southeast Inland

More respondents in this region consider local origins essential to success in revegetation than in any other. The use of local seedlings is second only to the Tropical & Subtropical Coast and respondents are among the most likely to consider that the total area they revegetate would increase to some extent if local seed and seedlings were easier to obtain.

They are more confident than most of getting the seed and seedlings they need *in general*. They are at least as confident, and in some cases more so, of getting seed that is *indigenous to the local area* or *of the right species* as those in other regions.

Southeast Coastal

The number of seedlings used in total and on average was relatively higher in the Southeast Coastal than in other regions. Increased seed and seedling use was also more pronounced here (and in the Rangelands) than in other regions.

References

Mortlock, W. L. (1999a). *Native seed in Australia: a survey of collection, storage and distribution of native seed for revegetation*. FloraBank. Canberra.

Mortlock, W. L. (1999b). *Native seed in Australia: summary findings and draft recommendations*, FloraBank. Canberra.

DO YOU plant native seed or seedlings in the field or in a nursery?

Many people involved in revegetation have told FloraBank that native seed, and particularly that from their local area, can be hard to obtain. But there is some debate and little information about demand for local indigenous seed. It is also a complex issue.

Your answers to this survey will greatly assist the understanding of the nature of demand and where seed shortages exist. FloraBank will use this information to advise the community and government on ensuring that the seed needs for community-based revegetation in Australia are met. All questions refer to you or whatever group, company or organisation you represent. If you represent more than one organisation, perhaps you could complete another copy of the survey. If you wish to do so, please distribute the survey to others who field plant seed or seedlings. Please start here and answer all questions 'Native' means: indigenous to Australia. 'Indigenous to the local area' means: originally grew (naturally) in the local area.

If the survey is conducted by phone, use the introduction and guidelines supplied and record the phone number here including STD code

1. Are you

Tick one box

- An individual or landholder
- A representative of
 - a community group
 - non gov't organisation
 - a commercial enterprise
 - state or local government
- other _____

All questions refer to you or whatever group, company or organisation you represent. If you represent more than one organisation perhaps you could complete another copy of the survey.

2. What is your location?

Please write

Nearest Town/ City _____
State _____ Postcode _____

3. In revegetation activities over the last 5 years, which of the following were your main activities?

'Native' means: indigenous to Australia

Tick one or more boxes

- Raised native seedlings from seed
- Planted native seedlings in the field
- Carried out direct seeding of natives
- Carried out hydromulching of natives
- Managed replanted areas
- Managed natural regeneration
- other _____

IF YOU DO NOT USE NATIVE SEED IN REVEGETATION WORK, GO TO QUESTION 10

4. For the last year, estimate how much native plant seed you used for all revegetation purposes?

Answer as kilograms _____

OR failing this as:

hectares seeded _____

5. In the next year, will this amount change?

Tick one box

- It will increase greatly
- It will increase
- It will be the same
- It will decrease
- It will decrease greatly
- Not sure

6. How will you obtain MOST of this seed?

Tick one box

- Collect most yourself
- From collectors or suppliers at no cost
- Buy most from collectors or suppliers
- Other _____

7. In the last year, how much of the native seed you used for all revegetation purposes was indigenous to the local area?

ie. originally grew (naturally) in the local area

Tick one box

- All
- Most
- Some
- None
- Not sure

8. In the next year, will this amount change?

Tick one box

- It will increase greatly
- It will increase
- It will be the same
- It will decrease
- It will decrease greatly
- Not sure

9. In the next year, will you be able to get sufficient supply to meet your needs for native seed:

Circle one option on each line

Generally *Yes / Unsure / No*

Of the right species *Yes / Unsure / No*

That is indigenous to local area

Yes / Unsure / No

IF YOU DO NOT USE NATIVE SEEDLINGS IN REVEGETATION WORK,
GO TO QUESTION 16

10. For the last year, estimate how many native plant seedlings you planted for all revegetation purposes?

Answer as number planted _____
OR failing this as:
hectares planted _____

11. In the next year, will this amount change?

Tick one box

It will increase greatly	<input type="checkbox"/>
It will increase	<input type="checkbox"/>
It will be the same	<input type="checkbox"/>
It will decrease	<input type="checkbox"/>
It will decrease greatly	<input type="checkbox"/>
Not sure	<input type="checkbox"/>

