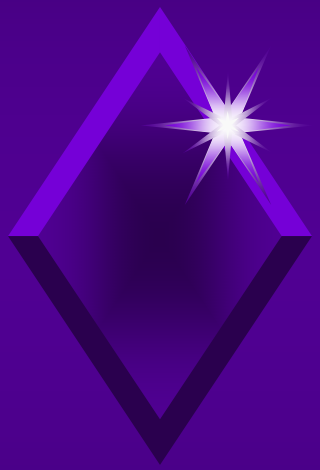
Factors affecting the capacity of tree crops and plantations to supply high quality wood fibre to the pulp and paper industry



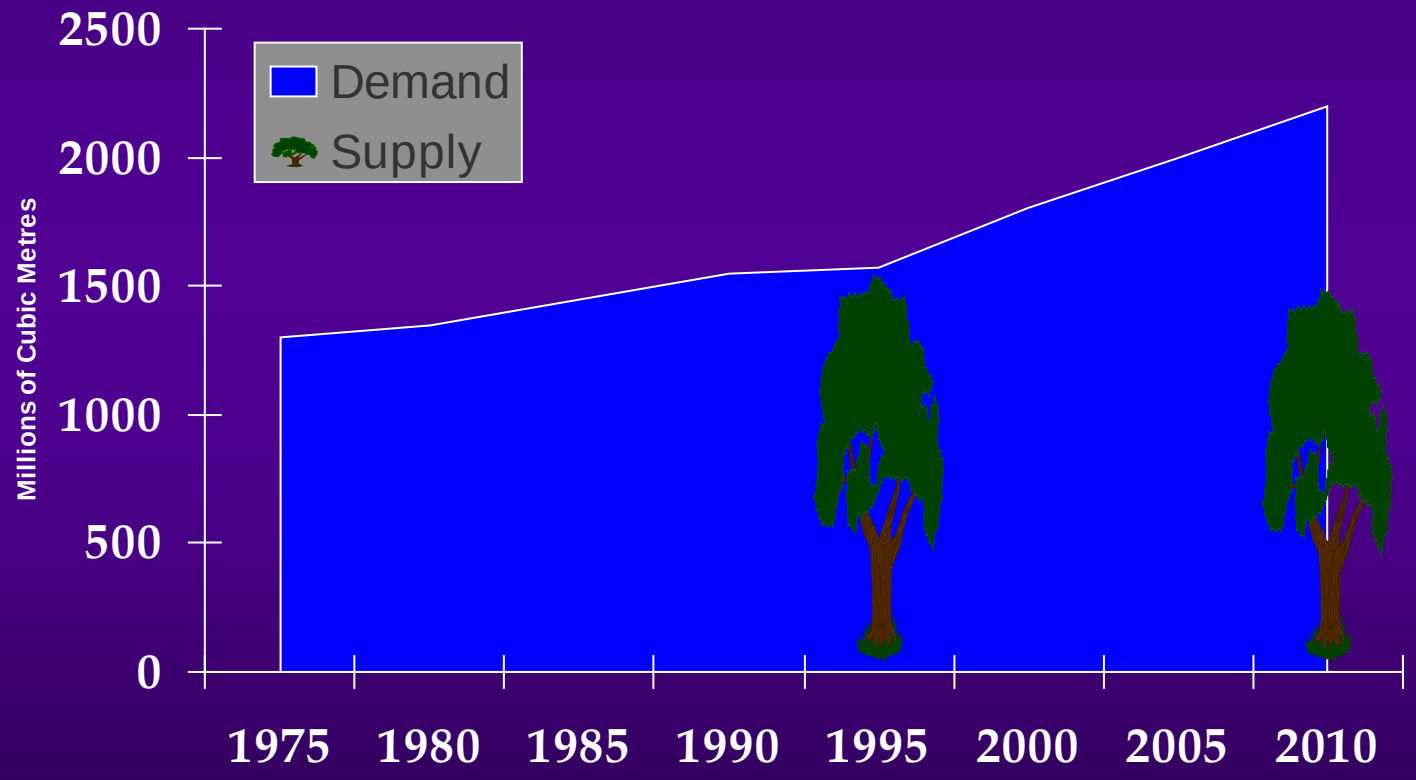
By

S R Shea and G Inions

Rotorua, New Zealand March 1998

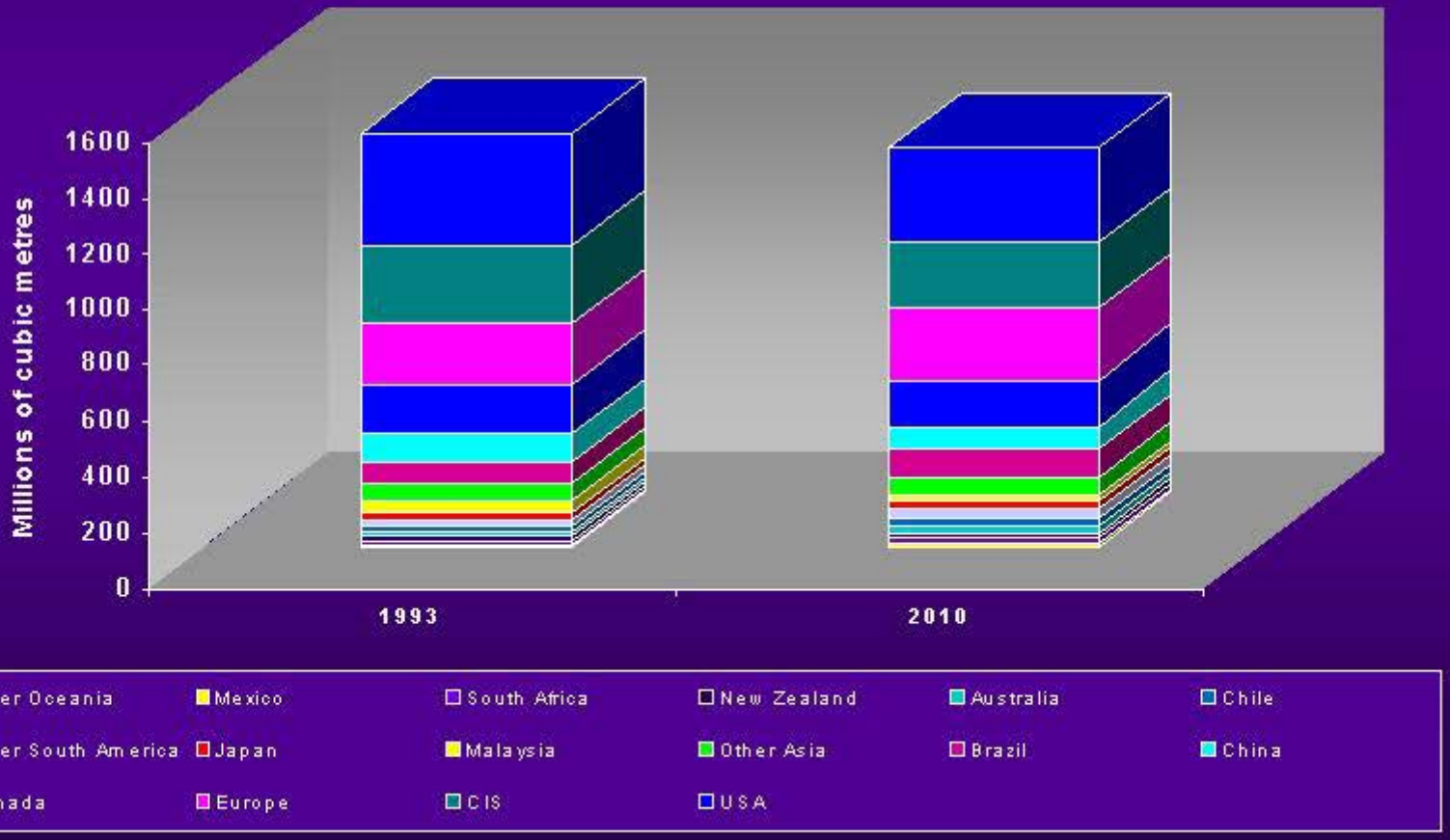
Declining global wood harvests

Global wood demand rises as supply falls

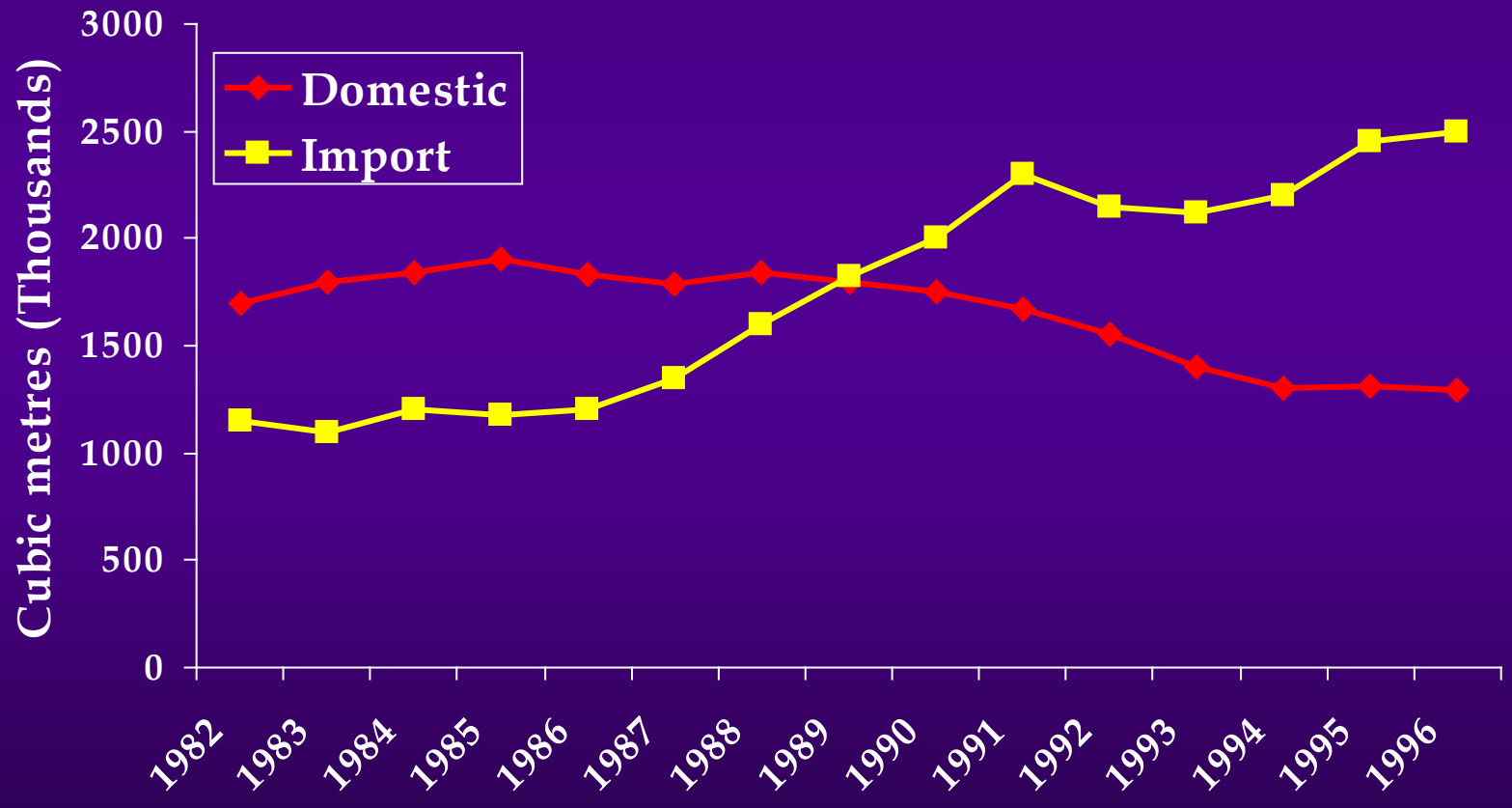


Sources: D A Neilson,UN FAO, Apsey & Reed, Jaakko Poyry, Widmans World Wood Reveiw, Xylem Investments Inc

