



**Indigenous plants
suitable for
rehabilitation**

compiled by Jon Wyatt, Mondi
Wetlands Programme, 1997

SECOND EDITION

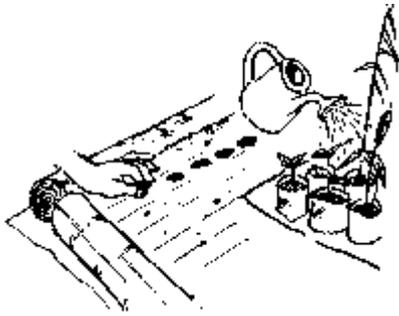


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Introduction

The aim of this guide is to assist in selecting suitable plants to perform specific functions. Whilst there may be several aims in revegetating riparian areas the priority should be the stabilization of watercourse banks and channel plug development. For this reason it is important to be deliberate in both selecting and placing of plants with vigorous rooting growth characteristics that will accelerate natural plant succession and deal directly with the problem on site.



Local plant species native to streambanks should be used. Propagating and growing your own plants is easiest, cheapest, and the most rewarding. In addition you will benefit from having created a propagation area that could be a commercial asset; there is a growing demand for indigenous plants. Tree seedling material should be fresh and of local origin. Resist using plants from far afield as they may not be best suited to local climatic or soil conditions. It is preferable to plant out once the wet season has started as this will eliminate the need for frequent watering whilst improving the chances of establishment.

An alternative to seed germination is to uproot small seedlings between 40mm to 100mm high from an area of mature forest undergrowth where there are many. Best results are obtained immediately after heavy rain. Remember that small seedlings are likely to transplant more successfully than will large ones. These should be potted until they are large enough to plant out. Consider developing the nursery within a forest clearing so as to take advantage of the protection and micro-climate afforded by the surrounding trees.



is Angoma

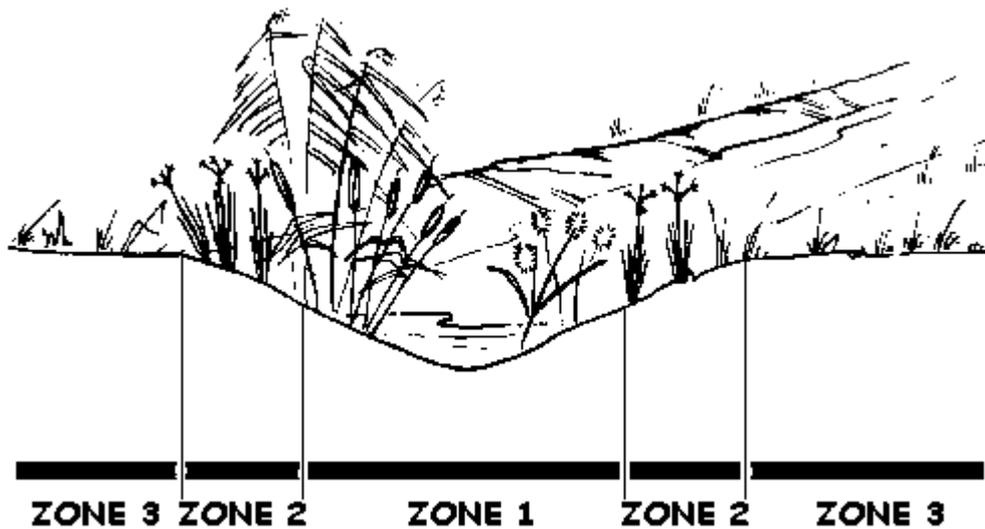


Basket Weaving

Commercial prospects should not be overlooked as many plant roots, stems, flowers and bark are highly sought after for flower, weaving, and traditional medicine markets.

Herbaceous plant zones on streambanks and in channels

Note: See "decision key" - Wetland Fix: Part 3 for choice on use of herbaceous plants rather than trees for reformation purposes.