12. How will you obtain MOST of these seedlings?

Tick one box

Grow most yourself	<input type="checkbox"/>
From growers or suppliers at no cost	<input type="checkbox"/>
Buy most from growers or suppliers	<input type="checkbox"/>
Other _____	

13. In the last year, how many of the native seedlings you used for all revegetation purposes were indigenous to the local area?

Indigenous means originally grew (naturally) in the local area

Tick one box

All	<input type="checkbox"/>
Most	<input type="checkbox"/>
Some	<input type="checkbox"/>
None	<input type="checkbox"/>
Not sure	<input type="checkbox"/>

14. In the next year, will this amount change?

Tick one box

It will increase greatly	<input type="checkbox"/>
It will increase	<input type="checkbox"/>
It will be the same	<input type="checkbox"/>
It will decrease	<input type="checkbox"/>
It will decrease greatly	<input type="checkbox"/>
Not sure	<input type="checkbox"/>

15. In the next year, will you be able to get sufficient supply to meet your needs for native seedlings?

Circle one option on each line
Generally Yes / Unsure / No
Of the right species Yes / Unsure / No
That are indigenous to local area
Yes / Unsure / No

16. How important to the success of your revegetation work is the use of local indigenous seed and seedlings?

Tick one box

essential	<input type="checkbox"/>
very important	<input type="checkbox"/>
important	<input type="checkbox"/>
not important	<input type="checkbox"/>
irrelevant	<input type="checkbox"/>
Not sure	<input type="checkbox"/>

17. In general, do you think there is adequate seed for collection in the bush to meet the needs of revegetation in your region?

Circle to record answer: YES / Not sure / NO

18. What would be the likely effect on the area you are able to revegetate each season if local indigenous seed and seedlings were easier to obtain?

Tick one box

Greatly increase the area	<input type="checkbox"/>
Increase the area	<input type="checkbox"/>
No effect	<input type="checkbox"/>
Not sure	<input type="checkbox"/>

19. What is your relationship to Greening Australia (GA)?

Tick one or more boxes

A current or past member	<input type="checkbox"/>
An employee	<input type="checkbox"/>
Work with or receive assistance from GA	<input type="checkbox"/>
There is no relationship	<input type="checkbox"/>

That is the end of the survey. Thank you very much for participating.

Please tear or cut this page from the Newsletter and return to FloraBank: in the envelope provided – no stamp required or fax to 02 62818590.

Survey results nationally and by region: Appendix 2

Q5: Next year will the amount of native plant seed used for all revegetation purposes change?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Increase greatly	<i>no. respondents</i>	6	10	12	41	29	98
	<i>as % of column</i>	12.2%	21.7%	20.7%	20.5%	30.9%	21.9%
Increase	<i>no. respondents</i>	18	11	19	80	28	156
	<i>as % of column</i>	36.7%	23.9%	32.8%	40.0%	29.8%	34.9%
Stay same	<i>no. respondents</i>	14	19	19	55	25	132
	<i>as % of column</i>	28.6%	41.3%	32.8%	27.5%	26.6%	29.5%
Decrease	<i>no. respondents</i>	4		2	8	4	18
	<i>as % of column</i>	8.2%	0.0%	3.4%	4.0%	4.3%	4.0%
Decrease greatly	<i>no. respondents</i>	2	1		5		8
	<i>as % of column</i>	4.1%	2.2%	0.0%	2.5%	0.0%	1.8%
Unsure	<i>no. respondents</i>	5	5	6	11	8	35
	<i>as % of column</i>	10.2%	10.9%	10.3%	5.5%	8.5%	7.8%
Total	<i>no. respondents</i>	49	46	58	200	94	447