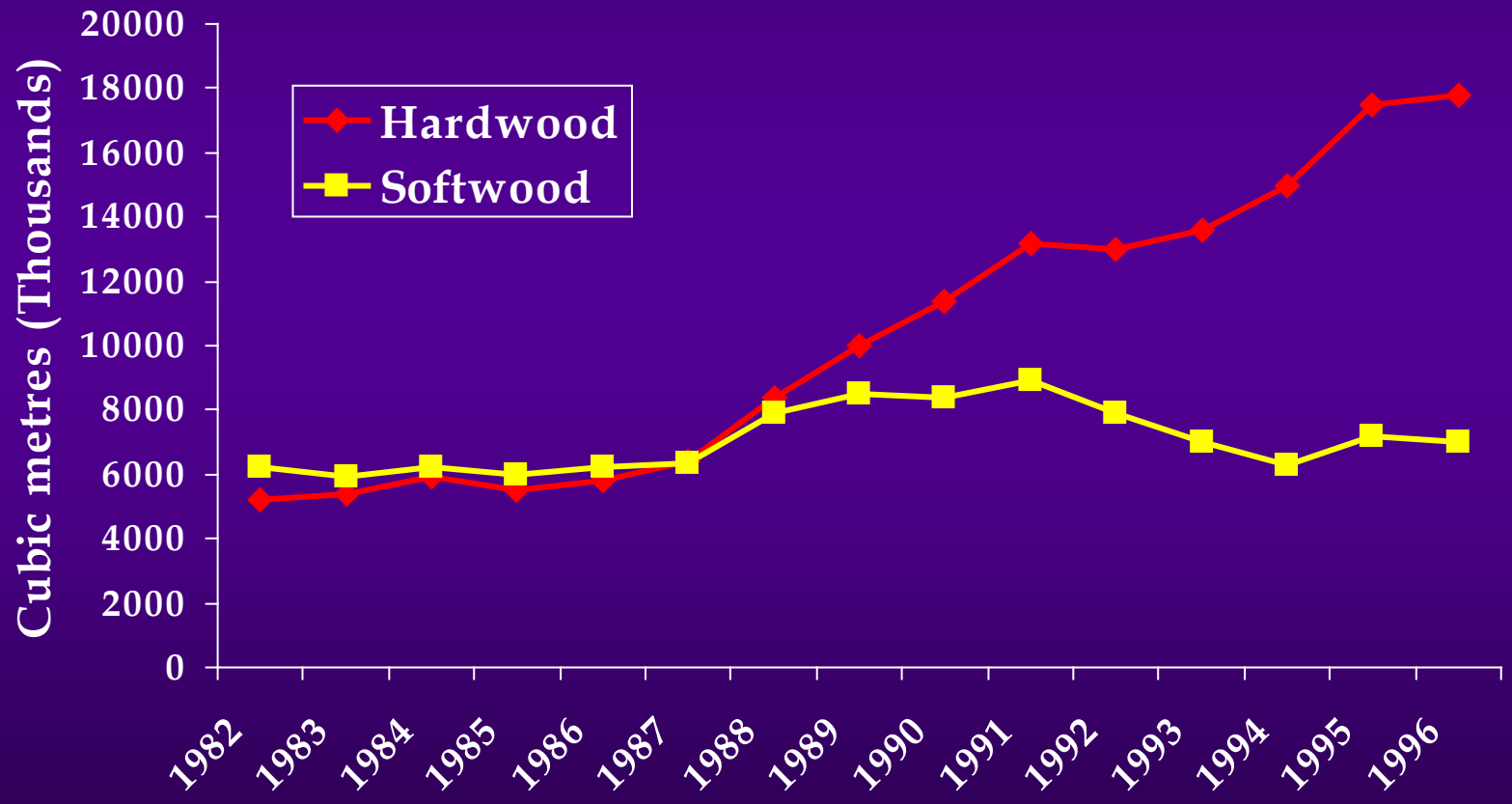
Declining Global Wood Harvests



Domestic supply vs. imported supply over time

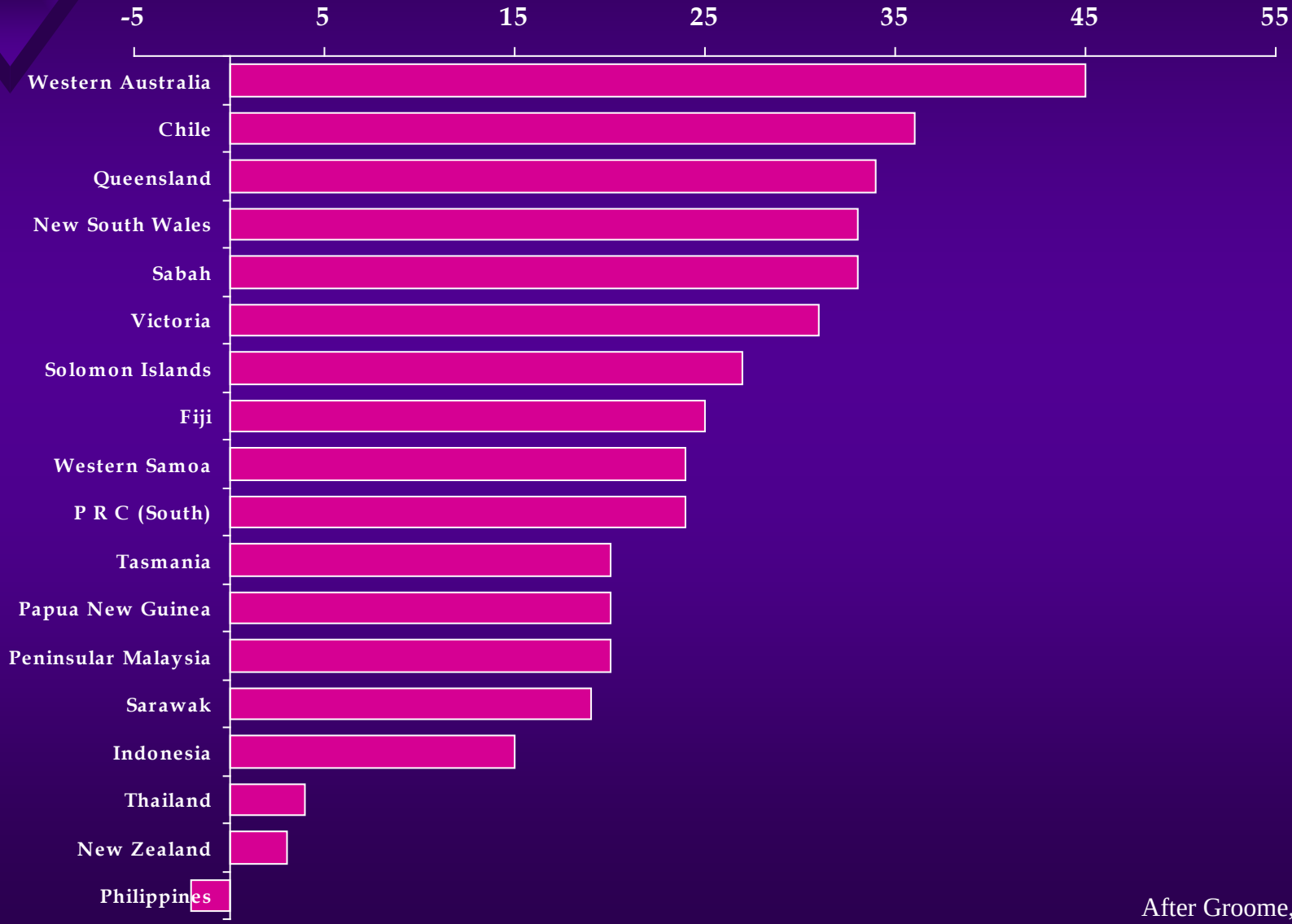


Hardwood chip imports vs. softwood chip imports

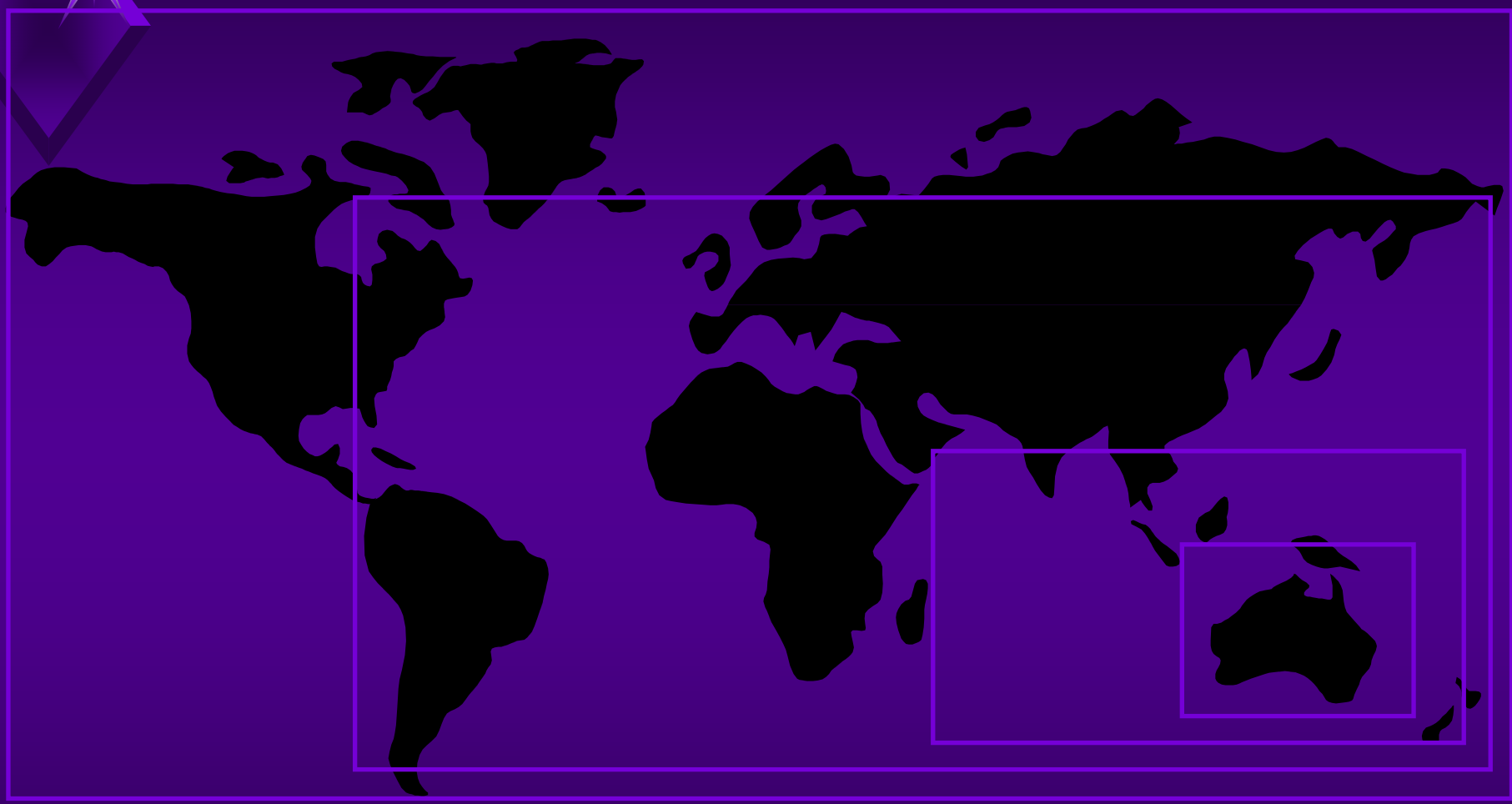


Total hardwood chip imports and the percentage of the imports sourced from plantations

Suitability by country for hardwood pulpwood plantation development to supply Asian markets

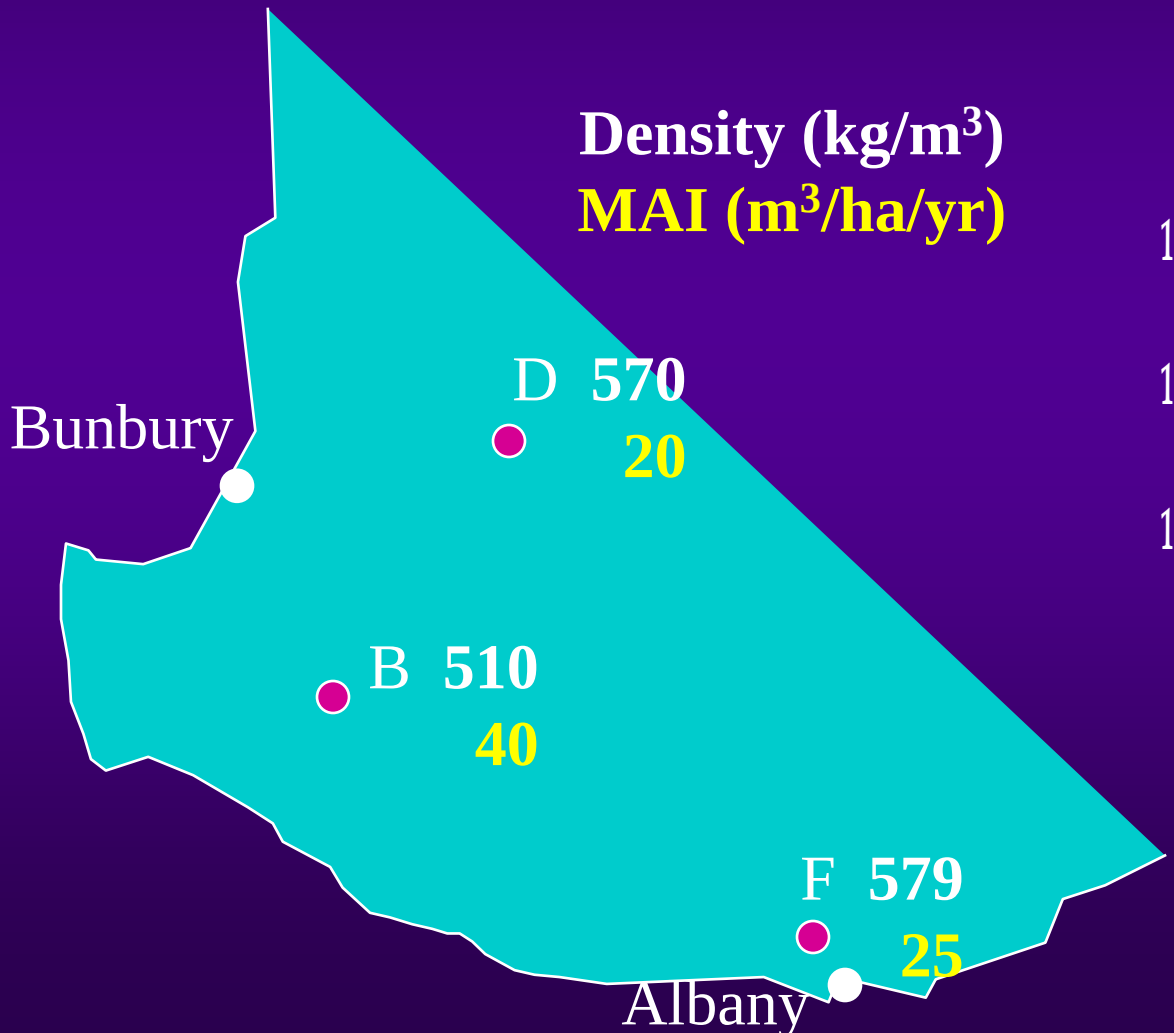


After Groome, 1989

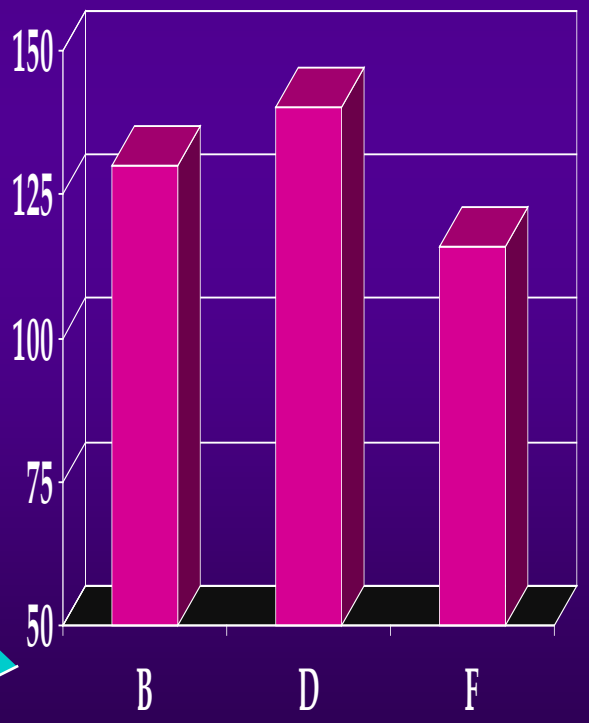


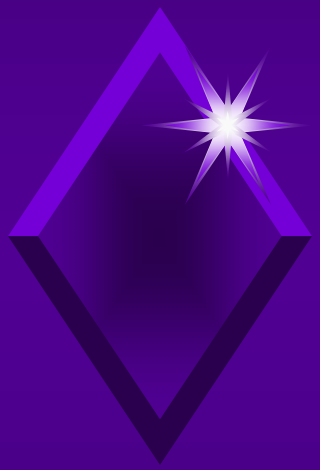
The objective should be to provide a secure supply of high quality wood fibre at the lowest price in the ship hold