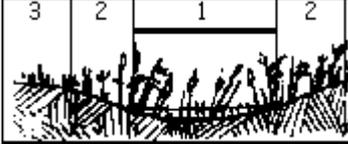
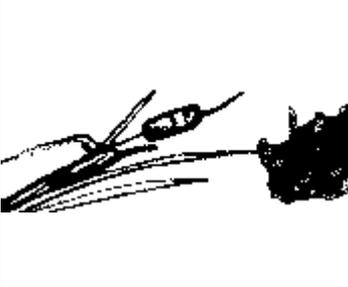
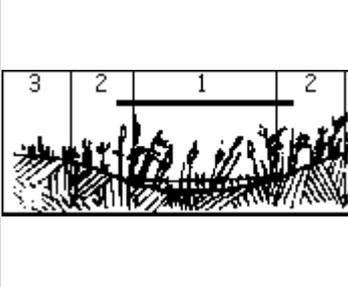
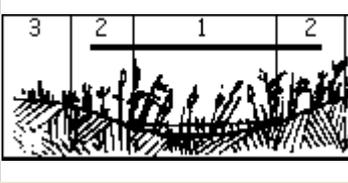
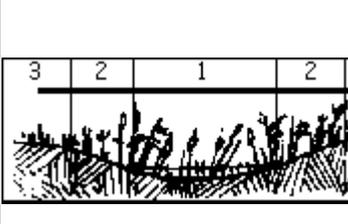
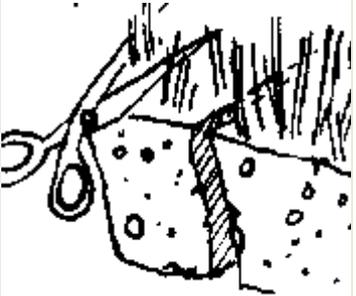
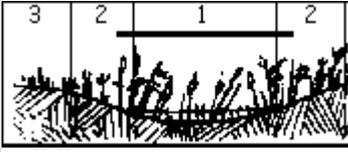
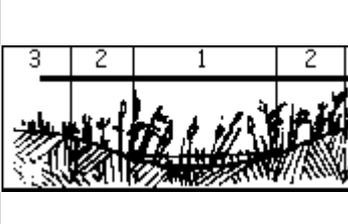
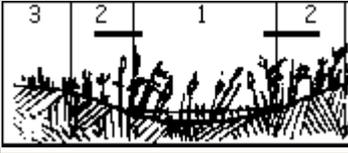
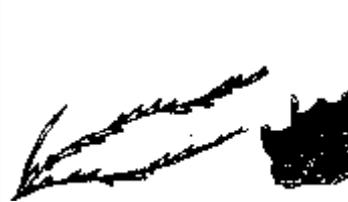
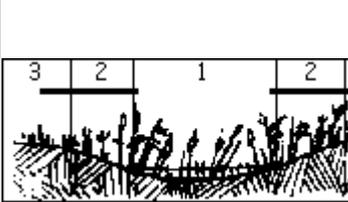
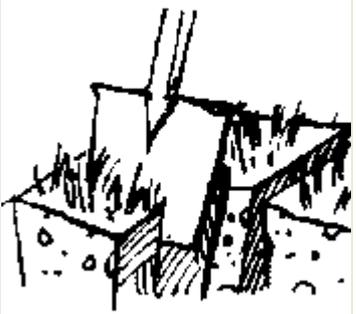


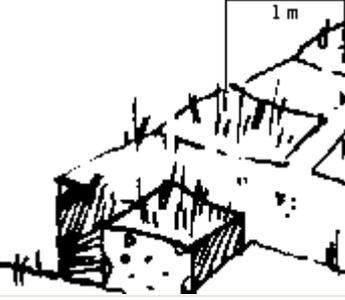
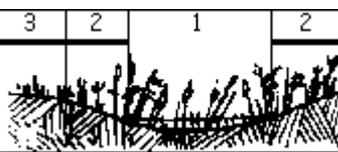
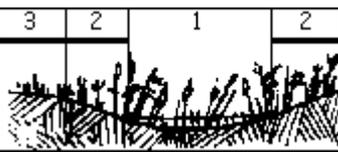
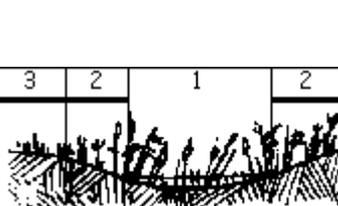
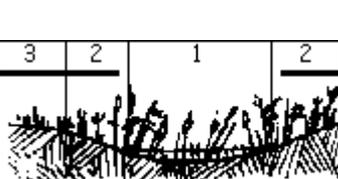
Zone 1-Permanently Wet The stream or channel-bed zone that is usually permanently or semi-permanently wet
Zone 2-Seasonally Wet The lower bank zone that is usually moist and is frequently waterlogged during the wet season
Zone 3-Temporarily Wet The bank-top zone that is usually only wet or inundated for short periods during the wet season

Herbaceous plants suitable for streambank stabilization and channel plug development

The following are a selection of herbaceous plants with creeping and spreading growth forms (ie. plants with Rhizomes or Stolons)that can be easily used to speed up natural plant succession and to effect rapid stabilisation measures on streambanks and in channels.

