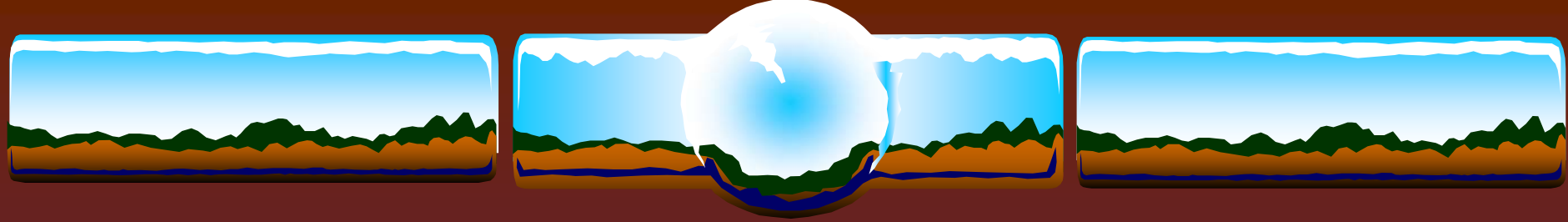

Global Forest Plantations Assessment: Contributions to Sustainable Wood Supply and Resource Conservation

Fred Cubbage[1] and Jacek Siry[2]

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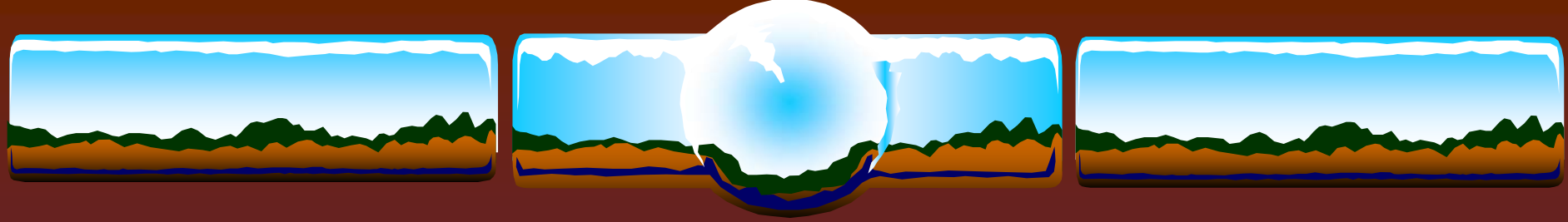
Speech Presented at the
2006 IUFRO Forest Plantations Meeting
October 10-13, 2006, Charleston, South Carolina, USA

Outline

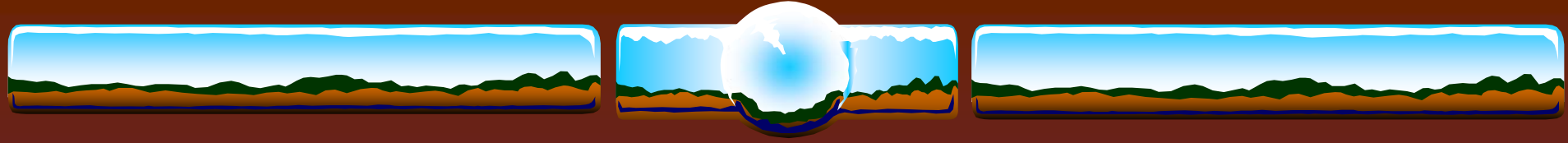
- World and southern U.S. forests and plantations
- Southern forest types, areas, and removals
- Global removals
- Plantations, the environment, and issues
- Forest certification
- Conclusions

Forest Plantations and Sustainable Forest Management

- Important industrial round wood source
- Represents ~ ¼ of industrial round wood supply
- Allows us to produce more wood on less area
- High rates of growth
- Opportunity to conserve the natural forests
- Issues
  - Require knowledge and large investment
  - Environmental conversion of natural forests, less benefits
  - Local communities
  - Opposition to GMOs