Costs of E. globulus fibre at the port from farms at different locations and with different site productivities

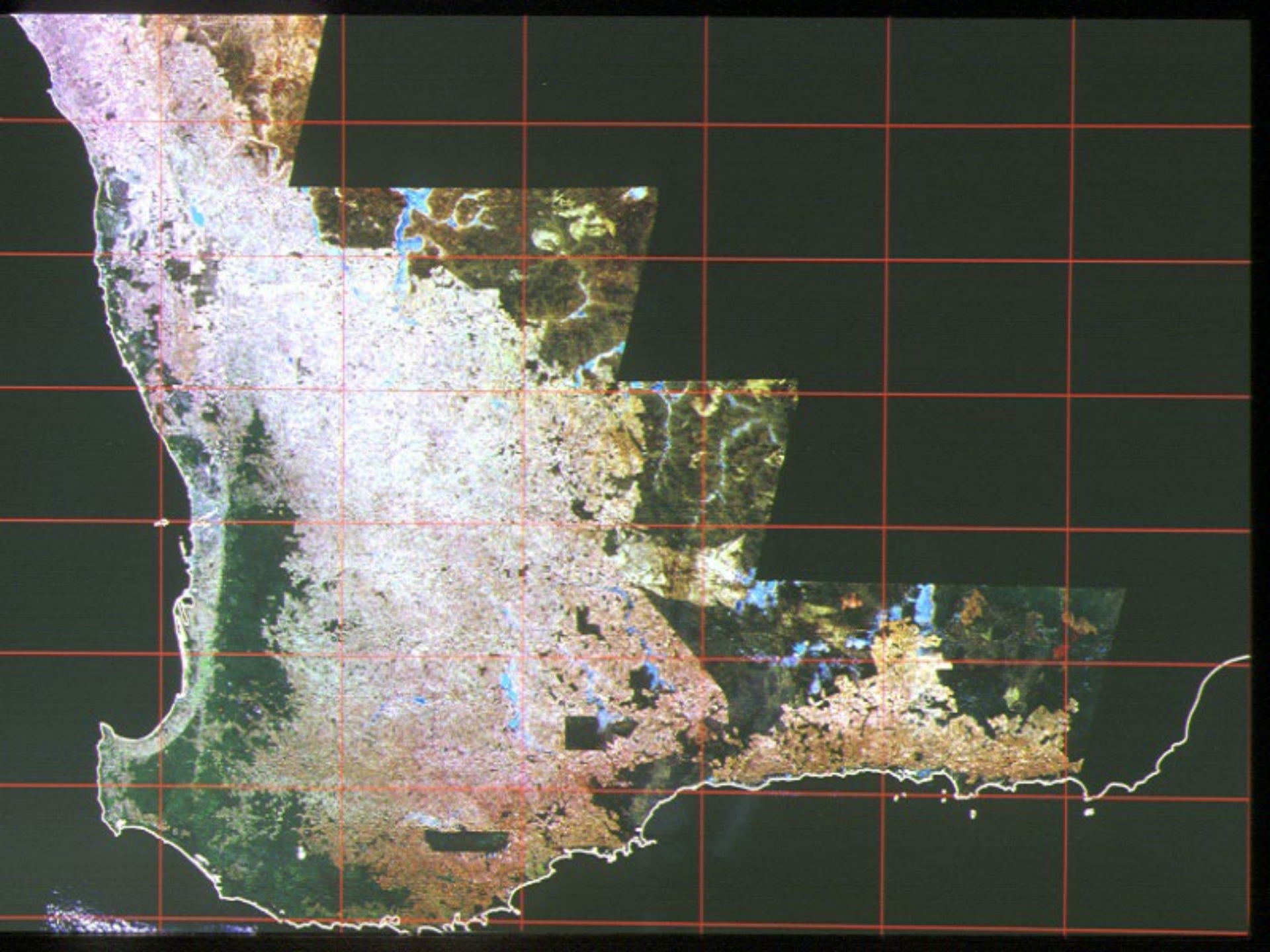


Compounded cost of chips at port ($/BDU, FOB)

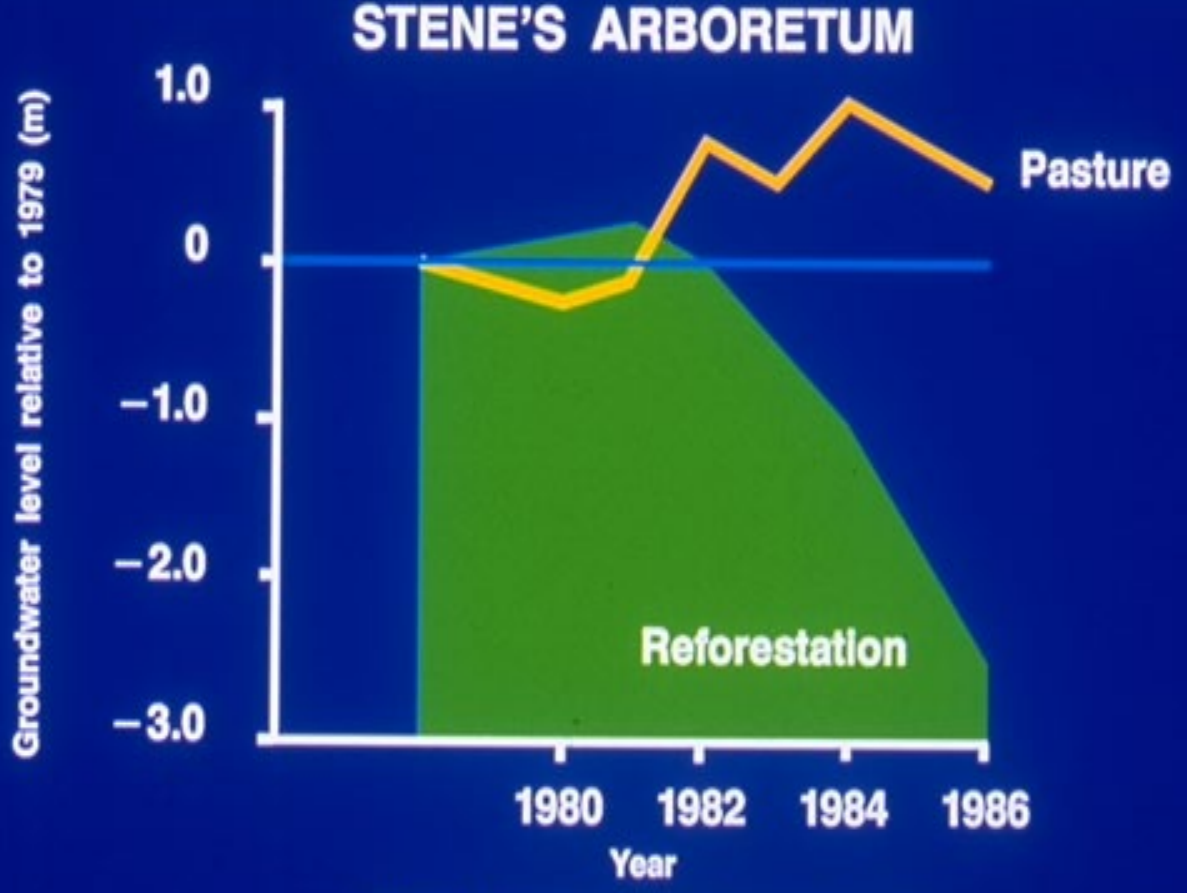




Land Acquisition

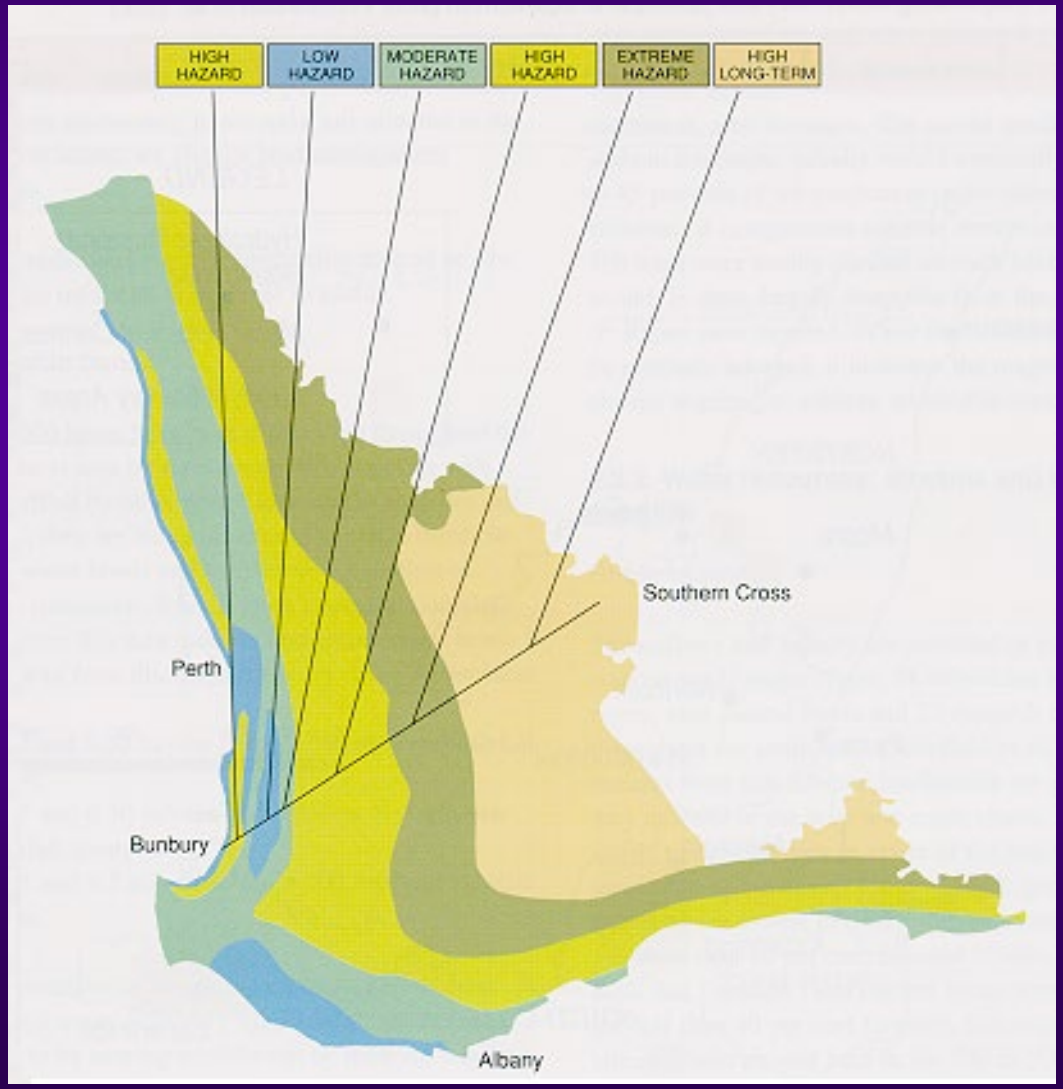


THE EFFECT OF TREE CROPS ON WATER TABLE LEVELS



Water Authority of Western Australia
July 1989
Report No. WS 33

Salinity hazard zones in the South-west



Farm forestry zones by area and rainfall

Farm forestry zone	Rainfall	Area (in million ha)
Traditional pine and new bluegum	>600 mm	2
New martime pine	400 to 600 mm	6
Wheatbelt	<400 mm	10