Plant name	Flower shape	Distribution map	Optimal position in the channel	Planting method
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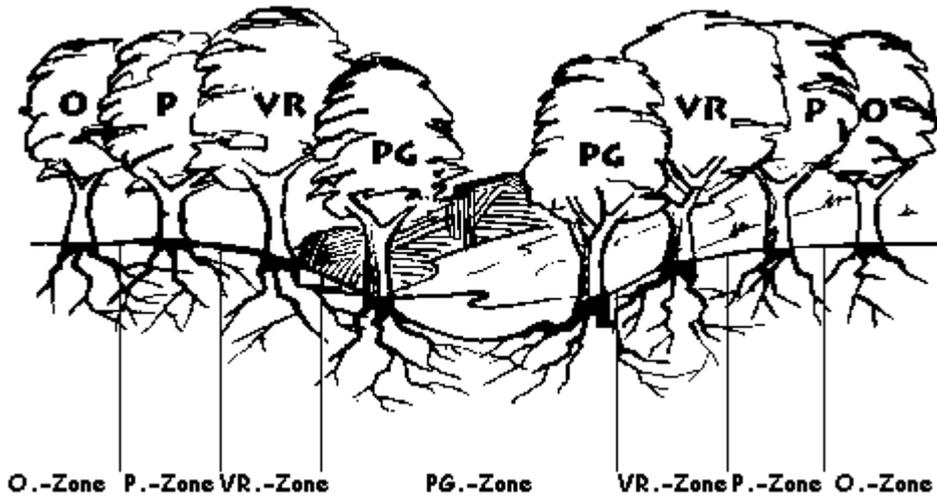
<p><i>Cyperus papyrus</i> Papyrus</p>			<p>Locate local plant material and dig out clumps with a spade</p>
<p><i>Typha capensis</i> Bulrush</p>			
<p><i>Phragmites australis</i> <i>P. mauritianus</i> Common reed</p>			<p>Trim the plant stems down to approx. 100mm to reduce transpiration</p>
<p><i>Echinochloa colona</i> <i>E. crus-galli</i> Jungle rice Watergras</p>			
<p><i>Cyperus Latifolius</i> <i>C. immensus</i> iKhwane grass</p>			<p>Transport to planting site as soon as possible and keep out of direct sun.</p>
<p><i>Leersia hexandra</i> Wild ricegrass Wilde rysgras</p>			
<p><i>Juncus kraussli</i> <i>J. effusus</i> Juncus iNcema</p>			<p>Plant as whole clump or split into slices or separate rhizomes.</p>
<p><i>Hemarthra altissima</i> Red swamp grass Rooikweek</p>			

<p><i>Acroceras macrum</i> Nile grass Nylgras</p>			<p>Plant into trenches on the streambank or channel floor at 1/2 to 1 metre spacings.</p> 
<p><i>Cynodon dactylon</i> Couch grass Kweek isiFulwane</p>			
<p><i>Imperata cylindrica</i> Cottonwool grass Dousgras um Thente</p>			
<p><i>Stenotaphrum secundatum</i> Coastal buffalo grass Strand buffelsgras uNgwengwe</p>			
<p><i>Setaria megaphylla</i> Broad leaved setaria Breeblaar setaria uBabe</p>			



Tree Zones: On streambanks and in channels

Note: See "decision key" Wetland Fix :Part 3 for choice on use of trees rather than herbaceous plants for restoration purposes.

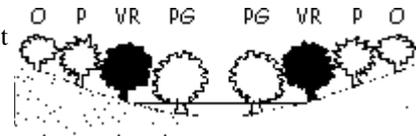


PG.-Zone

"Plug trees" with spreading roots in wet channels that under some conditions form a "root weir" effecting a blockage or "plug" in the channel **VR.-Zone** Vigorous rooting trees suitable for bank stabilization **P.-Zone** Pioneer or precursor trees that are fast growing, can tolerate full sun when young and will create partial shade for other trees and seedlings to follow **O.-Zone** Trees of ornamental, commercial or medicinal value-added to areas away from bank edge

Trees suitable for streambank stabilization and channel plug development

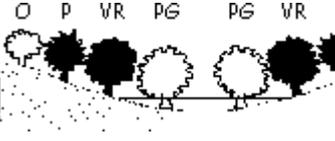
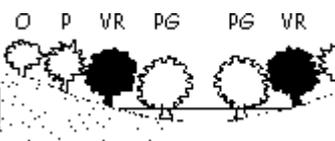
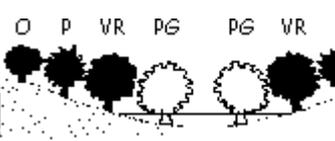
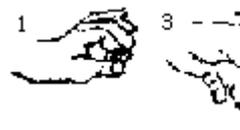
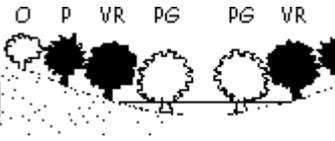
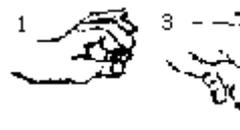
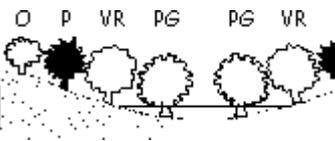
- Trees that have been shaded in on the sketches indicate their most functional position on the streambank or in the channel.