Q6: In the next year how will you obtain MOST of the native plant seed you use for all revegetation purposes?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
1: Collect yourself	<i>no. respondents</i>	17	31	33	104	52	237
	<i>as % of column</i>	35.4%	64.6%	57.9%	54.2%	54.2%	53.7%
2: Free from collectors/	<i>no. respondents</i>	2	6	4	17	7	36
	<i>as % of column</i>	4.2%	12.5%	7.0%	8.9%	7.3%	8.2%
3: Buy from collector &	<i>no. respondents</i>	25	7	13	57	25	127
	<i>as % of column</i>	52.1%	14.6%	22.8%	29.7%	26.0%	28.8%
1 & 2 above	<i>no. respondents</i>	0	1	1	5	2	9
	<i>as % of column</i>	0%	2.1%	1.8%	2.6%	2.1%	2.0%
1 & 3 above	<i>no. respondents</i>	2	1	4	2	7	16
	<i>as % of column</i>	4.2%	2.1%	7.0%	1.0%	7.3%	3.6%
2 & 3 above	<i>no. respondents</i>	0	1	1	2	0	4
	<i>as % of column</i>	0%	2.1%	1.8%	1.0%	0%	0.9%
1, 2 & 3	<i>no. respondents</i>	2	1	1	5	3	12
	<i>as % of column</i>	4.2%	2.1%	1.8%	2.6%	3.1%	2.7%
Total	<i>no. respondents</i>	48	48	57	192	96	441

Q7: In the last year how much of the native plant seed used for all revegetation purposes was indigenous to the local area?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
All	<i>no. respondents</i>	14	27	32	89	39	201
	<i>as % of column</i>	29.8%	57.4%	54.2%	47.8%	43.8%	47.0%
Most	<i>no. respondents</i>	23	12	17	70	34	156
	<i>as % of column</i>	48.9%	25.5%	28.8%	37.6%	38.2%	36.4%
Some	<i>no. respondents</i>	9	6	7	22	10	54
	<i>as % of column</i>	19.1%	12.8%	11.9%	11.8%	11.2%	12.6%
None	<i>no. respondents</i>	1	1	2	4	3	11
	<i>as % of column</i>	2.1%	2.1%	3.4%	2.2%	3.4%	2.6%
Not sure	<i>no. respondents</i>	0	1	1	1	3	6
	<i>as % of column</i>	0%	2.1%	1.7%	0.5%	3.4%	1.4%

Total	<i>no. respondents</i>	47	47	59	186	89	428
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Q8: In the next year will the amount of native plant seed used for all revegetation purposes that is indigenous to the local area change?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Increase greatly	<i>no. respondents</i>	6	7	5	26	10	54
	<i>as % of column</i>	12.5%	15.6%	8.3%	13.0%	10.8%	12.1%
Increase	<i>no. respondents</i>	12	14	23	66	26	141
	<i>as % of column</i>	25.0%	31.1%	38.3%	33.0%	28.0%	31.6%
Stay same	<i>no. respondents</i>	28	17	30	91	50	216
	<i>as % of column</i>	58.3%	37.8%	50.0%	45.5%	53.8%	48.4%
Decrease	<i>no. respondents</i>	1	1	0	9	0	11
	<i>as % of column</i>	2.1%	2.2%	0.0%	4.5%	0%	2.5%
Decrease greatly	<i>no. respondents</i>	0	1	0	0	0	1
	<i>as % of column</i>	0%	2.2%	0%	0%	0%	0.2%
Unsure	<i>no. respondents</i>	1	5	2	8	7	23
	<i>as % of column</i>	2.1%	11.1%	3.3%	4.0%	7.5%	5.2%
Total	<i>no. respondents</i>	48	45	60	200	93	446

Q9: In the next year will you be able to get sufficient supply to meet your needs for native seed:

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Generally?							
	<i>no. respondents</i>	43	30	46	132	60	311
	<i>as % of column</i>	93.5%	65.2%	82.1%	69.1%	66.7%	72.5%
Unsure	<i>no. respondents</i>	3	7	9	38	18	75
	<i>as % of column</i>	6.5%	15.2%	16.1%	19.9%	20.0%	17.5%
No	<i>no. respondents</i>	0	9	1	21	12	43
	<i>as % of column</i>	0%	19.6%	1.8%	11.0%	13.3%	10.0%
Total	<i>no. respondents</i>	46	46	56	191	90	429

Of the right species?