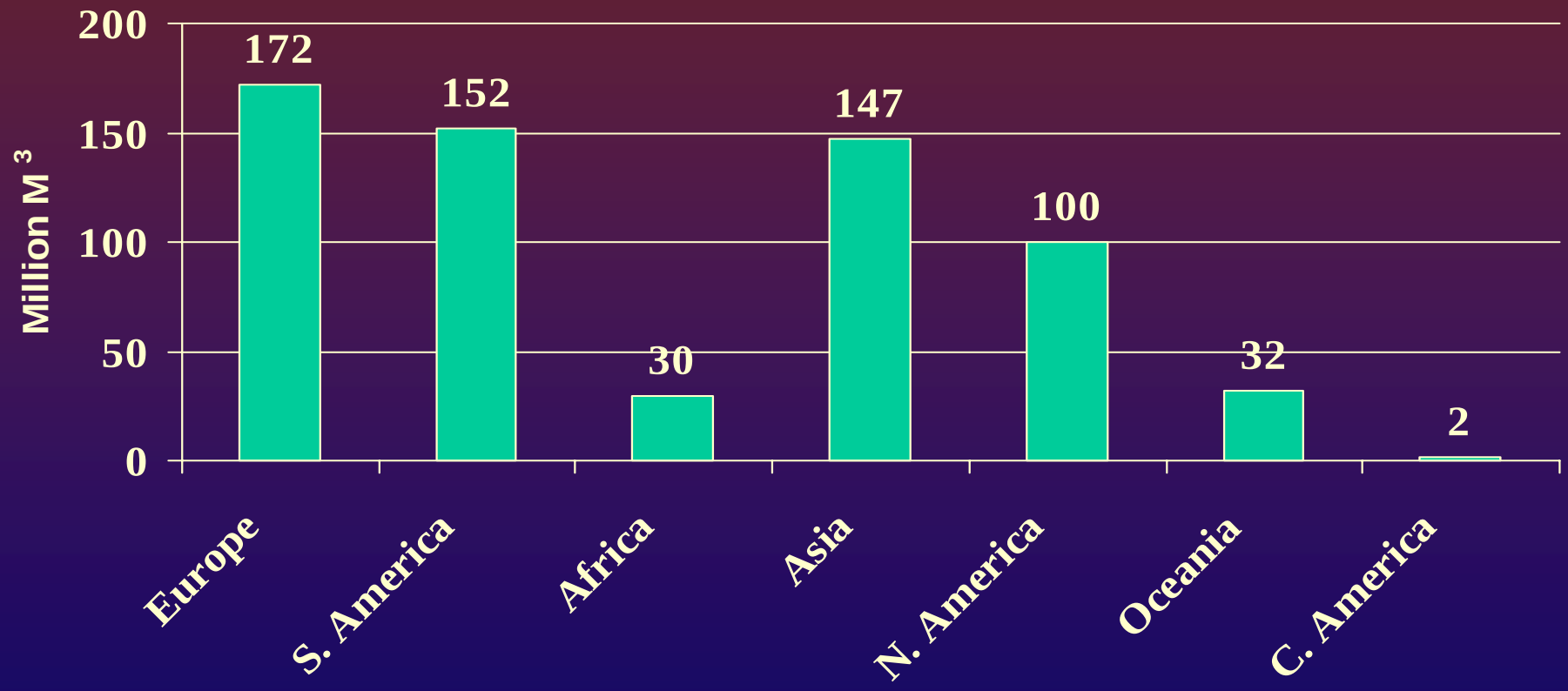
Global Industrial Roundwood Removals from Plantations



Global Forest Trends

- Forest decline continues
  - 10-16 million ha lost annually
  - Deforestation and timber harvest
- Increasing wood demand
  - Increased populations & incomes
  - Higher GDP, higher consumption
- Solutions to prevent deforestation & secure continued wood supply
  - Demand
  - Supply
    - Natural stands
    - Tree plantations

