

Australian Government
Bureau of Rural Sciences

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Why we need a national forest monitoring system:



The case for the Continental Forest Monitoring Framework (CFMF)

NATIONAL FOREST INVENTORY
A Commonwealth, State and Territory Co-operative Program

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CONTINENTAL MONITORING FRAMEWORK


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Outline

- Some good news (and bad) on Australia's forests
- Why do we need to monitor our forests?
- What would a national forest monitoring framework look like?
- Results from a pilot project in NE Victoria
- Next steps...

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How big is Australia?



UNITED KINGDOM & IRELAND JAPAN UNITED STATES

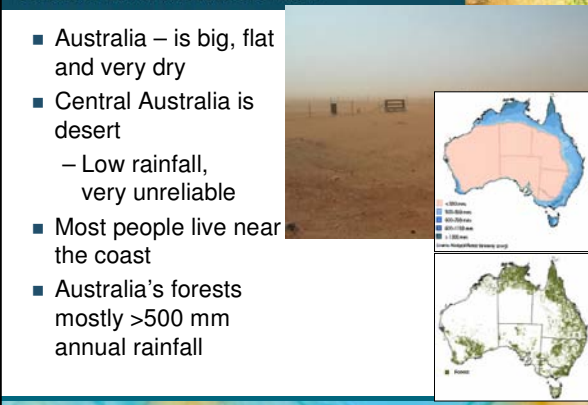
AUSTRALIA... A BIG COUNTRY!

EUROPE (Sorry Finland...)

NEW ZEALAND SOUTH EAST ASIA

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- Australia – is big, flat and very dry
- Central Australia is desert
 - Low rainfall, very unreliable
- Most people live near the coast
- Australia's forests mostly >500 mm annual rainfall



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Australia's place in the worlds forests
– *the good news: mega biodiversity, unique flora & fauna*

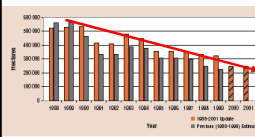
- Australia is 6th most forested country in the world (FAO)
 - 1. Russian Federation, 2. Brazil, 3. Canada, 4. U.S., 5. China, 6. Australia (4%)
- Australia has 164 million ha of forests
- Australia is one of the world's biodiversity "hotspots"
 - In the top 17 countries with at least 17,000 recognised plant spp. and >4,000 known animal species classed as forest dependent
- We have domestic and international responsibilities to monitor and manage our forests and vegetation

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The bad news: deforestation = biodiversity loss, carbon emissions, etc

- 1788 est Australia = 33% forest, now down to 21%
- Australia's annual deforestation was 250,000 ha/yr (-0.2%)
- Previously one of the highest in the world (top 10, now 15th)



The good news is.....
deforestation has halved from over 500,000 to 250,000ha/yr

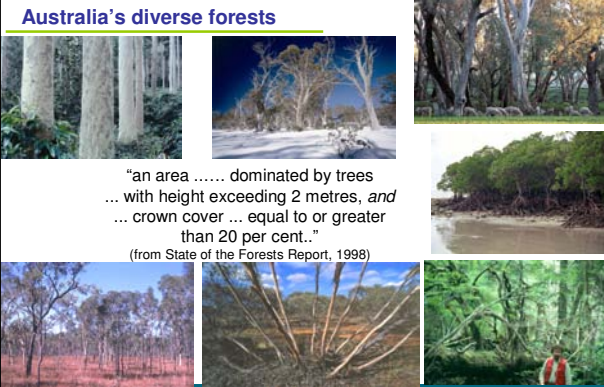
- Government policies and action to halt land clearing are working

Figure 2. Comparison of Previous (1988-1999) Land Use Change Area Est. and the 1988-2001 Revised Estimates.

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Australia's diverse forests

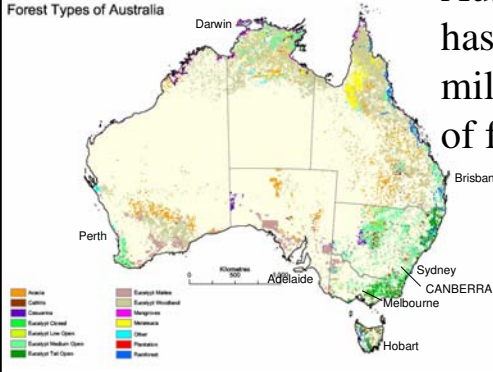


"an area dominated by trees ... with height exceeding 2 metres, and ... crown cover ... equal to or greater than 20 per cent.." (from State of the Forests Report, 1998)