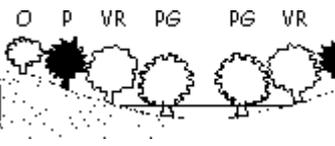
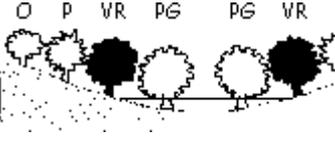
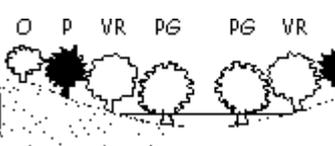
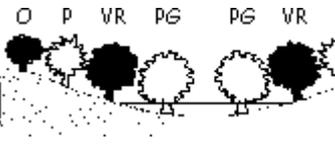
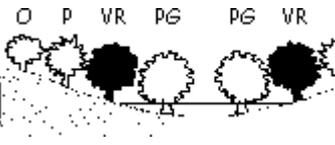
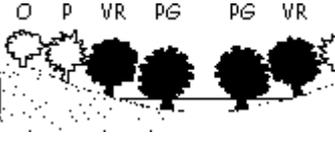
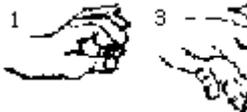


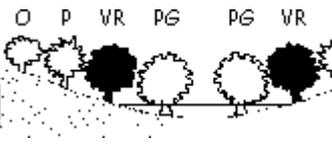
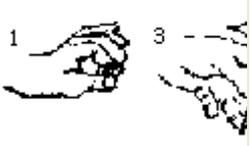
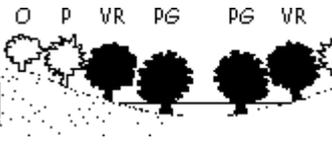
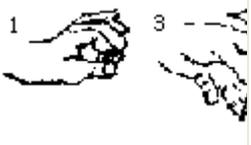
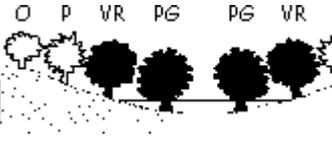
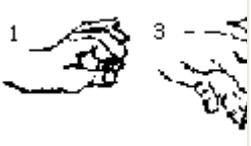
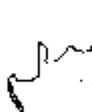
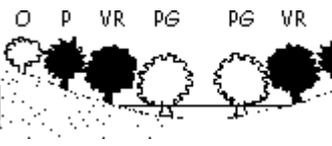
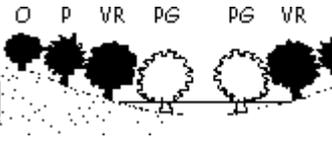
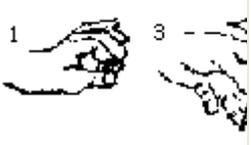
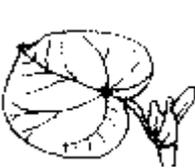
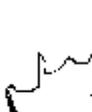
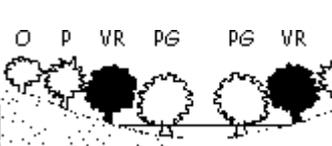
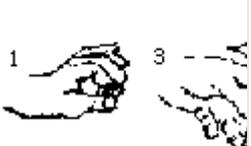
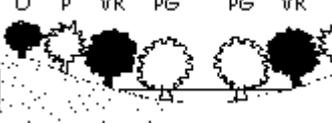
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		Frost	*	frost	*	frost	*	frost
		resistant		resistant		resistant	*	resistant

- Propagation method:
 - Remove flesh covering from fresh seeds and plant to depth of seed diameter. Seed material should be of local origin
 - Treat hard leguminous seeds by pouring boiling water over seeds in a bowl and allow to cool for 24 hours.

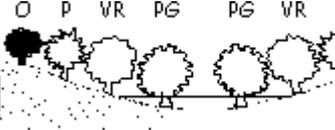
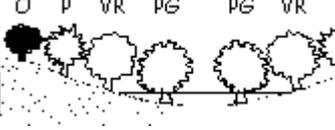
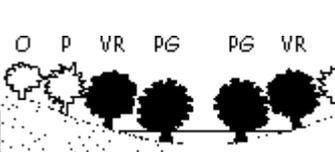
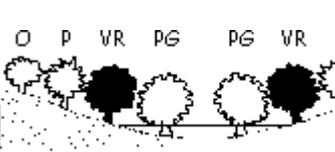
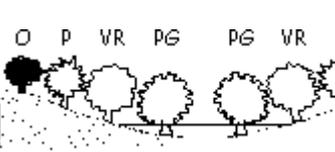
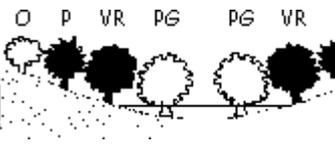
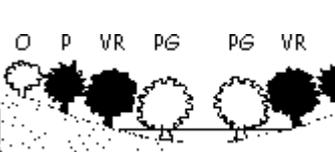
3. May be planted from cuttings or truncheons-treated with root inducing hormone.