Industrial Roundwood Harvest from Plantations



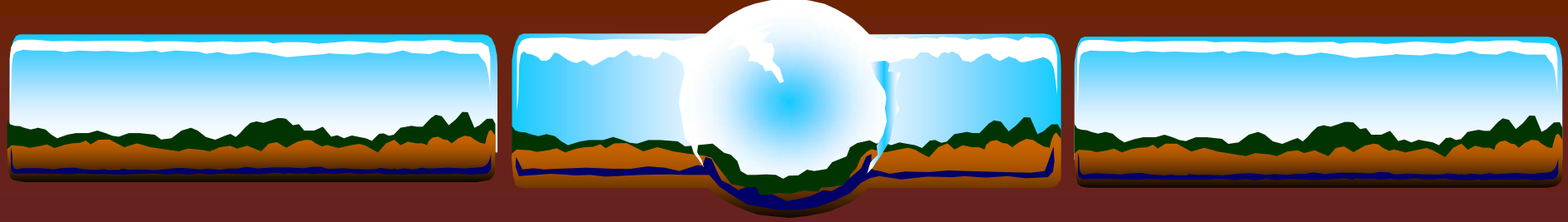
FAO 2006; country reports; authors, Brown (1999); DANA; SOUTHEM

Current Industrial Roundwood Harvest from Plantations

- 635 million cubic meters
  - 40% of global industrial wood supply as of 2005
- Fast grown plantations dominate production in Brazil, Chile, Australia and New Zealand
- Brown (1999)
  - 25% of global industrial roundwood production
- Jaakko Poyry (1999)
  - 35% of global industrial roundwood production

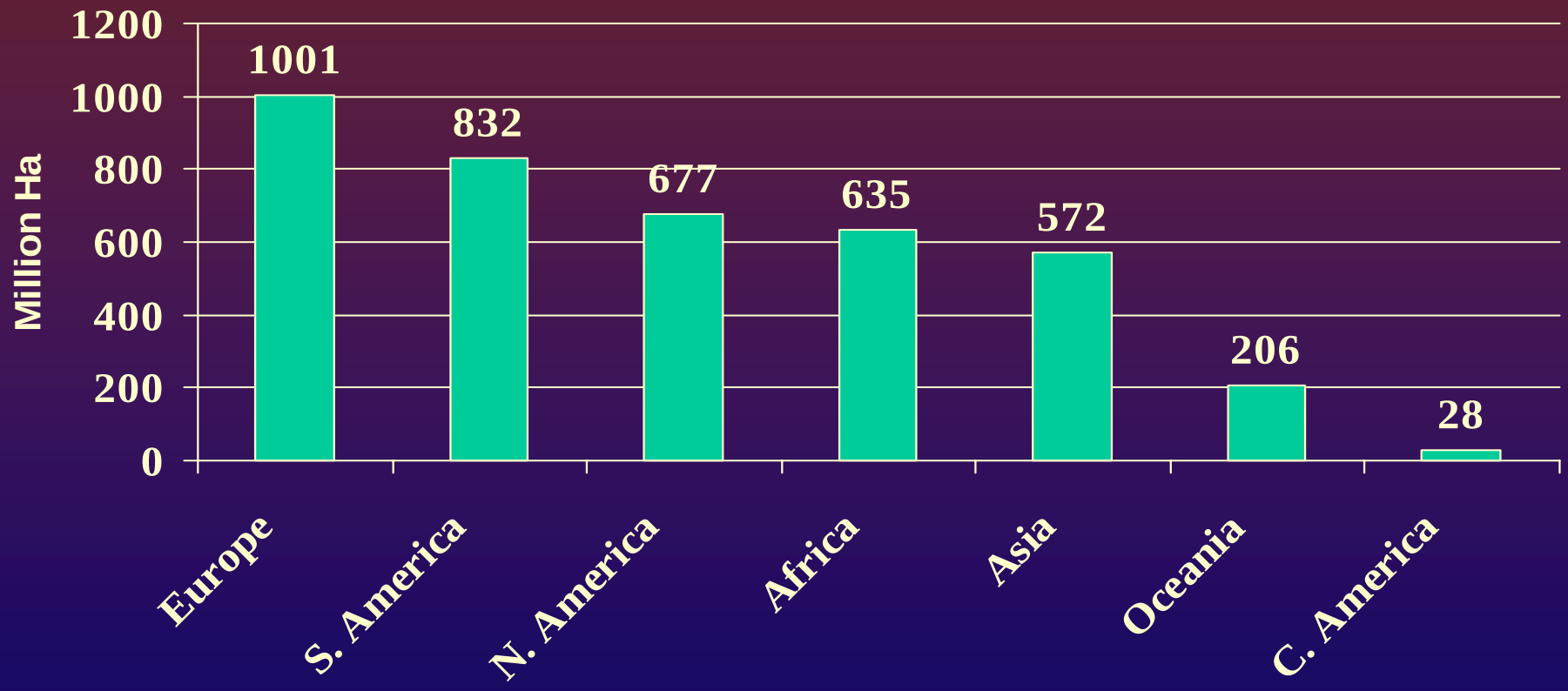
Factors Affecting Plantation Development