Land availability in the intermediate rainfall zone for maritime pine

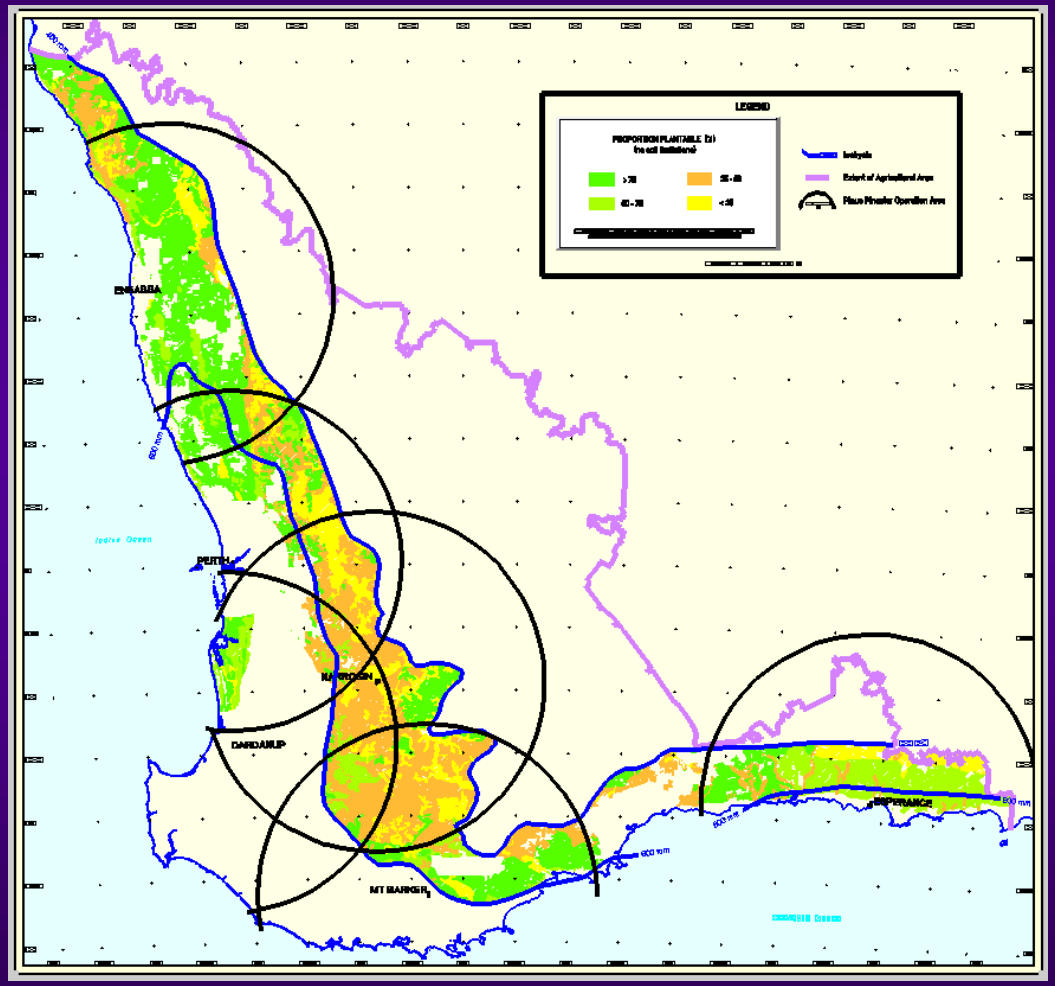


Figure 15

CALM has joint ventures with 1303 farmers

CALM has contracts with 84 land management contractors

Site Selection for Tree Crops

E. globulus *site productivity assessment for a typical farm*

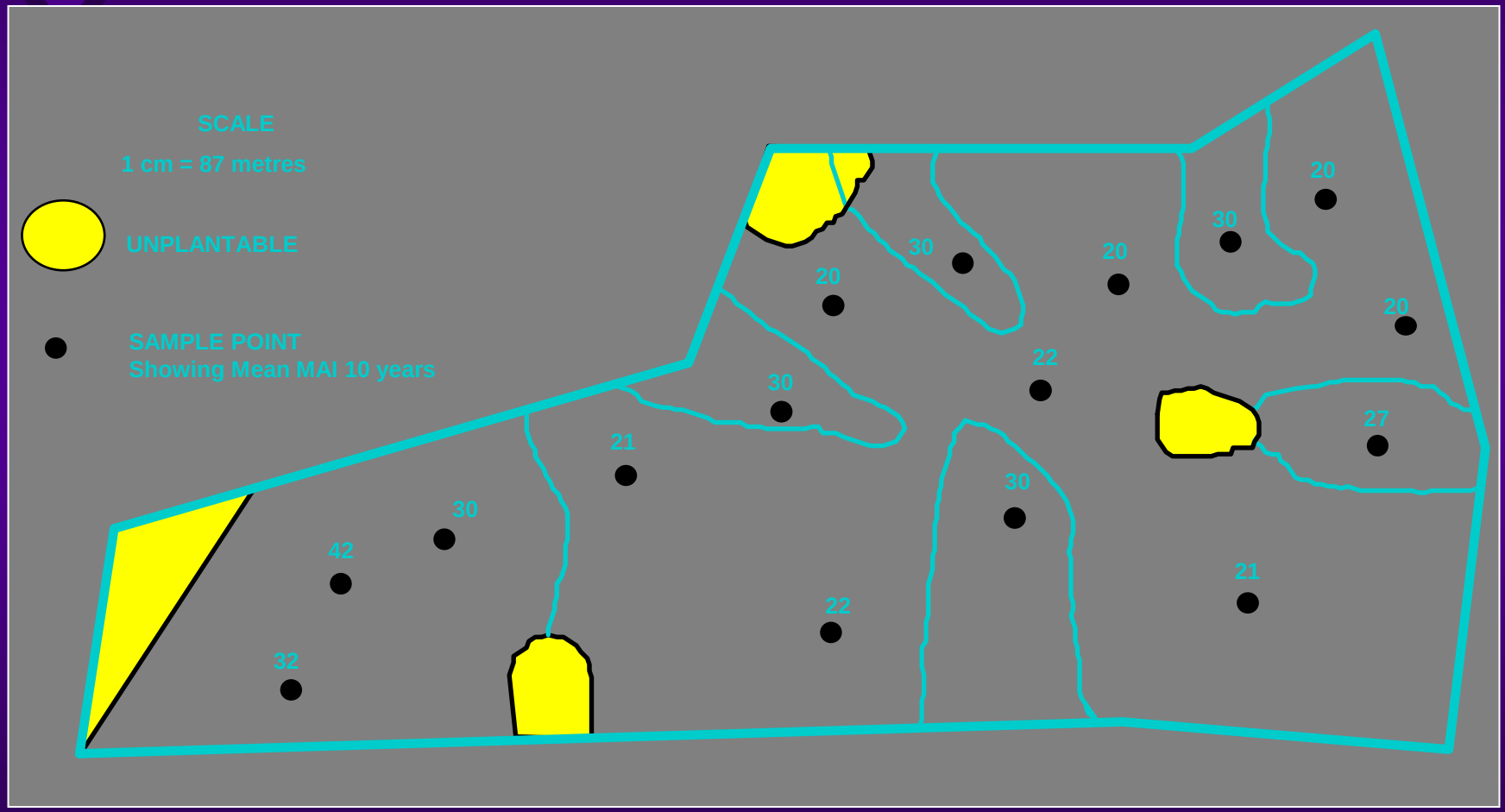
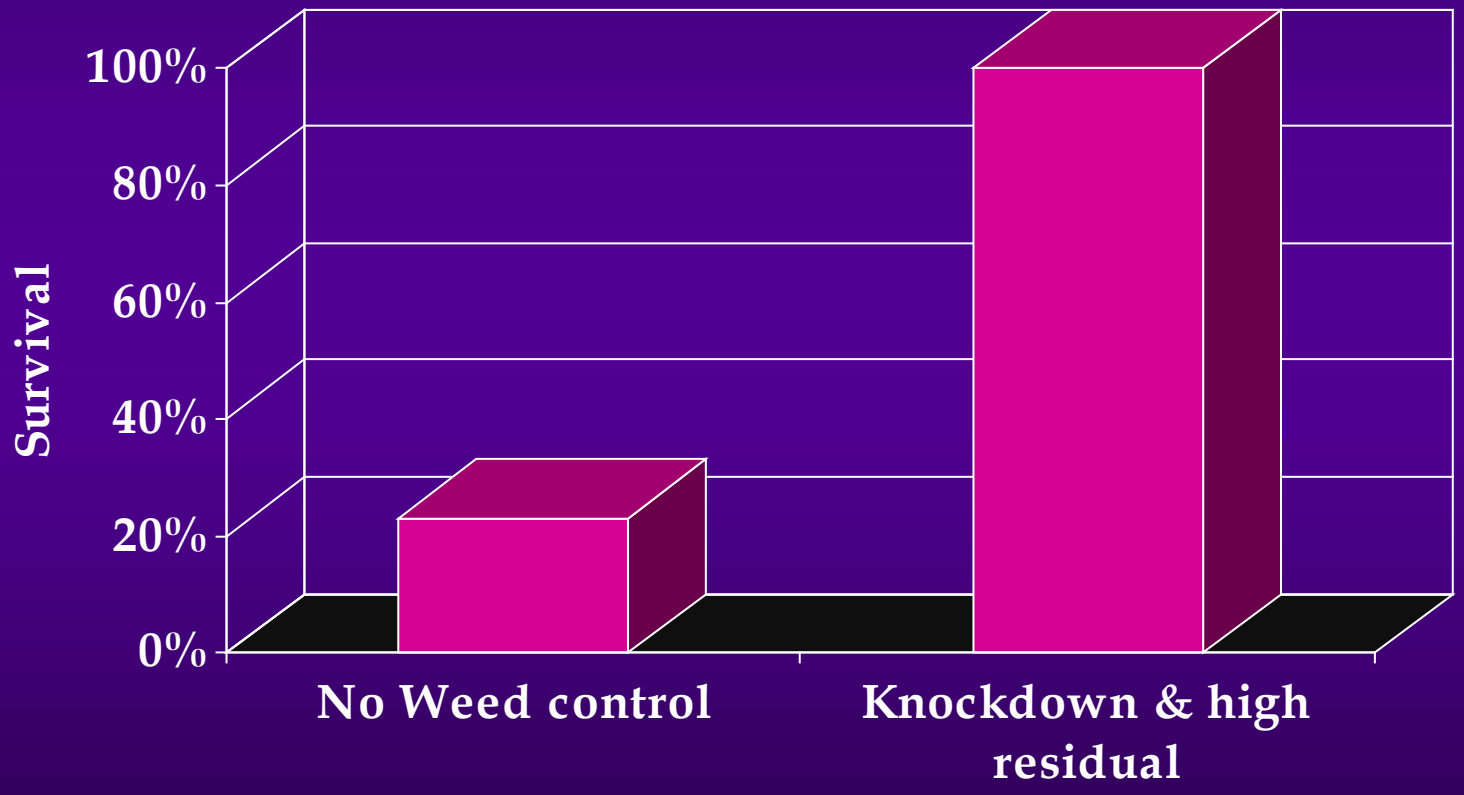
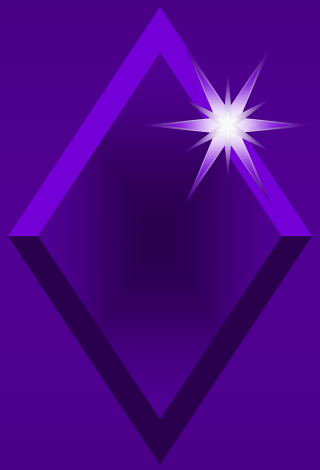


Figure 5

Tree Crop Establishment

Effect of chemical weed control on Tree Crops





Silviculture

Basal area response to Nitrogen and Phosphorus over four years after fertilization

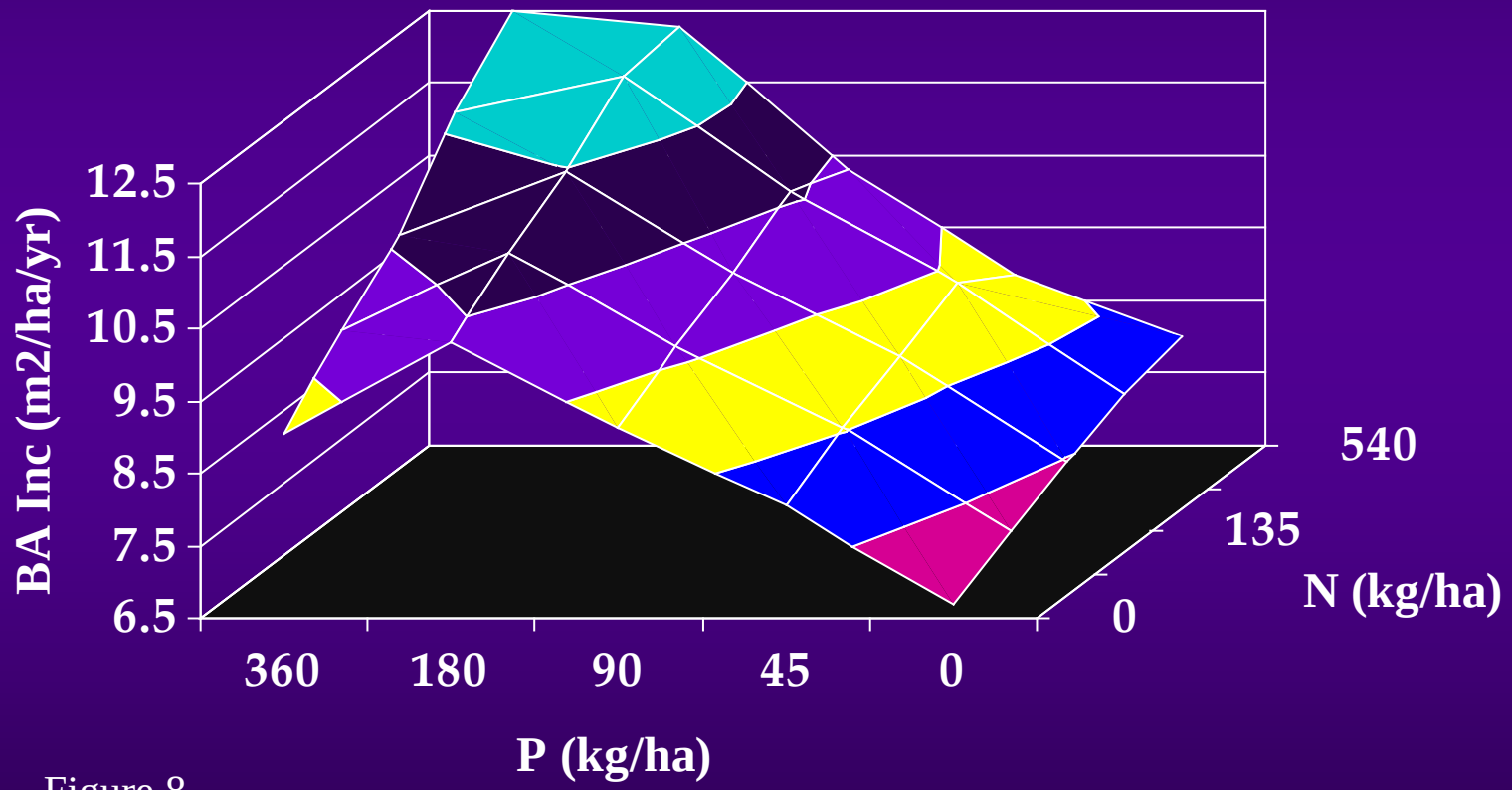


Figure 8

High quality genes

Traits assessed that influence breeding objective

- survival and health
- growth rate
- wood density
- tree form and branching
- drought tolerance
- salinity tolerance
- pest resistance
- flowering precocity and synchrony
- graft compatibility
- rooting ability