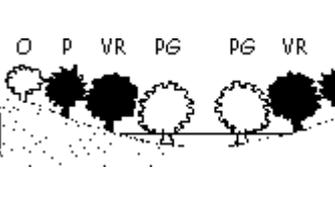
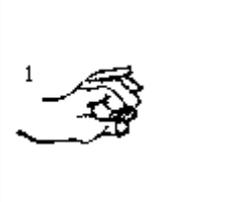
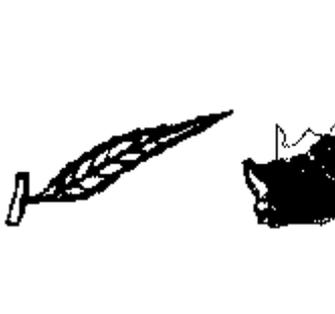
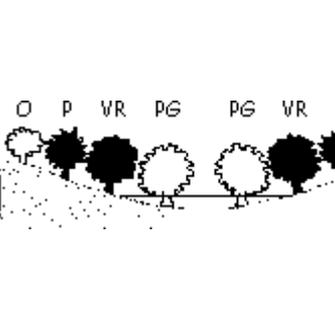
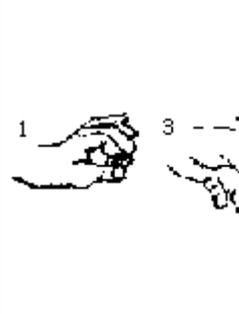
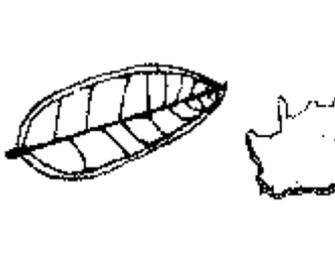
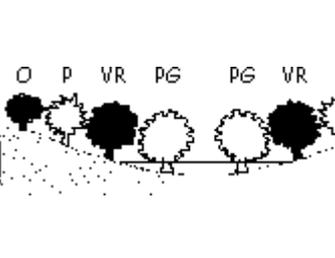
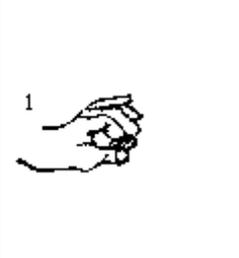
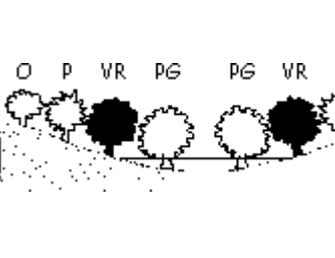
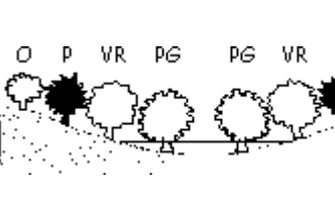
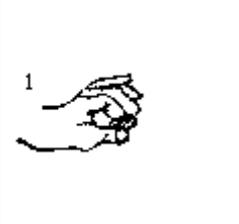
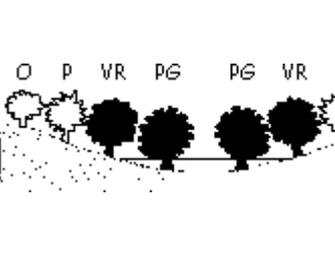
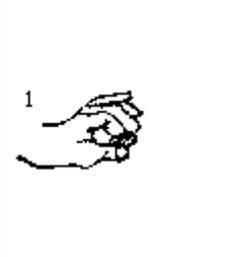
Tree name & No	Leaf or pod Distrabution Map shape	Position in stream channel profile	F. R.	Propagation method.
172 <i>Acacia Karroo</i> Sweet thorn Soetdoring umunga			* * *	
183 <i>Acacia robusta</i> Splendid thorn Enkeldoring umNgamanzi			*	
324 <i>Bridell micrantha</i> Coast Gold leaf Mitseeri umHlalamagwab aba				
637 <i>Buddlej saiviifolia</i> Sagewood Saliehout iLoshane			* * *	
524 <i>Baringtonia racemosa</i> Powderpuff tree Poeierkwasboom u Bhoquo				
39 <i>Ceitis africana</i> White stinkwood Witstinkhout um Vumvu			* *	

667 <i>Cierodendrum giabrum</i> Tinderwood Harpuisblaar umQoqonga			*	
536 <i>Combretum erythrophyllum</i> River Bushwillow Riviervaderlands wilg umBondwe			* * *	
330 <i>Croton sylvaticus</i> Forest croton Boskoorsbessie umZilanyone				
113 <i>Cryptocarya latifolia</i> Broad-leaved laurel Breeblaarkweper umHlangwene				
159 <i>Faidherbia albida</i> Ana tree Anaboom umHlalankwazi				
66 <i>Ficus natalensis</i> Natal Fig Natalvy umThombi			*	