- Government involvement & subsidies
- Changing & emerging markets
- Globalization of forest industries
- Land availability (agricultural land for planting)
- Technological advancements
- Environmental issues
  - Sustainability (broadly defined)
  - Certification
  - Carbon sequestration
  - Other



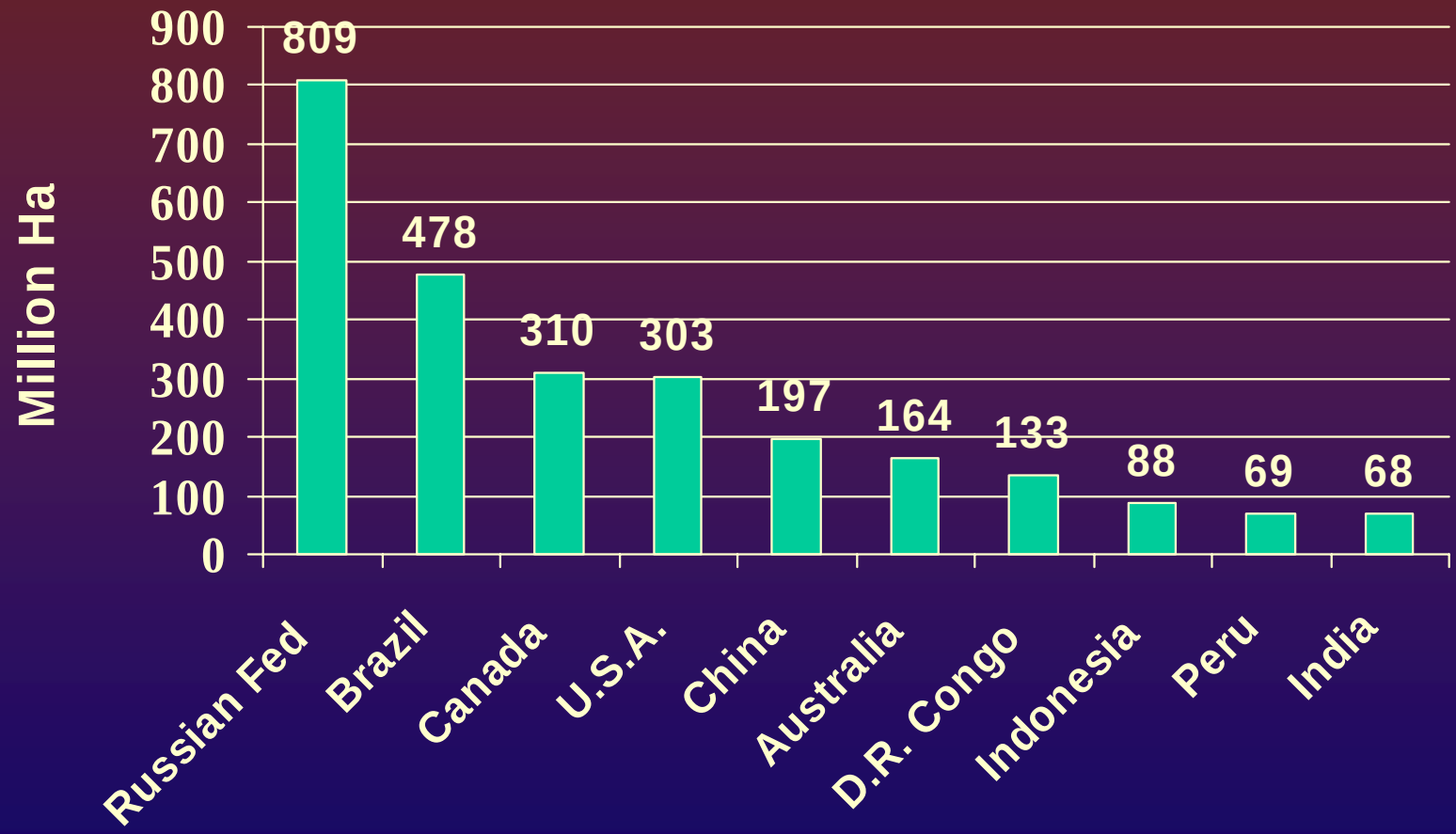
World, U.S.A., and U.S. South
Forests and Plantations