Yes	<i>no. respondents</i>	29	21	34	103	46	233
	<i>as % of column</i>	64.4%	46.7%	61.8%	56.3%	52.9%	56.1%
Unsure	<i>no. respondents</i>	12	12	16	57	22	119
	<i>as % of column</i>	26.7%	26.7%	29.1%	31.1%	25.3%	28.7%
No	<i>no. respondents</i>	4	12	5	23	19	63
	<i>as % of column</i>	8.9%	26.7%	9.1%	12.6%	21.8%	15.2%
Total	<i>no. respondents</i>	45	45	55	183	87	415

That is indigenous to the local area?

Yes	<i>no. respondents</i>	28	23	42	102	47	242
	<i>as % of column</i>	58.3%	51.1%	71.2%	54.0%	52.2%	56.1%
Unsure	<i>no. respondents</i>	12	8	11	57	24	112
	<i>as % of column</i>	25.0%	17.8%	18.6%	30.2%	26.7%	26.0%
No	<i>no. respondents</i>	8	14	6	30	19	77
	<i>as % of column</i>	16.7%	31.1%	10.2%	15.9%	21.1%	17.9%
Total	<i>no. respondents</i>	48	45	59	189	90	431

Q11: Next year will amount of native plant seedlings used for all revegetation purposes change?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Increase greatly	<i>no. respondents</i>	11	4	10	38	22	85
	<i>as % of column</i>	15.94%	7.84%	16.13%	16.52%	22.68%	16.70%
Increase	<i>no. respondents</i>	22	19	25	87	43	196
	<i>as % of column</i>	31.88%	37.25%	40.32%	37.83%	44.33%	38.51%
Stay same	<i>no. respondents</i>	20	16	22	71	19	148
	<i>as % of column</i>	28.99%	31.37%	35.48%	30.87%	19.59%	29.08%
Decrease	<i>no. respondents</i>	11	3	1	25	2	42
	<i>as % of column</i>	15.94%	5.88%	1.61%	10.87%	2.06%	8.25%
Decrease greatly	<i>no. respondents</i>	3	2	1	1	2	9
	<i>as % of column</i>	4.35%	3.92%	1.61%	0.43%	2.06%	1.77%
Unsure	<i>no. respondents</i>	2	7	3	8	9	29
	<i>as % of column</i>	2.90%	13.73%	4.84%	3.48%	9.28%	5.70%
Total	<i>no. respondents</i>	69	51	62	230	97	509

Q12: In the next year how will you obtain MOST of the native plant seedlings you use for all revegetation purposes?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
1: Grow most yourself	<i>no. respondents</i>	14	32	26	93	40	205
	<i>as % of column</i>	20.0%	61.5%	42.6%	41.5%	43.0%	41.0%
2: Free from collector/suppliers	<i>no. respondents</i>	4	3	0	19	7	33
	<i>as % of column</i>	5.7%	5.8%	0%	8.5%	7.5%	6.6%
3: Buy from collectors/	<i>no. respondents</i>	49	15	30	102	34	230
	<i>as % of column</i>	70.0%	28.8%	49.2%	45.5%	36.6%	46.0%
1 & 2 above	<i>no. respondents</i>	0	0	0	3	3	6
	<i>as % of column</i>	0%	0%	0%	1.3%	3.2%	1.2%
1 & 3 above	<i>no. respondents</i>	2	1	2	5	4	14
	<i>as % of column</i>	2.9%	1.9%	3.3%	2.2%	4.3%	2.8%
2 & 3 above	<i>no. respondents</i>	1	1	1	1	2	6
	<i>as % of column</i>	1.4%	1.9%	1.6%	0.4%	2.2%	1.2%
1, 2 & 3	<i>no. respondents</i>	0	0	2	1	3	6
	<i>as % of column</i>	0%	0%	3.3%	0.4%	3.2%	1.2%
Total	<i>no. respondents</i>	70	52	61	224	93	500