<p>50 <i>Ficus sur</i></p> <p>Cape Fig</p> <p>Besemtrosvy umKhiwane</p>			<p>O P VR PG PG VR</p> 	
<p>66 <i>Ficus sycomorus</i></p> <p>Sycamore Fig</p> <p>Gewone Trosvy umKhiwane</p>			<p>O P VR PG PG VR</p> 	
<p>54 <i>Ficus trichopoda</i></p> <p>Swamp Fig</p> <p>Moerasvy umVubu</p>			<p>O P VR PG PG VR</p> 	
<p>670 <i>Halleria lucida</i></p> <p>Tree fuchsia</p> <p>Notsung iMinza</p>			<p>O P VR PG PG VR</p>  <p style="text-align: right;">* *</p>	
<p>361 <i>Harpephyllum</i></p> <p>Wildplum</p> <p>Wildepruim umGwenya</p>			<p>O P VR PG PG VR</p>  <p style="text-align: right;">*</p>	
<p>464 <i>Hibiscus taliaceus</i></p> <p>Lagoon hibiscus</p> <p>Wildekatoenboom umLolwa</p>			<p>O P VR PG PG VR</p> 	
<p>397 <i>Llex mitis</i></p> <p>African holly</p> <p>Without iPhuphuma</p>			<p>O P VR PG PG VR</p>  <p style="text-align: right;">* * *</p>	

<p>145 <i>Leucosidea sericea</i></p> <p>Oldwood</p> <p>Ouhout umTshitshi</p>			<p>O P VR PG PG VR</p> <p>*</p> <p>*</p> <p>*</p>	<p>1</p>
<p>335</p> <p><i>Macaranga capensis</i></p> <p>Wild poplar</p> <p>Wildepopulier iPhumela</p>			<p>O P VR PG PG VR</p>	<p>1</p>
<p>577 <i>Maesa lanceolata</i></p> <p>False assegai</p> <p>Basterassegai uPhongaphonga</p>			<p>O P VR PG PG VR</p> <p>*</p>	<p>1</p>
<p>37 <i>Myrica piluifera</i></p> <p>Broad-leaved waxberry</p> <p>Breeblaarwasbesse ie</p>			<p>O P VR PG PG VR</p> <p>*</p> <p>*</p> <p>*</p>	<p>1</p>
<p>38 <i>Myrica serrata</i></p> <p>Lance-leaved waxberry</p> <p>Smalblaarwasbesse ie</p> <p>uMakhuthula</p>			<p>O P VR PG PG VR</p> <p>*</p> <p>*</p>	<p>1</p>
<p>22 <i>Phoenix reclinata</i></p> <p>Wild date palm</p> <p>Wildedadelboom iSundu</p>			<p>O P VR PG PG VR</p> <p>*</p>	<p>1</p>
<p>18</p> <p><i>Podocarpus latifolius</i></p> <p>Real Yellowwood</p> <p>Opregte Geelhout umSonti</p>			<p>O P VR PG PG VR</p> <p>*</p> <p>*</p> <p>*</p>	<p>1</p>

<p>16</p> <p><i>Podocarpus falcatus</i></p> <p>Outeniqua Y.wood</p> <p>Outeniekwageelh out umSonti</p>		<p>O P VR PG PG VR</p>  <p>*</p> <p>*</p> <p>*</p>	 <p>1</p>
<p>118</p> <p><i>Ocotea bullata</i></p> <p>Stinkwood</p> <p>Stinkhout umNukani</p>		<p>O P VR PG PG VR</p>  <p>*</p>	 <p>1</p>  <p>3</p>
<p>26</p> <p><i>Raphia australis</i></p> <p>Kosi palm</p> <p>Kosipalm umVuma</p>		<p>O P VR PG PG VR</p> 	 <p>1</p>
<p>647</p> <p><i>Rauvolfia caffra</i></p> <p>Quinine tree</p> <p>Kinaboom umHlambamanzi</p>		<p>O P VR PG PG VR</p>  <p>*</p>	 <p>1</p>
<p>380</p> <p><i>Rhus chirindensis</i></p> <p>Red current</p> <p>Bostaaios inHlokoshiyane- enkhulu</p>		<p>O P VR PG PG VR</p>  <p>*</p> <p>*</p>	 <p>1</p>  <p>3</p>
<p>386</p> <p><i>Rhus lancea</i></p> <p>Willow rhus Karee</p>		<p>O P VR PG PG VR</p>  <p>*</p> <p>*</p> <p>*</p>	 <p>1</p>  <p>3</p>
<p>384.1</p> <p><i>Rhus montana</i></p> <p>Drakensberg karee</p> <p>Drakensberg karee</p>		<p>O P VR PG PG VR</p>  <p>*</p> <p>*</p> <p>*</p>	 <p>1</p>

<p>396 <i>Rhus viminalis</i></p> <p>White karee</p> <p>Witkaree</p>		<p>O P VR PG PG VR</p>  <p>*</p> <p>*</p>	
<p>35 36.2</p> <p><i>Salix mucronata</i></p> <p>River willow</p> <p>Vaalwilger umZenkana</p>		<p>O P VR PG PG VR</p>  <p>*</p> <p>*</p> <p>*</p>	
<p>555</p> <p><i>Syzygium cordatum</i></p> <p>Waterberry</p> <p>Waterbessie umDoni</p>		<p>O P VR PG PG VR</p>  <p>*</p>	
<p>557</p> <p><i>Syzygium guineense</i></p> <p>Water pear</p> <p>Waterpeer umDoni-namanzi</p>		<p>O P VR PG PG VR</p> 	
<p>42 <i>Trema orientalis</i></p> <p>Pigeonwood</p> <p>Hophout umBhatini</p>		<p>O P VR PG PG VR</p> 	
<p>646</p> <p><i>Voacanga thouarsli</i></p> <p>Wild frangipani</p> <p>Wildefrangipani umKhadlu</p>		<p>O P VR PG PG VR</p> 	

Growing your own trees from seeds or cuttings

1 Nursing site selection

Select a reasonably level site for the nursery. Protect the nursery from the prevailing wind by using trees hedges, buildings or any other barrier.