Eucalyptus globulus

Breeding population trials

Program commenced in 1980

Source	Parents	Number	Area	Trees
CSIRO 1987 - 90	766	29	117 ha	107 000
King Island	83	1	3	3 000
Salt Tasmania	44	3	2	2 000
Orme	73	1	4	4 000
Orme (Prov)		2	11	6 000
APPM	73	4	4	3 000
CSIRO cc	135	1	3	3 000
Total	1174	41	144	128 000


WESTERN BLUE GUM
Inspect an E. globulus seedling for quality. Check the stem diameter, look for a pruned fibrous root system and notice if the foliage has a red tinge to show the seedling is hardy. All these aspects will help in the survival of the seedling. To be confident that the seedling will give you extra profit from its volume production in 10 years' time, look for the Western Blue Gum label.

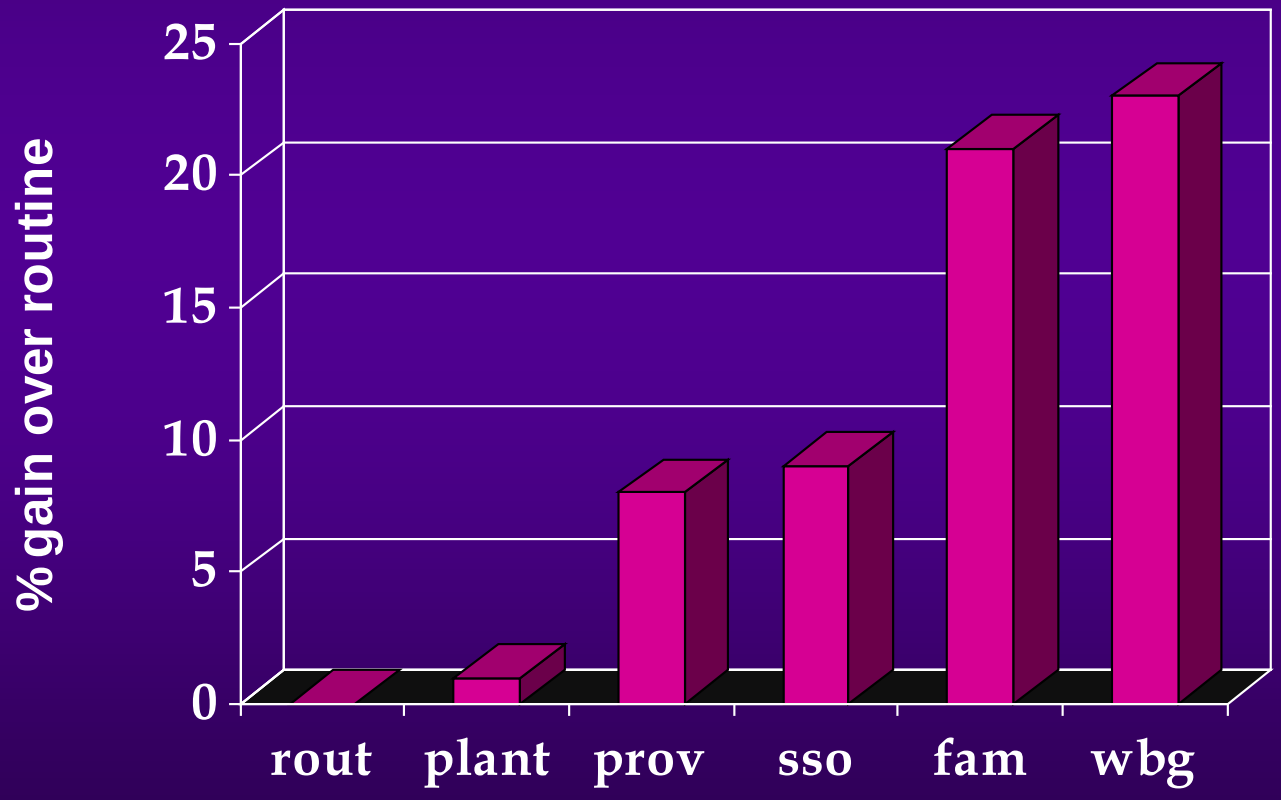

Western Bluegum
Tasmanian Bluegum
Trees are 2 years 8 months old

Genetic Gains Trial:

EG 44 and EG 45 (1994)

Measurement on April 1996

wood volume

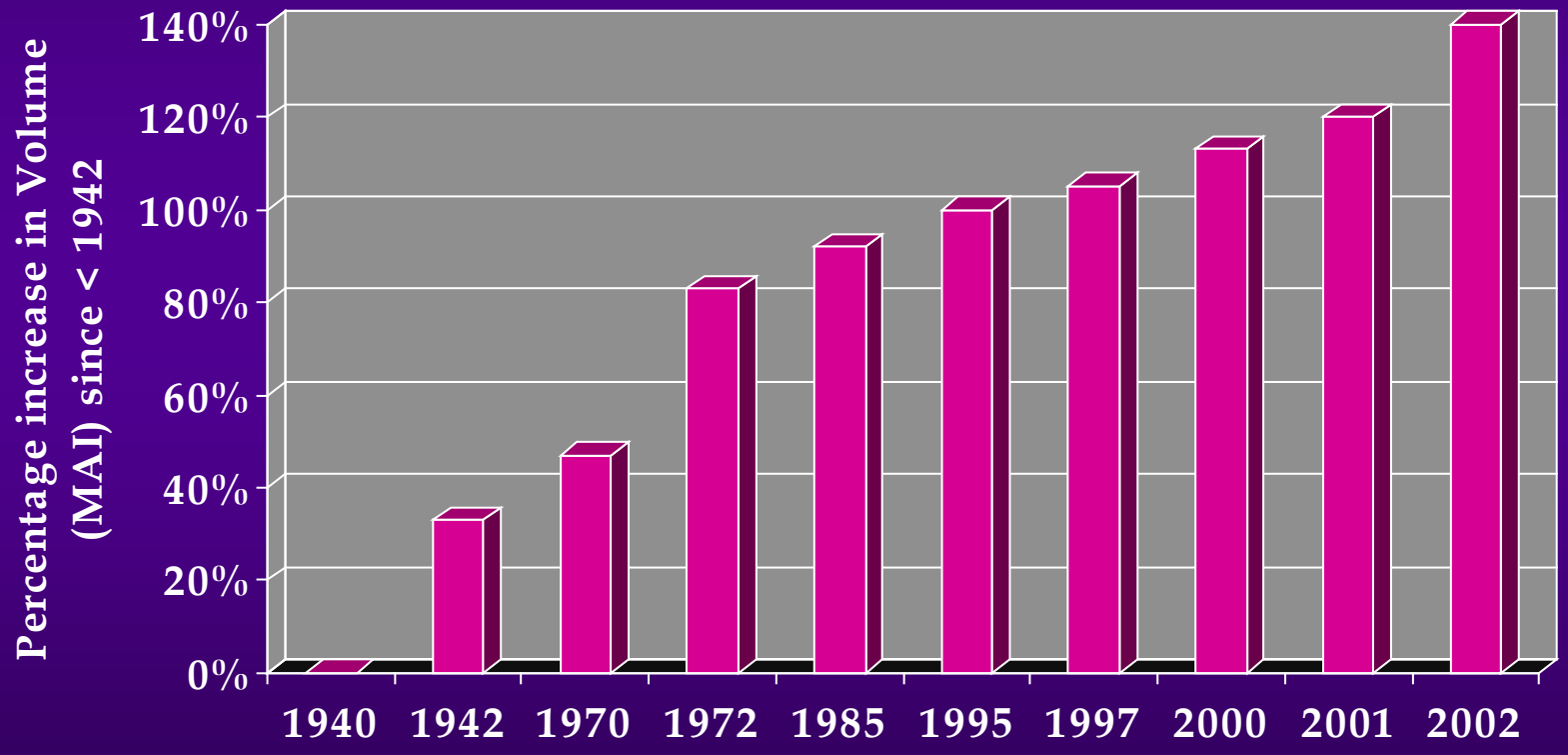


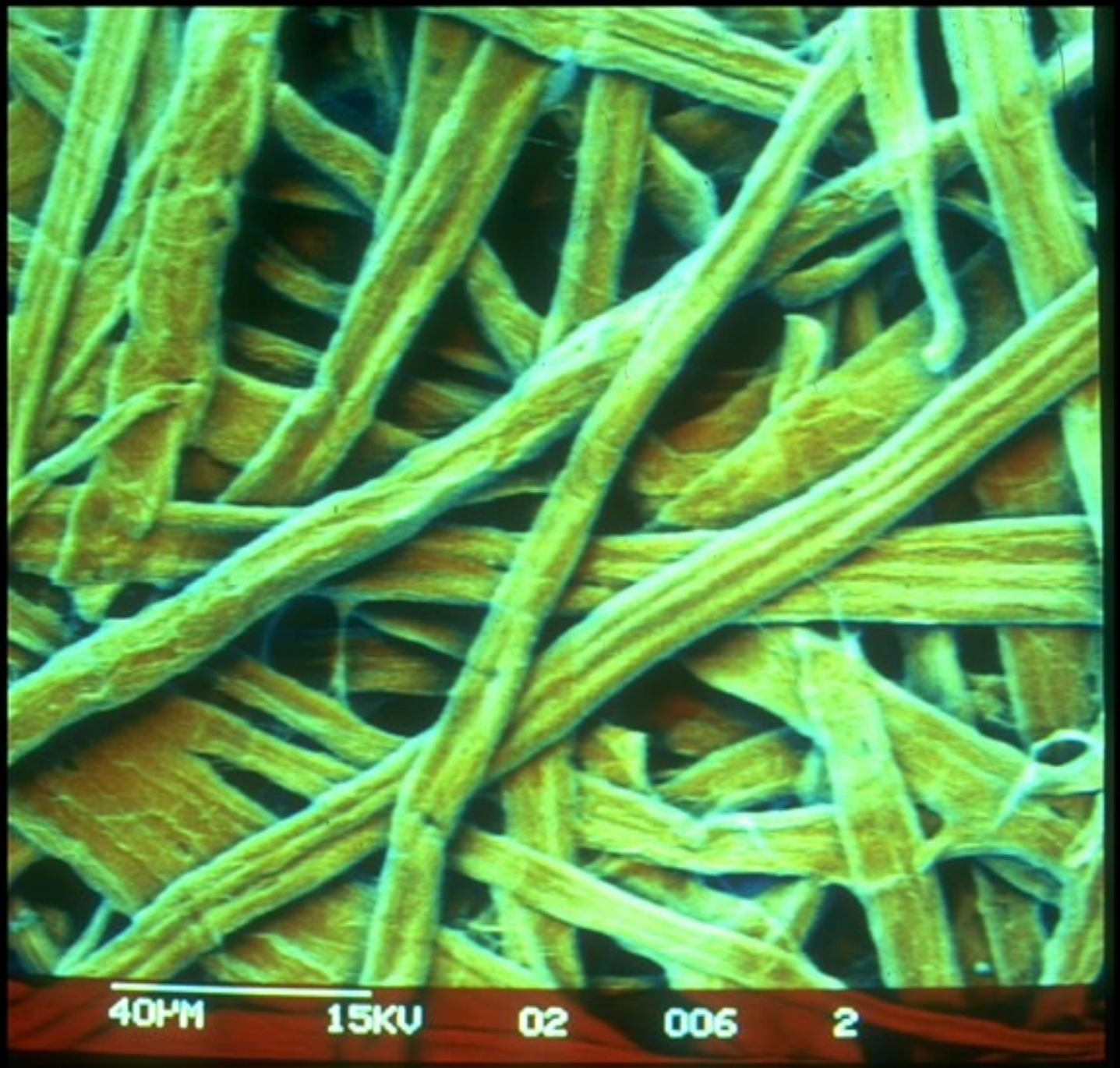
CALM's Genetic Resource: Pinus pinaster

Program commenced in 1957

	Parents	Number	Area	Trees
Breeding Population Trials	313	93	171 ha	202 000
Breeding Research Trials		11	43 ha	45 000
Clonal Seed Orchards		4	48 ha	(24 ha active)
Clonal Archives		3	6 ha	