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Australia's forests

Forest Types of Australia



Australia has 164 million ha of forest

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Most of Australia's forests are low, sparse and remote



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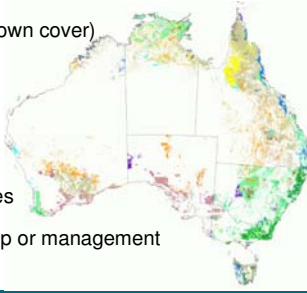
Not much is tall, dense and available for timber



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Australia's Forests – ownership / management

- 164 million ha forest
 - 99% native forest (> 2 m height and 20 % crown cover)
 - 1% plantation
 - 46 % leasehold
 - 7 % private
 - 13 % conservation reserves
 - 13 % indigenous ownership or management



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The old paradigm was fairly simple...



- Monitor and Manage productive forests

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Changing society values =>
forest and land management becomes more complex

Manage and monitor forest and Landscape ecosystems for a wide range of values

Reserved for future values

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Demand for forest information is increasing

- Inform public debate
- Inform policy development
- Inform industry development
- Evaluate management programs
- Meet national & international reporting obligations

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Australia's reporting process (Howell et al.2005)

- 2003 State of the Forest Report (SOFR)
- Based on Montreal Process Criteria and Indicators
- First time all 74 national indicators reported against
- Some trends could be established for a number of indicators based on Australia's 1998 SOFR
- Australia's Country Report to Montréal Process (World Forestry Congress Oct 2003)
- Currently reviewing our indicators

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Capacity for reporting

- Data not comprehensive for all indicators
- Of the 74 indicators in the 2003 SOFR
 - 16 indicators - Good spatial and temporal data
 - 56 indicators - Limited coverage or data from case studies
 - 2 indicators - No data

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The current framework of data collection

a "patchwork quilt"

- Compilation and mapping approach
- Data from State agencies (variety of sources and standards)
 - State and Territory inventories
 - remote sensing
 - Air Photo Interpretation (API), satellites, laser altimetry (Lidar), high resolution video
- Data from private plantation growers
- Translated to national classifications
- OK for snapshots, BUT...
- Varying sources and methods = inconsistent
- Different scales and quality of data
- Collected at different times

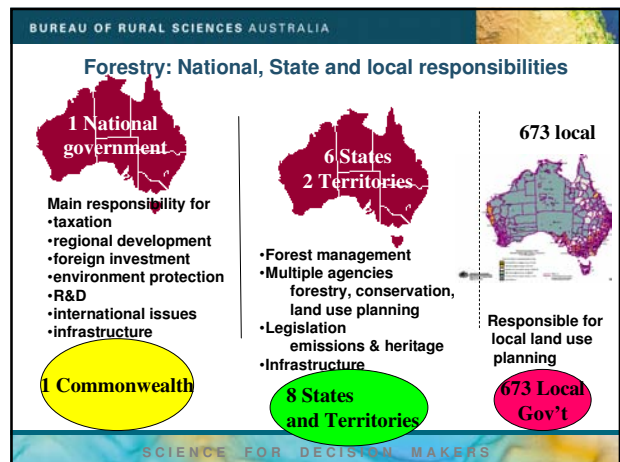
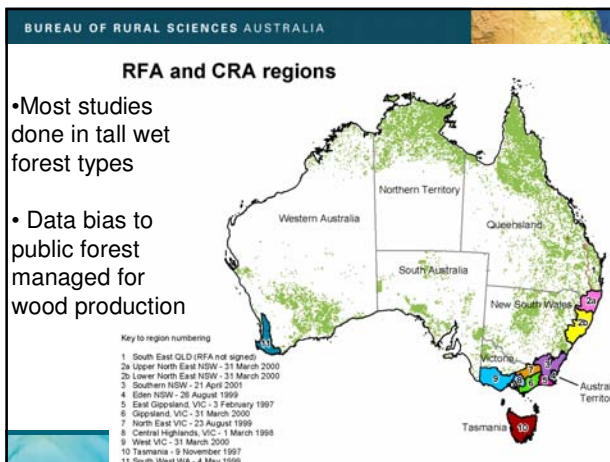
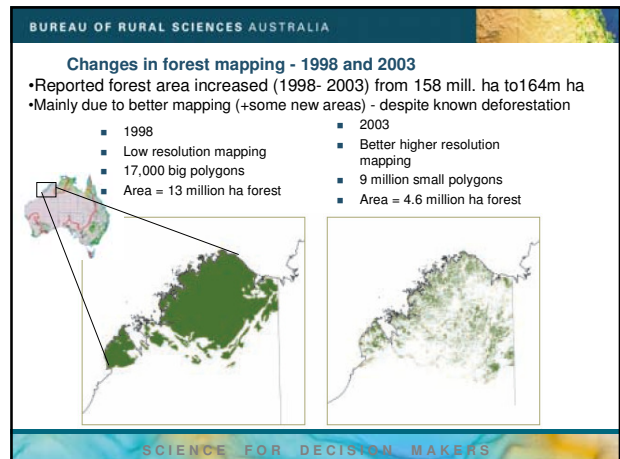
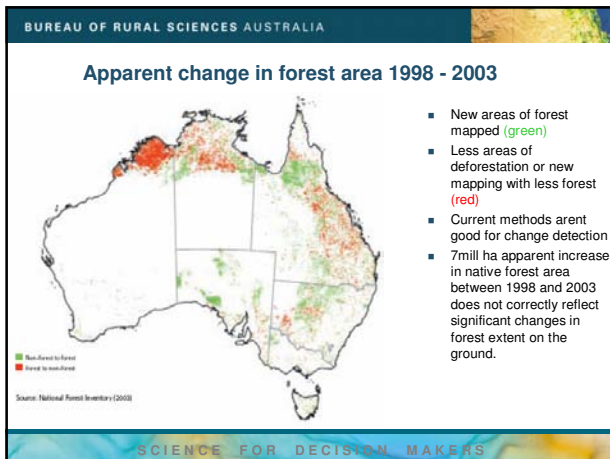
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Varying scale of data collection