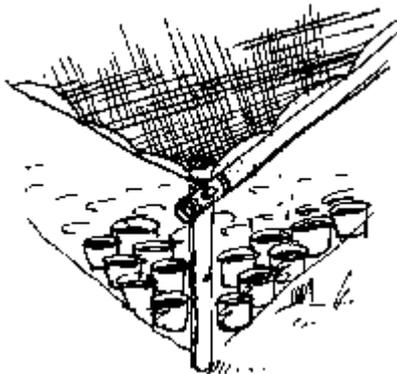


Ensure a nearby and reliable source of water



2 Nursery Construction

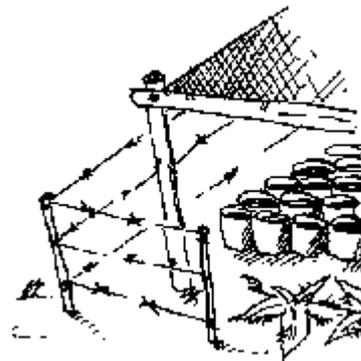
Provide a 40% shade cover using reeds, slats, or shade cloth - mounted on a simple frame construction.



Alternative shade from trees with spreading branches may also be used.



Fence the nursery off or use plants such as sisal or aloes as a barrier to animals



3 Seed Germination

The seedbed mixture should be 1/2 sand and 1/2 pine bark or soil.

Place the seedbed mix into a simple frame of logs, bricks, rocks etc., placed over a punctured sheet of plastic so as to prevent roots penetrating the underlying soil.

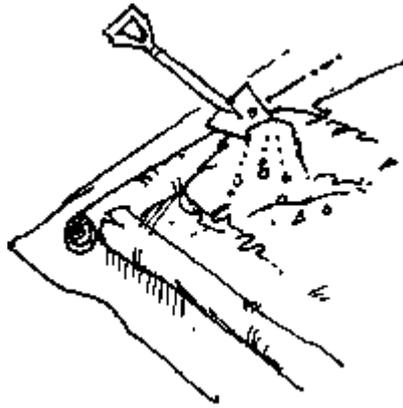
Remove flesh and plant to seed depth.

- Rows 100 mm apart
- Seeds 20mm apart
- Cover with soil
- Press down to compact
- Water the bed

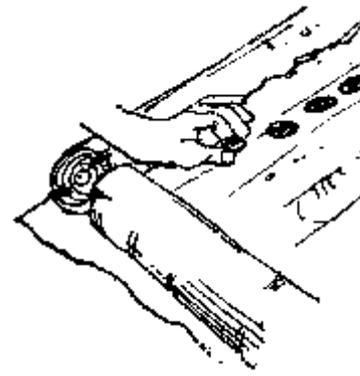


4 Growing Trees from Cuttings

The cutting bed mix should be 1/2 sand and 1/2 pine bark or soil.



Cut off the end of a branch from the main plant stem. Remove all unwanted leaves and lower branches. Truncheons- 2-3 metre branches and 70mm to 150mm diameter are planted directly into site.



- Dip the stem in root hormone
- Plant into cutting bed
- Rows 100mm apart
- Cover with soil
- Press soil down to compact
- Water the bed

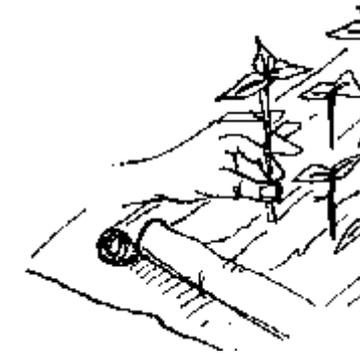


5 Potting Out

The potting mix should be 1/3 sand; 1/3 topsoil; and 1/3 compost. Mix thoroughly and fill potting bag.



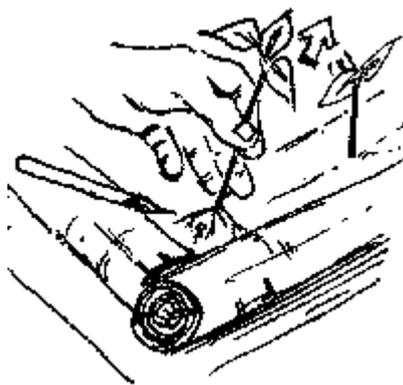
Prick out young seedlings when about 40mm to 100mm high for potting into bags.