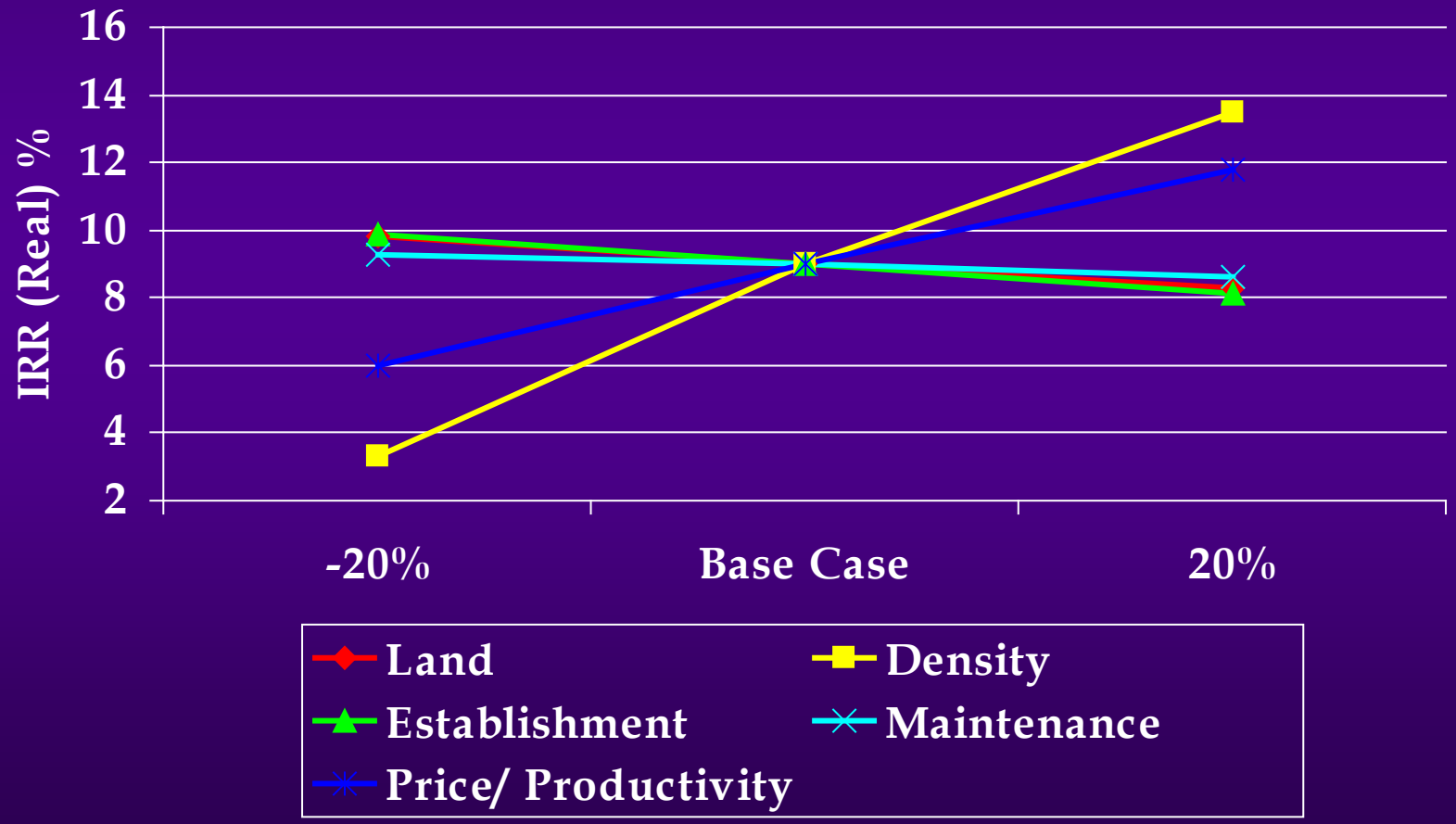
Volume gains from the tree improvement program for Maritime pine




40µM
15KV
02
006
2

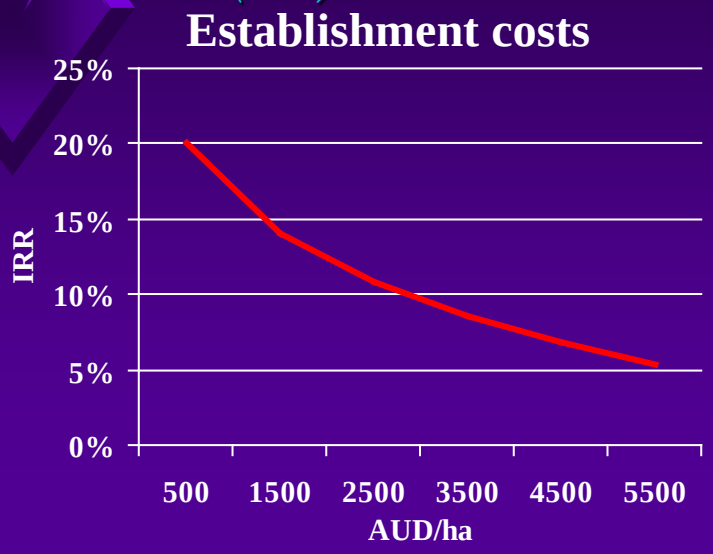
The Economic Return from Tree Crops

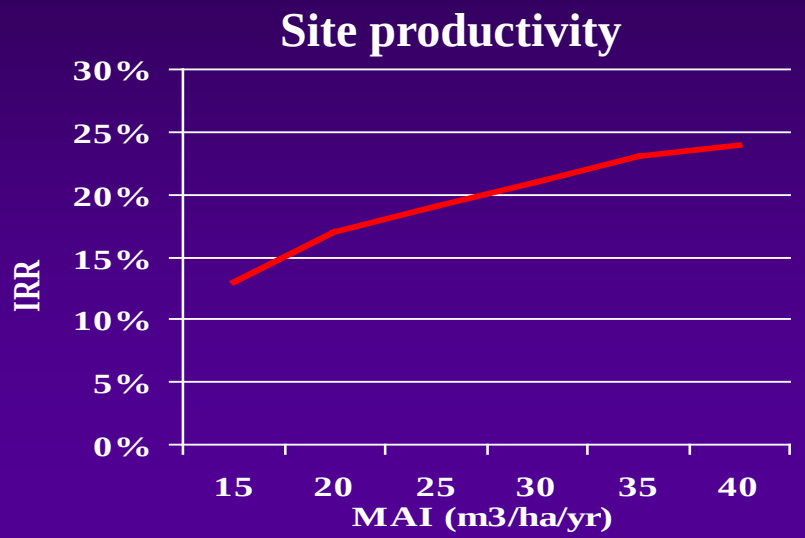
E. globulus
Sensitivity to major parameters

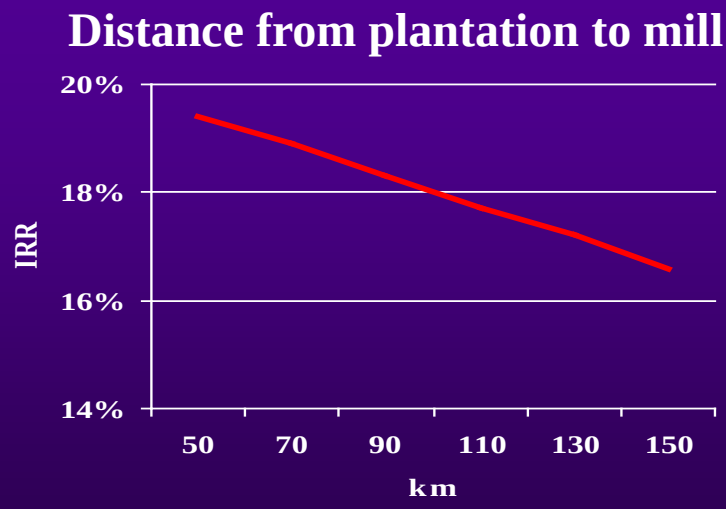


Sensitivity of profitability for E. globulus

IRR (real)







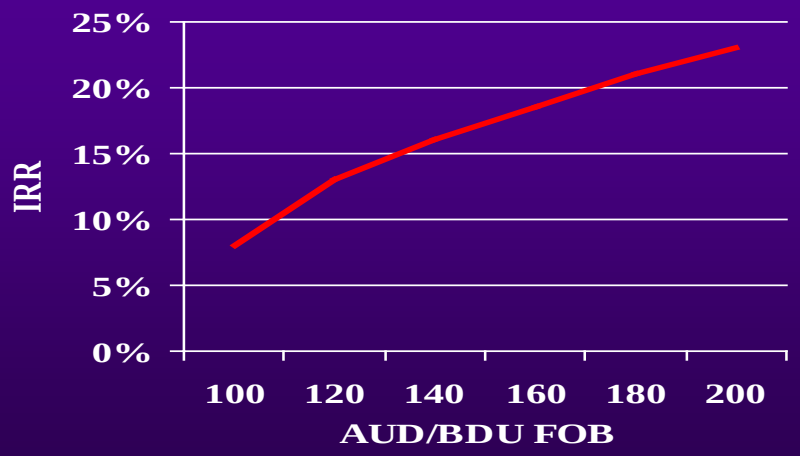
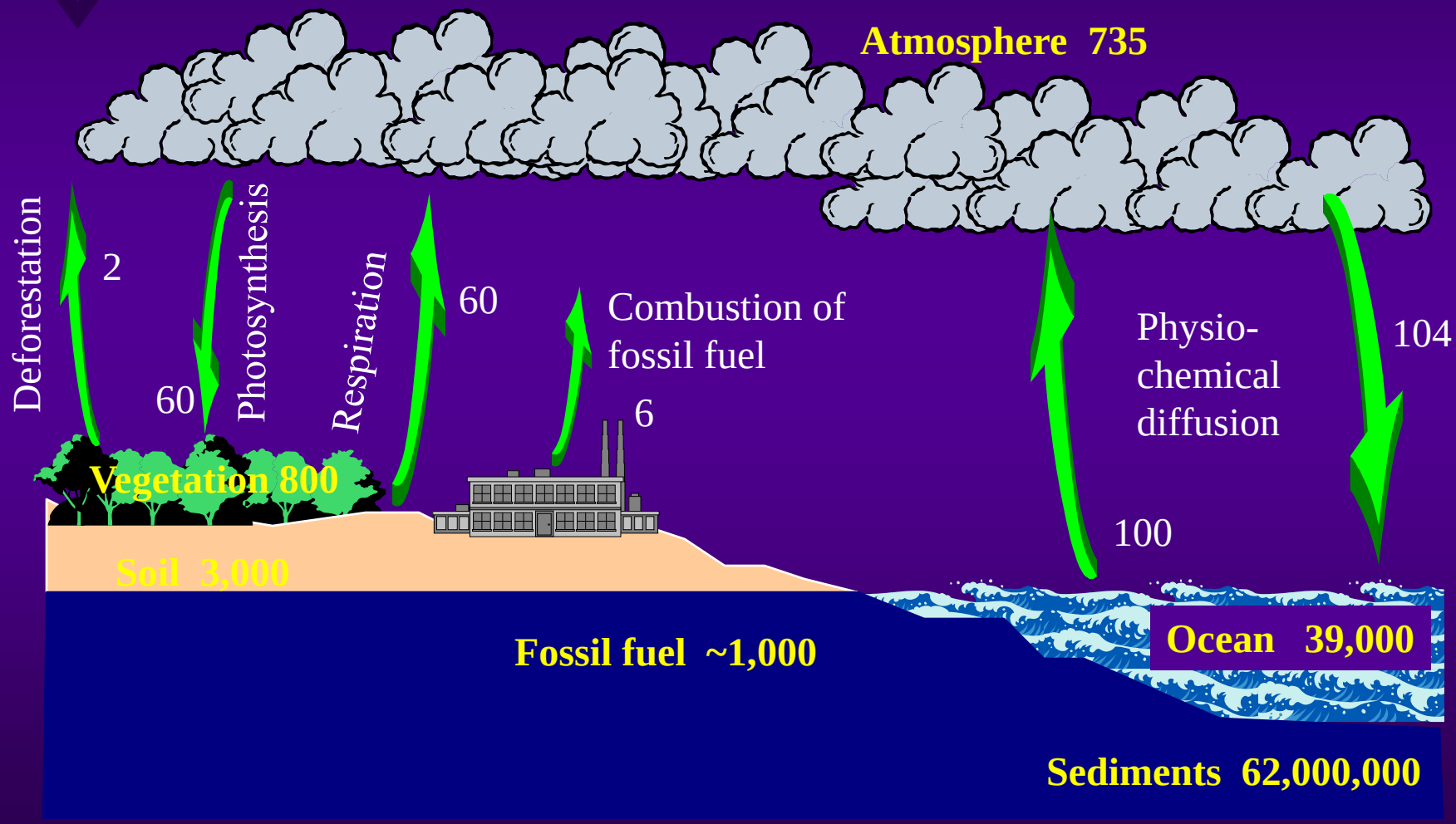


Figure 13

Carbon sequestration

The carbon cycle



Extract from Kyoto Protocol - Article 2

Each Party included in Annex 1 in achieving its quantified emission limitation and reduction commitments under Article 3, in order to promote sustainable development, shall:

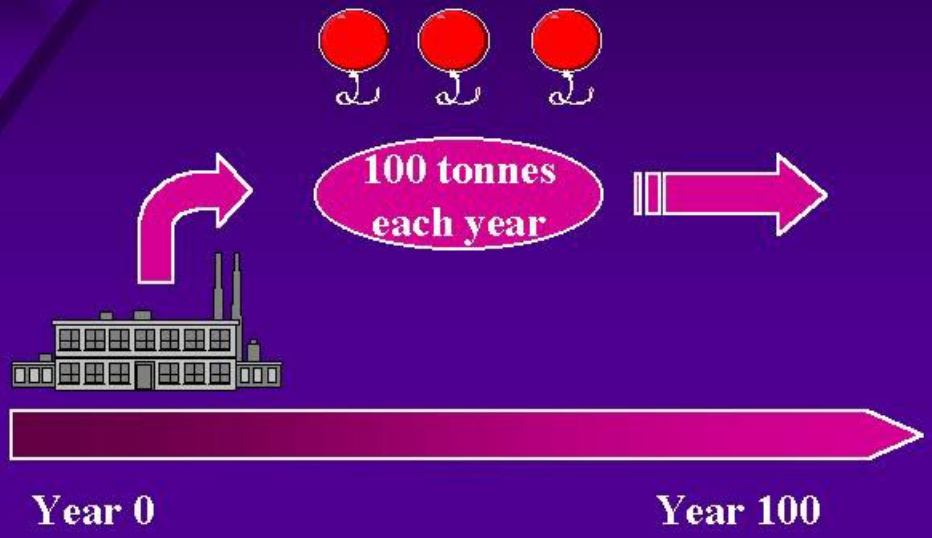
(a) Implement and/or further elaborate policies and measures in accordance with its national circumstances, such as:

……..…

(ii) Protection and enhancement of sinks and reservoirs of greenhouse gases ….taking into account ….promotion of sustainable forest management practices, afforestation and reforestation.