Source: National Forest Inventory (2003)

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A partnership approach

- No one agency can do it all
 - we need a framework where partners can contribute and share data, knowledge and expertise
 - “add value” and share cost
- Efficiencies - from utilizing existing data
- Many agencies have similar information requirements
 - core set of data
 - additional specific needs can be done by top up

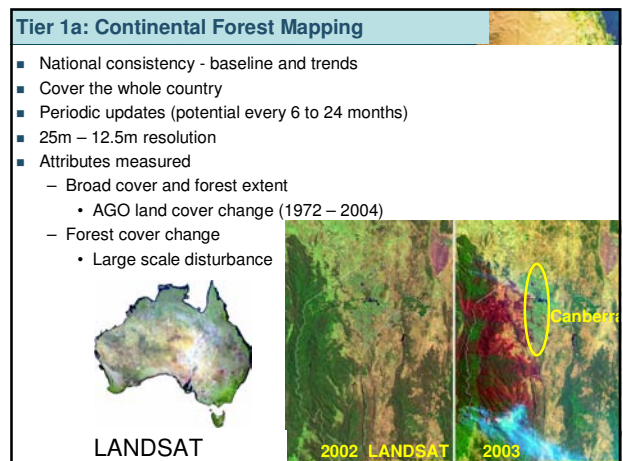
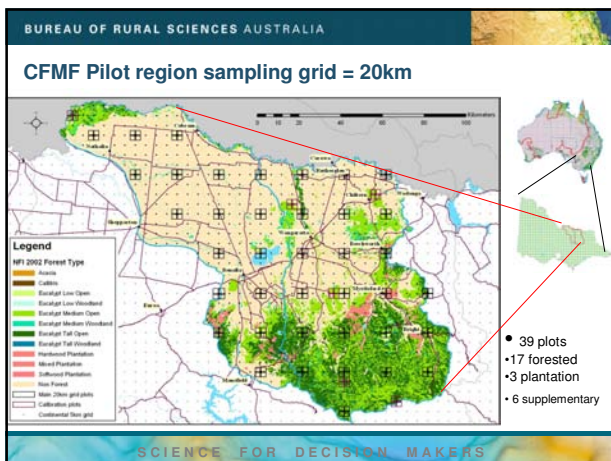
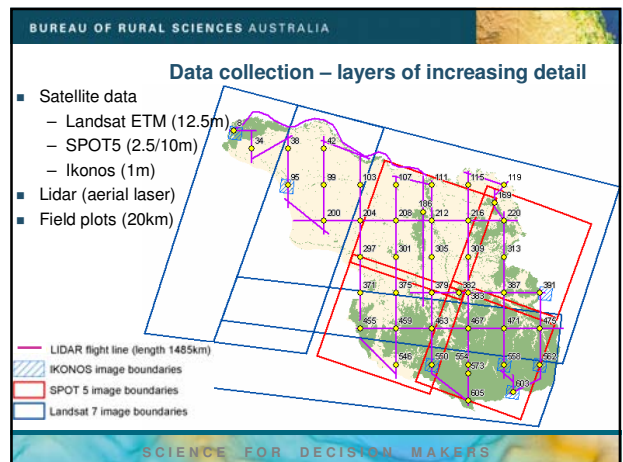
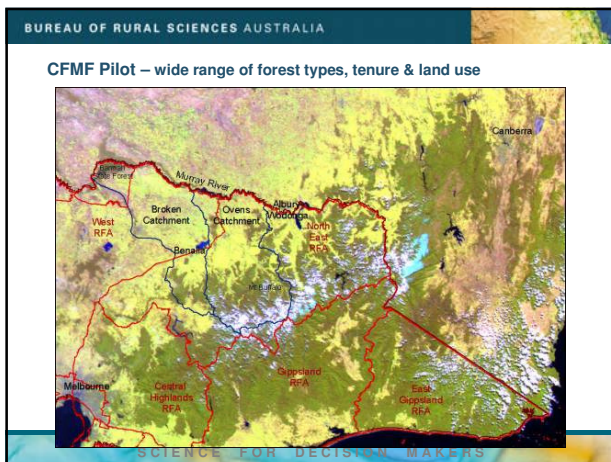
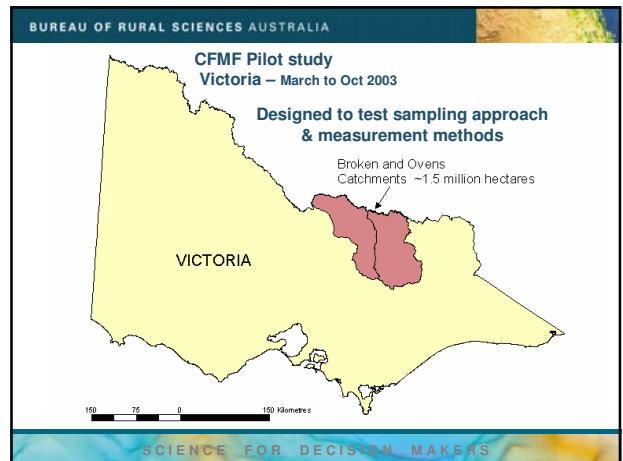
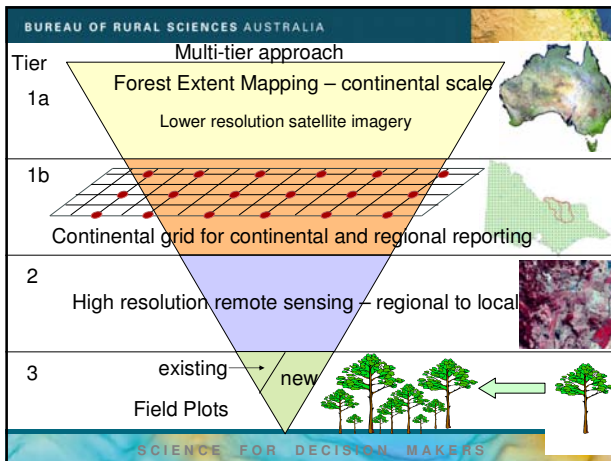
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The proposed Continental Forest Monitoring Framework (CFMF)


- National consistency through permanent plots
- A grid framework for future partners to use
- Core set of scientifically reliable data
 - on **baseline and trends** in **forest extent and condition**
 - from repeated, consistent measures
- Accurate change estimates at 5 year intervals