Q13: In the last year how much of the native plant seedlings used for all revegetation purposes were indigenous to the local area?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
All	<i>no. respondents</i>	14.0	27.0	32.0	75.0	38.0	186
	<i>as % of column</i>	20.3%	52.9%	52.5%	33.9%	43.2%	38.0%
Most	<i>no. respondents</i>	31.0	16.0	17.0	101.0	34.0	199
	<i>as % of column</i>	44.9%	31.4%	27.9%	45.7%	38.6%	40.6%
Some	<i>no. respondents</i>	21.0	8.0	11.0	30.0	10.0	80
	<i>as % of column</i>	30.4%	15.7%	18.0%	13.6%	11.4%	16.3%
None	<i>no. respondents</i>	2.0		1.0	7.0	4.0	14
	<i>as % of column</i>	2.9%		1.6%	3.2%	4.5%	2.9%
Not sure	<i>no. respondents</i>	1.0			8.0	2.0	11
	<i>as % of column</i>	1.4%			3.6%	2.3%	2.2%
Total	<i>no. respondents</i>	69.0	51.0	61.0	221.0	88.0	490

Q14: In the next year will the amount of native plant seedlings used for all revegetation purposes that are indigenous to the local area change?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Increase greatly	<i>no. respondents</i>	8.0	6.0	10.0	22.0	8.0	54
	<i>as % of column</i>	11.6%	11.8%	16.1%	9.6%	8.8%	10.8%
Increase	<i>no. respondents</i>	16.0	13.0	18.0	57.0	30.0	134
	<i>as % of column</i>	23.2%	25.5%	29.0%	24.9%	33.0%	26.7%
Stay same	<i>no. respondents</i>	37.0	26.0	31.0	130.0	44.0	268
	<i>as % of column</i>	53.6%	51.0%	50.0%	56.8%	48.4%	53.4%
Decrease	<i>no. respondents</i>	4.0	1.0	1.0	11.0		17
	<i>as % of column</i>	5.8%	2.0%	1.6%	4.8%	0.0%	3.4%
Decrease greatly	<i>no. respondents</i>	2.0				2.0	4
	<i>as % of column</i>	2.9%	0.0%	0.0%	0.0%	2.2%	0.8%
Unsure	<i>no. respondents</i>	2.0	5.0	2.0	9.0	7.0	25
	<i>as % of column</i>	2.9%	9.8%	3.2%	3.9%	7.7%	5.0%
Total	<i>no. respondents</i>	69.0	51.0	62.0	229.0	91.0	502

Q15: In the next year, will you be able to get sufficient supply to meet your needs for native seedlings:

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Generally?							
Yes	<i>no. respondents</i>	60.0	33.0	50.0	159.0	70.0	372
	<i>as % of column</i>	90.9%	68.8%	86.2%	72.9%	76.9%	77.3%
Unsure	<i>no. respondents</i>	4.0	10.0	4.0	45.0	9.0	72
	<i>as % of column</i>	6.1%	20.8%	6.9%	20.6%	9.9%	15.0%
No	<i>no. respondents</i>	2.0	5.0	4.0	14.0	12.0	37
	<i>as % of column</i>	3.0%	10.4%	6.9%	6.4%	13.2%	7.7%
Total	<i>no. respondents</i>	66.0	48.0	58.0	218.0	91.0	481

Of the right species?

Yes	<i>no. respondents</i>	48.0	20.0	33.0	116.0	51.0	268
	<i>as % of column</i>	75.0%	42.6%	62.3%	55.5%	58.0%	58.1%
Unsure	<i>no. respondents</i>	13.0	16.0	16.0	73.0	21.0	139
	<i>as % of column</i>	20.3%	34.0%	30.2%	34.9%	23.9%	30.2%
No	<i>no. respondents</i>	3.0	11.0	4.0	20.0	16.0	54
	<i>as % of column</i>	4.7%	23.4%	7.5%	9.6%	18.2%	11.7%
Total	<i>no. respondents</i>	64.0	47.0	53.0	209.0	88.0	461

That is indigenous to the local area?