"Tonne-year" currency

Balance sheet of 1 year of emissions and storage



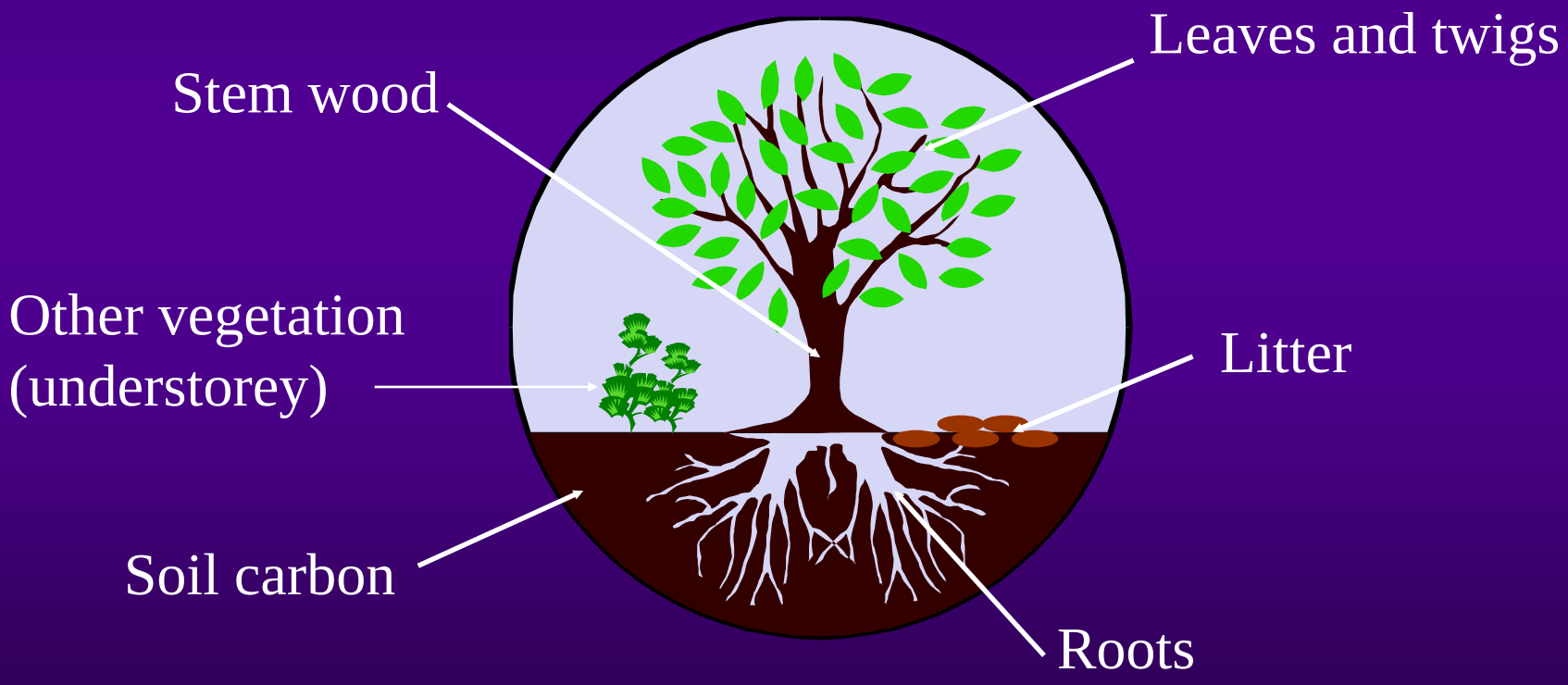
=> 100 x 100

= 10 000 tonne years

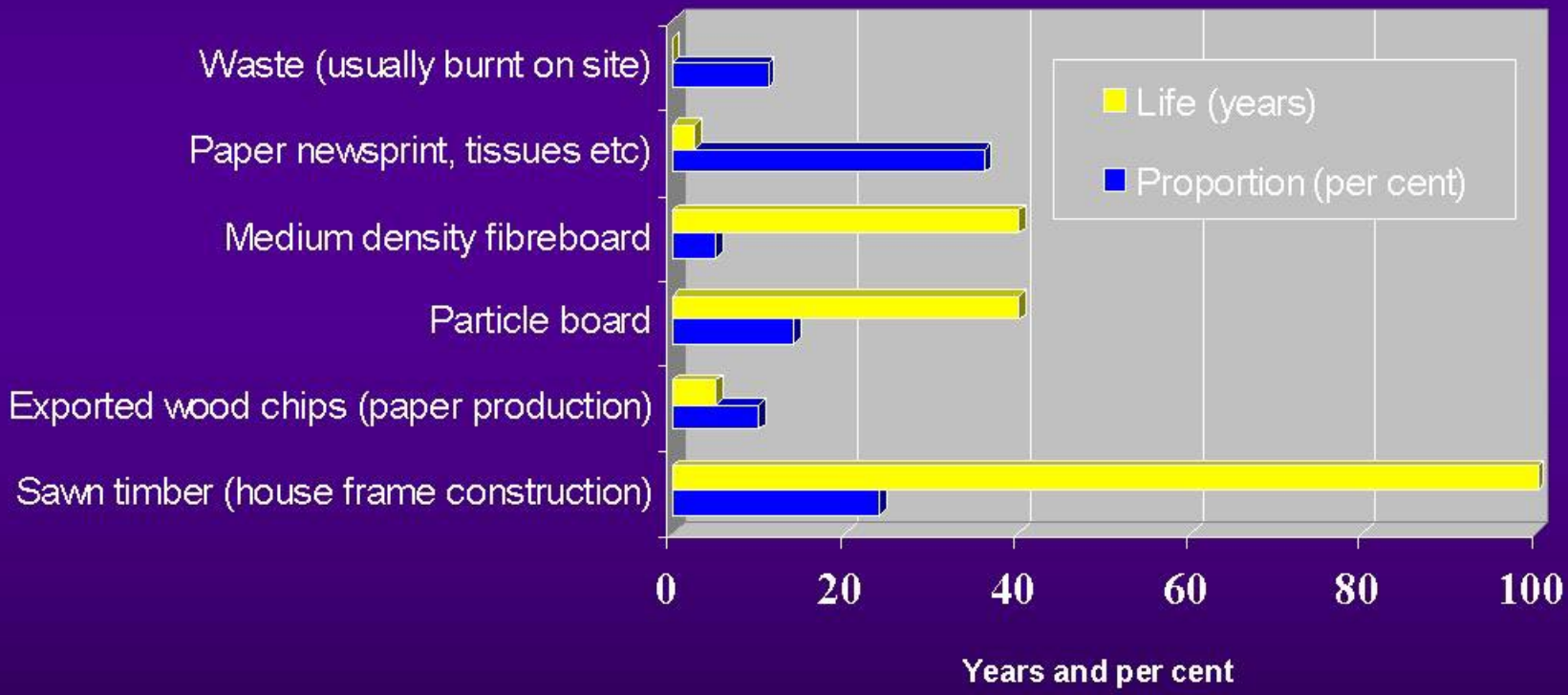
=> 290 x 35

= 10 000 tonne years

Major pools of forest carbon



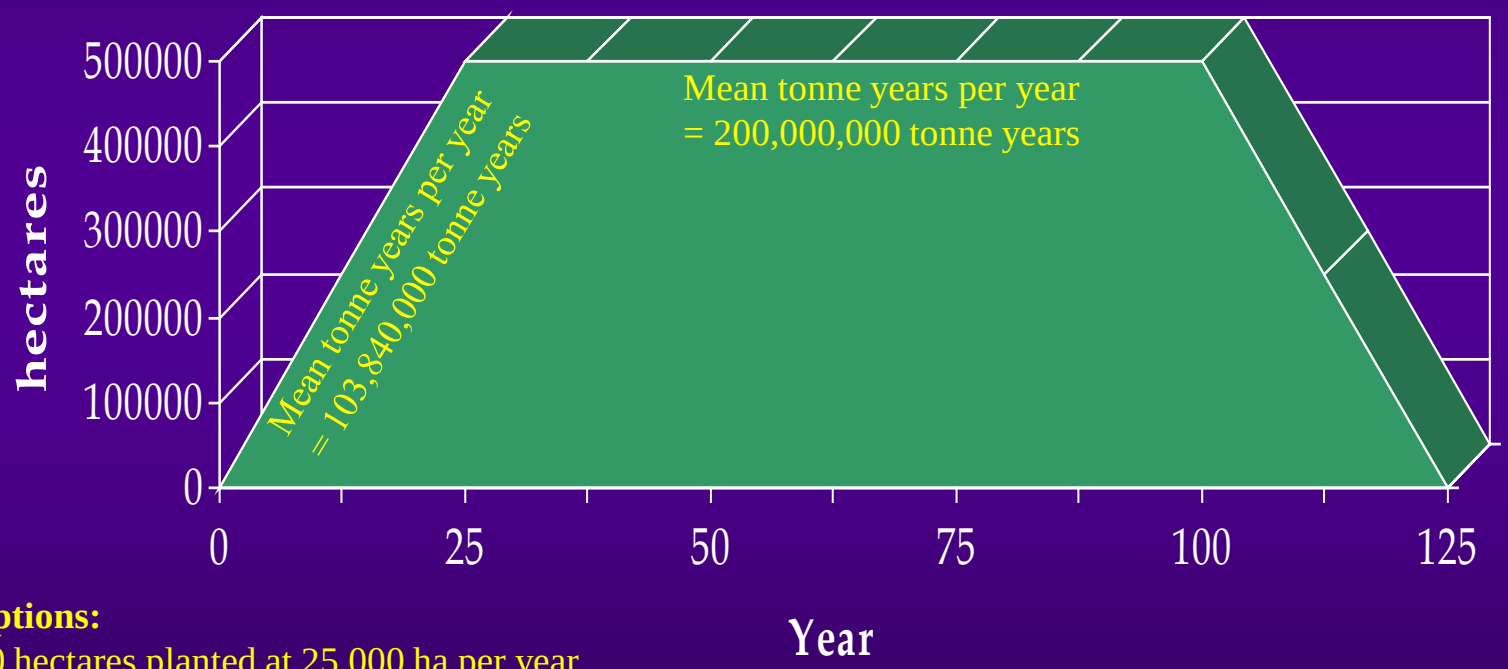
Estimate of typical proportions and lifetimes of merchantable pine wood used for different products



Estimated tonnes and Carbon tonne years produced per hectare per year

	Carbon Tonnes per year	Average Carbon storage time (years)	Tonne years
Maritime pine	10	40	400
Bluegum	20	7.5	150
Mallee Stems	1	5	5
Roots	1	100	100
Biodiversity planting	2	50	100

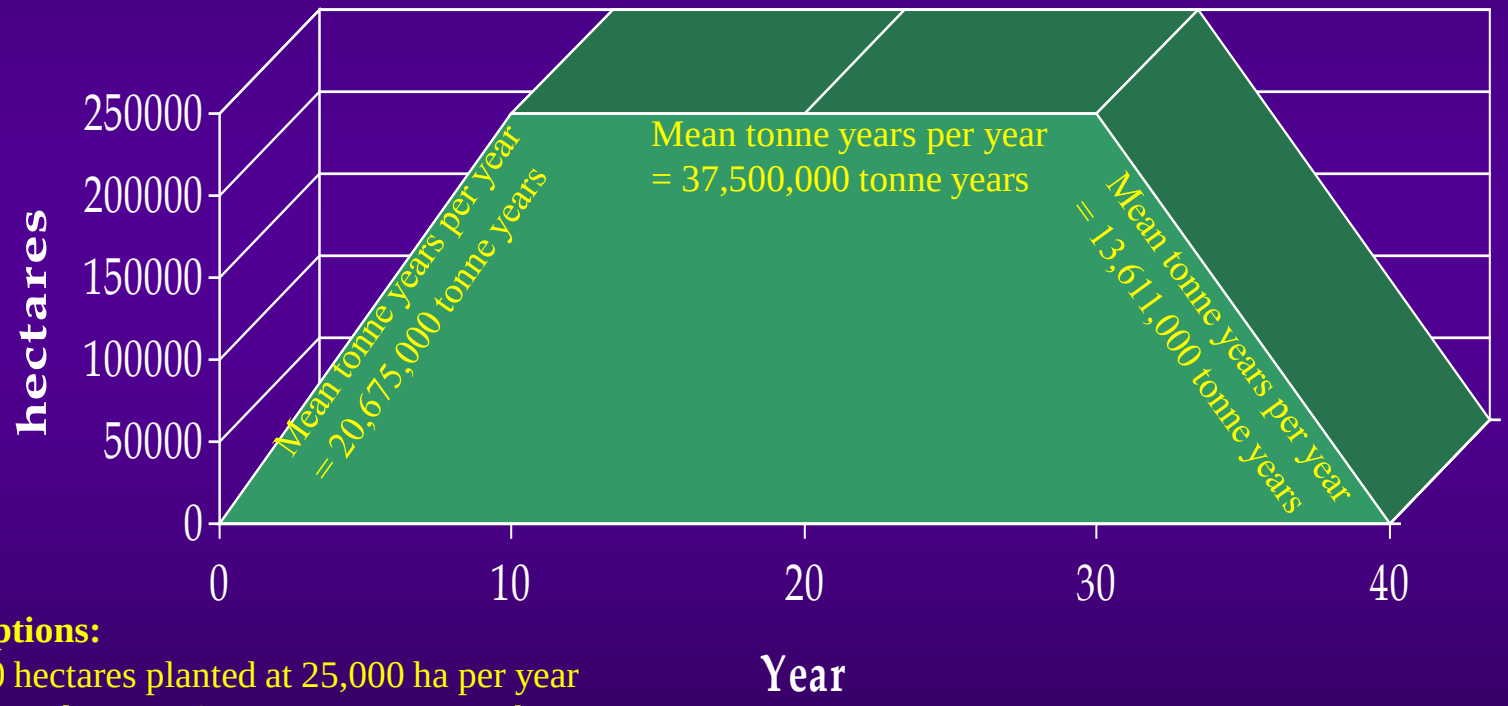
Maritime pine



Assumptions:
500,000 hectares planted at 25,000 ha per year
Carbon production 10 tonnes per year per hectare
Rotation 25 years
Assume 4 rotations
Average Carbon storage time 40 years