Transplant seedlings into 5 litre bags. Press down firmly, water well, keep under shade BUT; harden off in direct sun before field planting.



6 Hole Preparation

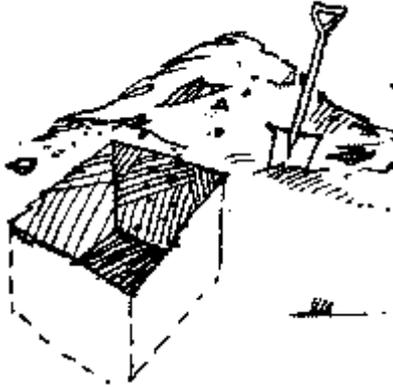


Mix 1/2 sand; 1/3 topsoil; 1/3 compost and 120gm Supers into a heap.



Hammer a sturdy stake into the hole to help support the young tree.

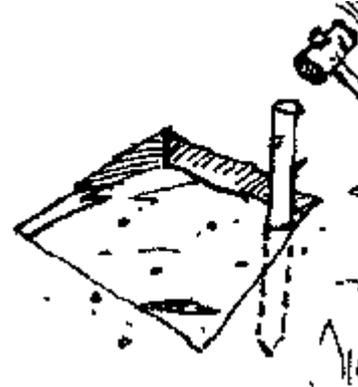
Dig a square hole (400mm) or as deep as your forearm and as wide. Loosen the soil at the bottom of the hole.



Fill the hole with the mix.



The stake will also mark the tree and assist to avoid trampling.

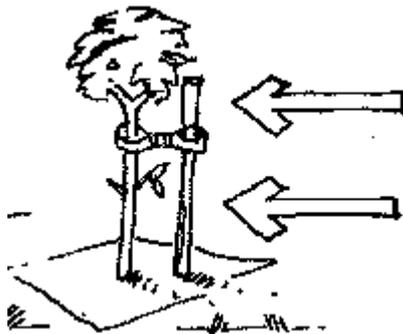


7 Field Planting-Out

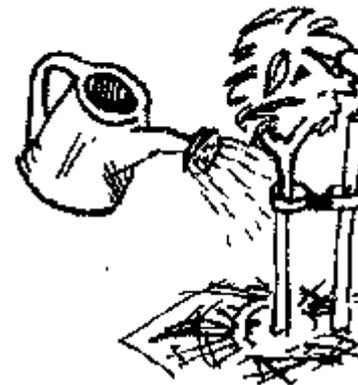
Remove the container by cutting or sliding it off so that it can be used again.



Plant out the young trees when they have reached a height of about 700mm. Firm the soil by treading in down. Support young trees by tying to stake where wind is a problem.



Build up a soil basin around the tree. Water when planting and about once a week if conditions are dry.

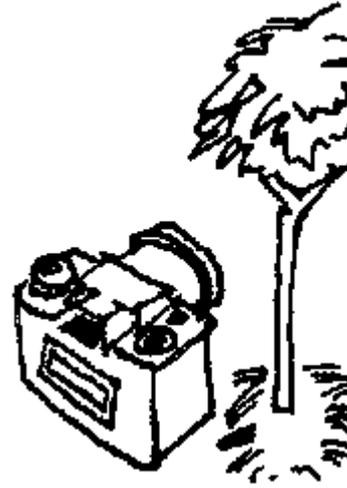


8 Maintenance

Slash grass and weed growth; do not hoe around the young trees. Mulch to retain moisture and to inhibit weed growth. Do not spray weeds in surrounding area rather pull weeds out.

Prevent buck, stock, or rodent damage to the young trees. Old fertilizer bags protect trees whilst creating a warm and humid micro-climate. Remove fertilizer bags during very hot summer months. A length of tubing cut down one side provides protection against rodents.

Take photographs from a fixed point each year so as to monitor progress of vegetation cover.



Glossary of terms

Channel (of water)	The bed in which a stream of water runs. Those seed plants that do not develop permanent woody tissue and do die down at the end of the growing season.
Herbaceous	
Indigenous	Belonging to the locality; not imported.
Mulch	A protective covering (eg -of compost) spread on the ground to control weeds, retain soil moisture and to enrich the soil.
pioneer (plants)	Plants capable of invading bare or disturbed sites and persisting there until replaced by other species.
propagate (plants)	To reproduce plants by means of cuttings or seeds.
Restoration (of wetlands)	The act of enhancing the condition of degraded wetlands to a level whereby certain of the functions which the system formally provided become replaced.
Rhizome	An underground stem that develops roots, culms, and leaves at the nodes, thereby giving rise to new independent plants.
Riparian	Occurring on the banks of streams or rivers.
Stabilization	The process of stilling the movement of sand and soil.
Stolon	A stem that creeps above the ground, rooting at the nodes and giving rise to new culms.
Succession (of plants)	The progressive change in composition of a community of plants towards a stable climax.
Truncheon	A thick cutting (70mm to 150mm in diameter) from a plant used for propagation purposes (see Pg 9)

Further Reading

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