- 3 Tier structure integrates field data and remote sensing technologies to build on relative strengths of each data source

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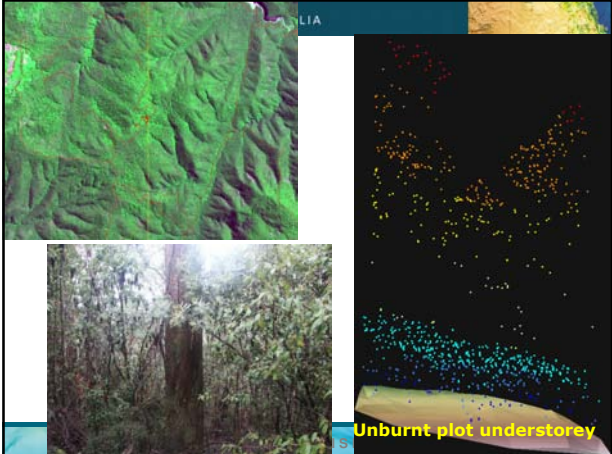
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Tier 2: Hi-res plot



- 5 km by 5 km image plots
- 1m – 10m resolution data
- SPOT 5, lidar, air photos & Ikonos
- Repeat all samples every 5 years
- Archived library
- Attributes measured
 - Forest extent
 - Forest type, cover, height
 - Land use and change
 - Forest health and disturbance
 - Extent and condition rare forest types and linear features (eg riparian vegetation)

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Unburnt plot understorey

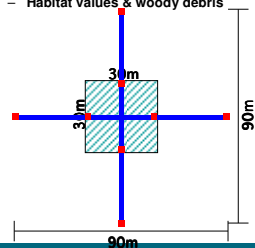
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Tier 3: Ground plots



- Nested units
 - Species, height, cover, growth stage by strata (upper, mid, lower)
 - Tree map
 - Site, disturbance, health
 - Habitat values & woody debris



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How many plots required?