Mean
~ 150 million tonne years per year

Tasmanian bluegums

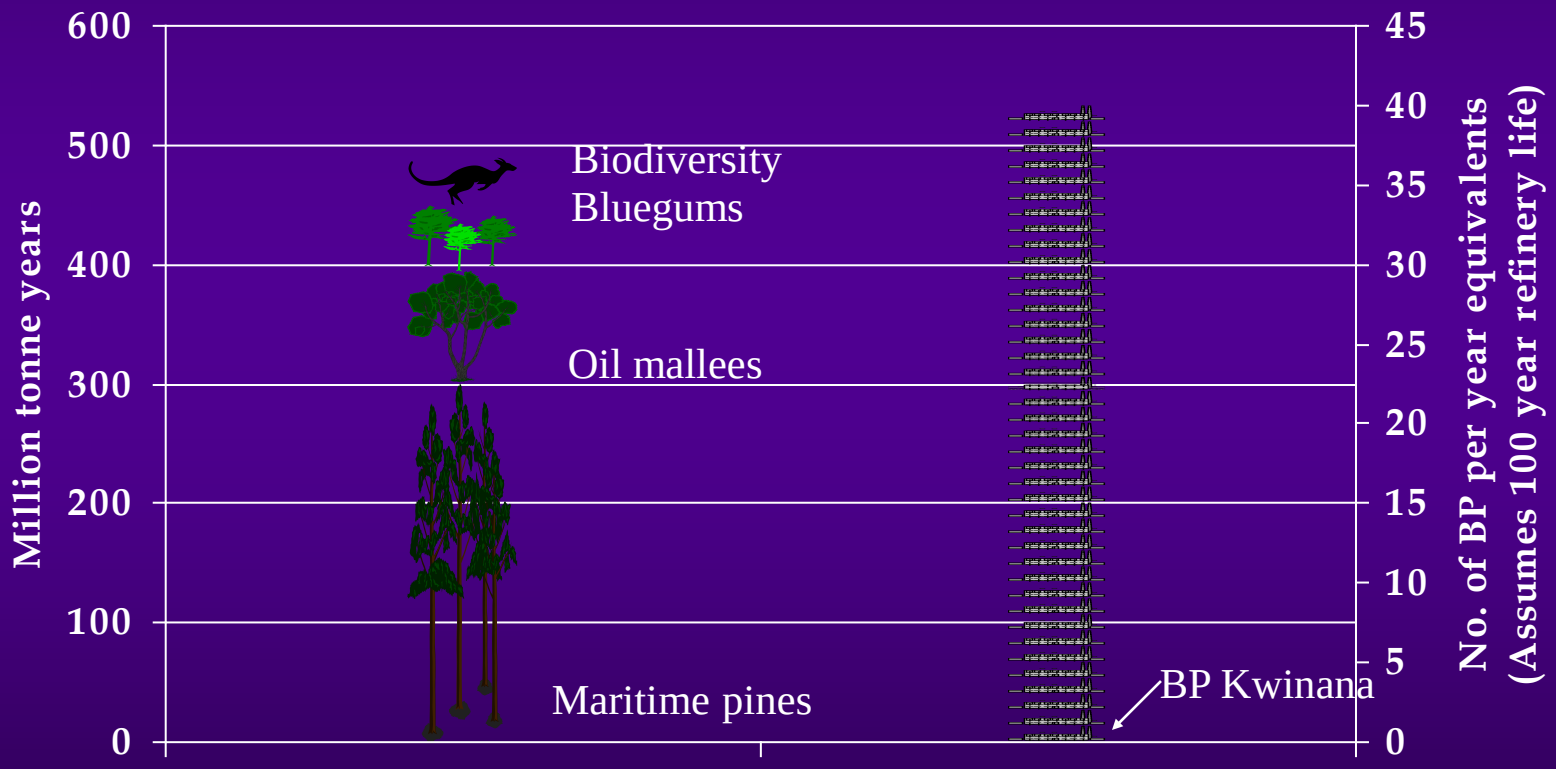


Assumptions:

250,000 hectares planted at 25,000 ha per year
Carbon production 20 tonnes per year per hectare
Rotation 10 years
Assume 3 rotations
Average Carbon storage time 7.5 years

Mean
~ 27 million tonne years per year

Optimistic scenario

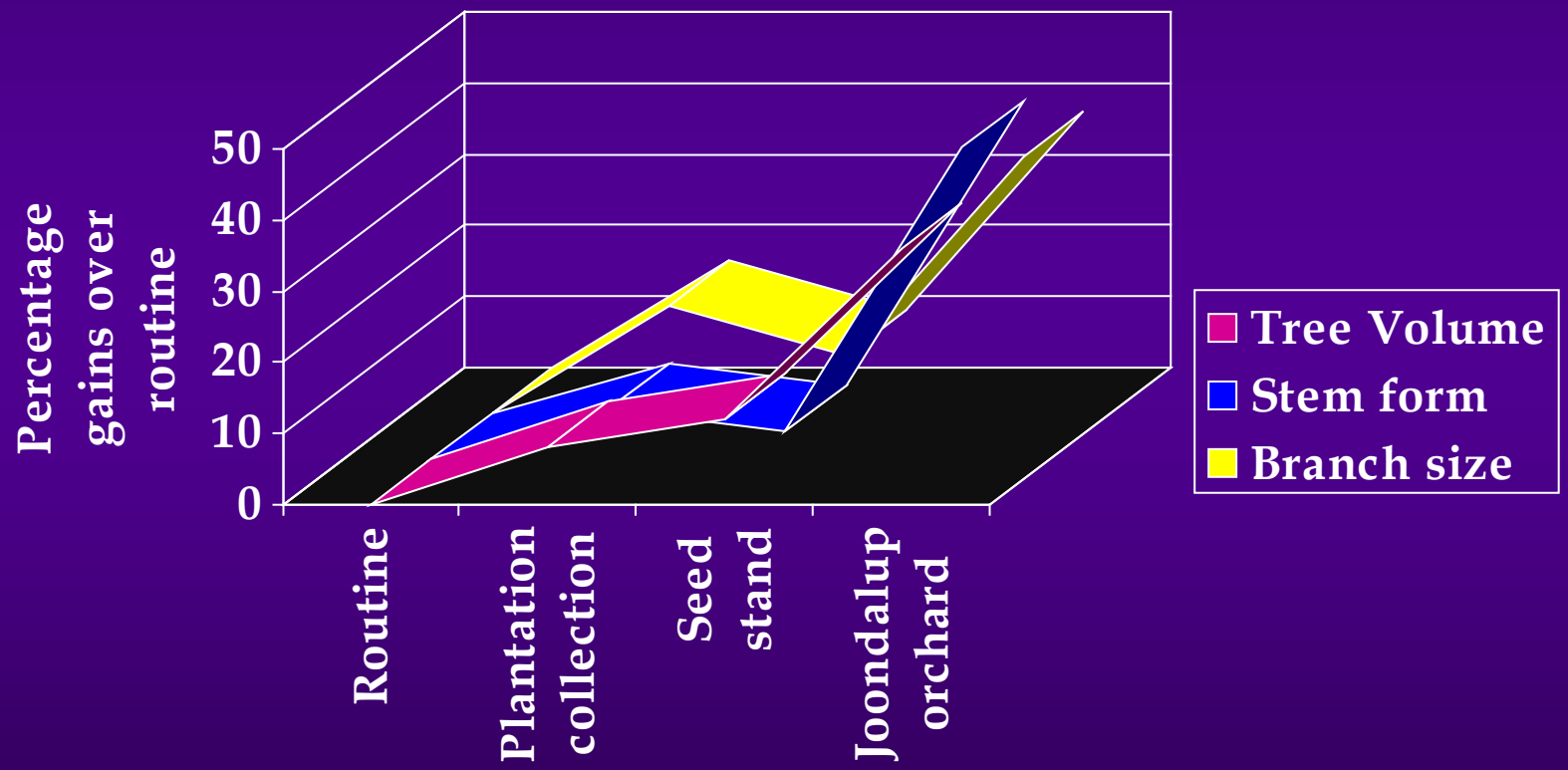


Assumptions

Half life of refinery,

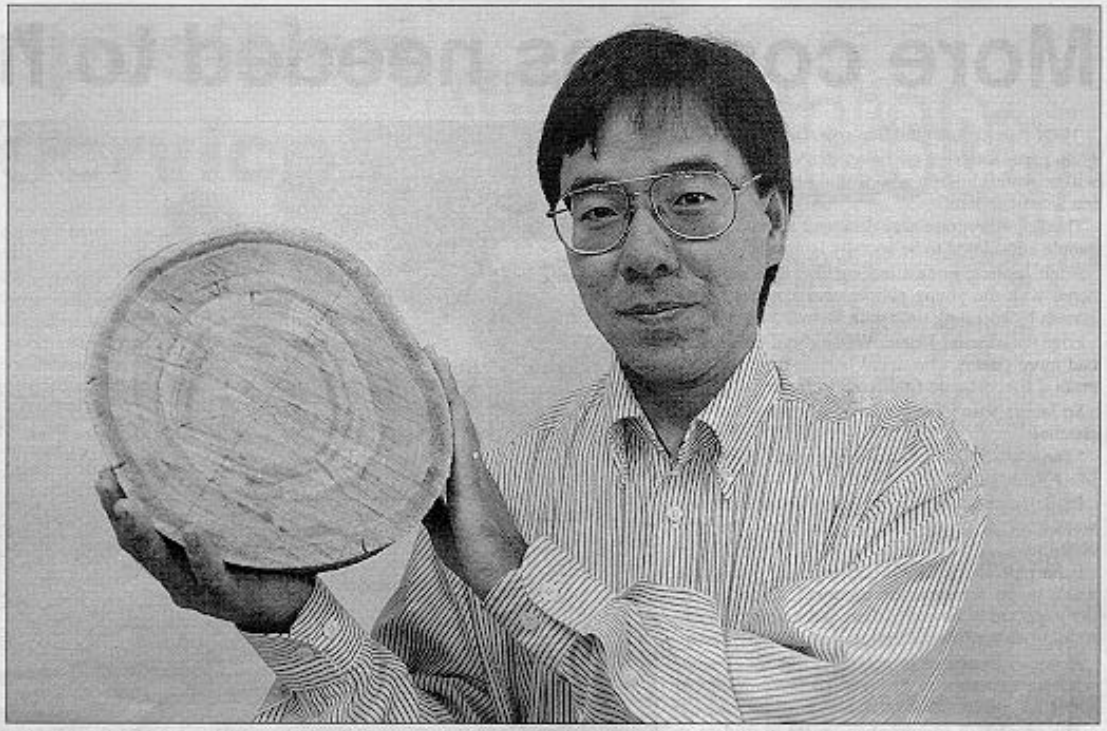
double carbon storage times for pine, bluegum and biodiversity plantings

Actual gains from Maritime pine yield trials



Security

The politics of growing tree crops for wood fibre export



WINNING WAYS: Albany Plantation Forest Company director Tom Okada plans to accept the Asia Pacific Marketing Federation's inaugural gold environmental marketing award in Bangkok later this month.

Conservation work wins praise

AN Albany company has won an international award for its services to the environment.

Albany Plantation Forest Company this week took out the Asia Pacific Marketing Federation's award inaugural gold marketing award, launched last year to encourage environmental conservation.

It was chosen from four finalists, from companies working in the 15 countries represented in the Asia Pacific Marketing Federation.

The company was formed in 1993 and plans to establish more than 20,000 hectares of bluegum plantations in the Albany region.

Working with CALM, it had already planted nearly 14 million trees locally.

Its parent companies Oij Paper and Itochu Corporation are part of a WA-Japanese joint venture (with Bunnings Forest Products) who are planning a $30 million woodchipping mill in the Great Southern. The project has been tipped to be operational by next year.

Director Tom Okada said the company was committed to preserving the global environment.

"Our project to establish commercial bluegum plantation is a long-term commitment to the environment and economy of the Albany region," he said.

"Our sophisticated sharefarming scheme, which is being carried out in partnership with the local community, has now brought APFC international recognition."

Mr Okada will accept the award, with representatives Oij Paper, Itochu Corporation and Senshukai Co Ltd, at a ceremony in Bangkok on March 26 by her Royal Highness Princess Maha Chakri Sirindhorn. It is the second environmental award won by the company. In 1995 it won the Landcare Australia award for WA business.