Yes	<i>no. respondents</i>	43.0	27.0	39.0	116.0	55.0	280
	<i>as % of column</i>	65.2%	56.3%	68.4%	53.5%	61.8%	58.7%
Unsure	<i>no. respondents</i>	15.0	11.0	8.0	82.0	19.0	135
	<i>as % of column</i>	22.7%	22.9%	14.0%	37.8%	21.3%	28.3%
No	<i>no. respondents</i>	8.0	10.0	10.0	19.0	15.0	62
	<i>as % of column</i>	12.1%	20.8%	17.5%	8.8%	16.9%	13.0%
Total	<i>no. respondents</i>	66.0	48.0	57.0	217.0	89.0	477

Q16: How important to the success of your revegetation work is the use of local indigenous seed and seedlings?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Essential	<i>no. respondents</i>	27	34	45	122	55	283.0
	<i>as % of column</i>	37.5%	63.0%	68.2%	49.2%	49.5%	51.4%
Very important	<i>no. respondents</i>	21	14	8	72	28	143.0
	<i>as % of column</i>	29.2%	25.9%	12.1%	29.0%	25.2%	26.0%
Important	<i>no. respondents</i>	19	4	10	44	22	99.0
	<i>as % of column</i>	26.4%	7.4%	15.2%	17.7%	19.8%	18.0%
Not important	<i>no. respondents</i>	3	2	3	7	1	16.0
	<i>as % of column</i>	4.2%	3.7%	4.5%	2.8%	0.9%	2.9%
Irrelevant	<i>no. respondents</i>	2	0	0	0	3	5.0
	<i>as % of column</i>	2.8%	0%	0%	0%	2.7%	0.9%
Unsure	<i>no. respondents</i>	0	0	0	3	2	5.0
	<i>as % of column</i>	0%	0%	0%	1.2%	1.8%	0.9%
Total	<i>no. respondents</i>	72	54	66	248	111	551.0

Q17: In general, do you think there is adequate seed for collection in the bush to meet the needs of revegetation in your region?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Yes	<i>no. respondents</i>	40.0	21.0	34.0	121.0	59.0	275.0
	<i>as % of column</i>	54.8%	38.2%	52.3%	49.0%	52.7%	49.8%
Unsure	<i>no. respondents</i>	17.0	12.0	12.0	66.0	32.0	139.0
	<i>as % of column</i>	23.3%	21.8%	18.5%	26.7%	28.6%	25.2%
No	<i>no. respondents</i>	16.0	22.0	19.0	60.0	21.0	138.0
	<i>as % of column</i>	21.9%	40.0%	29.2%	24.3%	18.8%	25.0%
Total	<i>no. respondents</i>	73.0	55.0	65.0	247.0	112.0	552.0

Q18: What would be the likely effect on the total area you are able to revegetate each season if local indigenous seed and seedlings were easier to obtain?

		Southwest	Tropical & Subtropical Coast	Southeast Inland	Southeast Coast	Rangelands	Australia
Increase greatly	<i>as % of column</i>	6.0	13.0	8.0	30.0	17.0	74.0
	<i>no. respondents</i>	15.3%	12.3%	13.1%	24.1%	8.3%	13.7%
Increase	<i>as % of column</i>	14.0	23.0	21.0	78.0	34.0	170.0
	<i>no. respondents</i>	30.6%	32.0%	34.4%	42.6%	19.4%	31.4%
No effect	<i>as % of column</i>	48.0	16.0	23.0	110.0	54.0	251.0
	<i>no. respondents</i>	48.6%	45.1%	37.7%	29.6%	66.7%	46.3%
Unsure	<i>as % of column</i>	4.0	2.0	9.0	26.0	6.0	47.0
	<i>no. respondents</i>	5.4%	10.7%	14.8%	3.7%	5.6%	8.7%
Total	<i>as % of column</i>	72.0	54.0	61.0	244.0	111.0	542.0