State	Land use Zone	MUF	OCL	lease	NCR	Private	Unresolved	Forest total	Non forest	Total	Total per State
Old	ILZ	78	13	494	80	227	19	911	1,027	1,938	2,309
	ELZ	-	1	66	6	3	-	76	295	371	
NSW	ILZ	70	24	230	115	205	12	659	1,193	1,849	1,874
	ELZ	-	-	-	-	-	-	-	25	25	
NT	ILZ	-	21	176	-	150	1	348	238	586	1,037
	ELZ	-	-	34	-	42	-	76	375	451	
WA	ILZ	40	51	53	50	21	-	215	996	1,211	2,023
	ELZ	1	30	19	13	3	-	66	746	812	
Vic	ILZ	79	6	6	88	34	-	213	358	571	571
	ELZ	-	-	-	-	-	-	-	-	-	
SA	ILZ	-	12	70	72	22	4	180	753	933	1,166
	ELZ	-	-	10	5	-	3	18	215	233	
Tas	ILZ	33	2	-	15	21	-	71	64	135	141
	ELZ	-	-	-	2	-	-	2	4	6	
ACT	ILZ	-	-	-	-	-	-	-	-	-	Included with NSW
	ELZ	-	-	-	-	-	-	-	-	-	
Total		301	160	1,158	446	728	39	2,832	6,289	9,121	9,121

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Conclusions from NE Victorian CFMF pilot

- CFMF multi-tier design is robust
 - maximises advantages of varying technologies
 - provides high accuracy but at high cost
 - Cost estimated \$14m over first 5 years, then \$2m/yr ongoing
- Assess modifying original design
 - reduce costs – investigate modelling and better use of existing data
 - field plots size
 - Tier 2 (detailed remote sensing) needs further testing
- LiDAR (aerial laser)
 - accurate measurements but difficult & costly
- Investigate whether CFMF has broader application across the landscape to incl. other vegetation ecosystems

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Forest Monitoring Workshop Nov 2005

- Reviewed current work being undertaken nationally on monitoring trends in forest extent and condition
 - particularly using remote sensing and links to field plots;
- Presented design and results from the pilot implementation of the Continental Forest Monitoring Framework (CFMF);
- Recommended **expanding** the CFMF and incorporating the **best current techniques** into a Continental Forest and **Vegetation Monitoring Framework**.
- Considered options for the **next steps** in developing and implementing an agreed integrated continental monitoring framework.

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Should we expand the CFMF into a Continental Forest and Vegetation Monitoring Framework?

- Similarity of issues across other themes outside forests
 - vegetation, fauna, soils, land use etc...
- No one agency can do it all ...
- Build linkages between the CFMF and other systems
 - ability to incorporate existing data
 - opportunities for partnerships and sharing data
 - efficiencies in sharing knowledge and expertise

Conclusions

We need a forest and vegetation monitoring system that:

- Provides national, consistent forest monitoring framework
- Provides more efficient and accurate ways to analyse and report domestically and internationally on all of Australia's vegetation
- Strengthens the capacity of agencies to manage and conserve these resources
- Is built on partnerships with a wide range of forest owners and managers
- Improves information for decision-making by all land managers and other stakeholders

Next steps...

Develop options for design & implement an agreed integrated continental forest and vegetation monitoring framework

- Build support for forest and vegetation monitoring
- Get expressions of interest in future work to develop a system – drawing on best methods
- Possibly working group to refine design?
- Build on, link to, and feed into:
 - Montreal Criteria and Indicator reporting for 2008 SOFR
 - FAO-FRA2010, esp. if remote sensing done
 - Other processes eg. Global Earth Observation (GEO)
- Presentation to key stakeholders, policy and decision-makers and funding agencies

Improving information on Australia's forests

- Australia's State of the Forests Report (400 pages)
- Forests at a glance (pocket size)
- Plantation spatial report (5 yearly)
- Annual Plantation statistics
- Increasing internet delivery
 - for more go to:
 - www.brs.gov.au/plantations
 - www.daff.gov.au/nfi