Total World Forest Area By Region, 2005



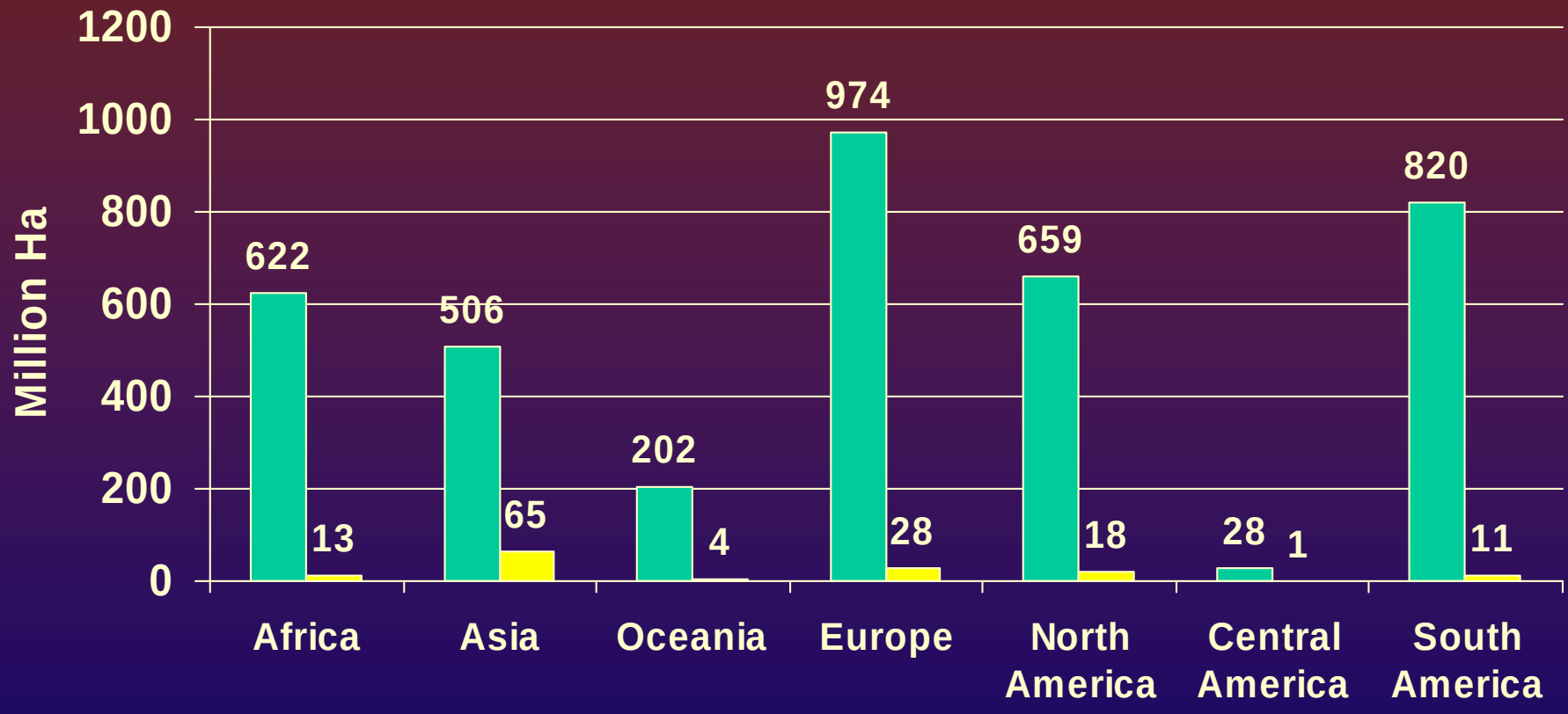
FAO 2005; 3.952 billion ha total

Total Forest Area For Major Countries, 2005



FAO 2005

Area of Natural and Planted Forests by Region, 2005

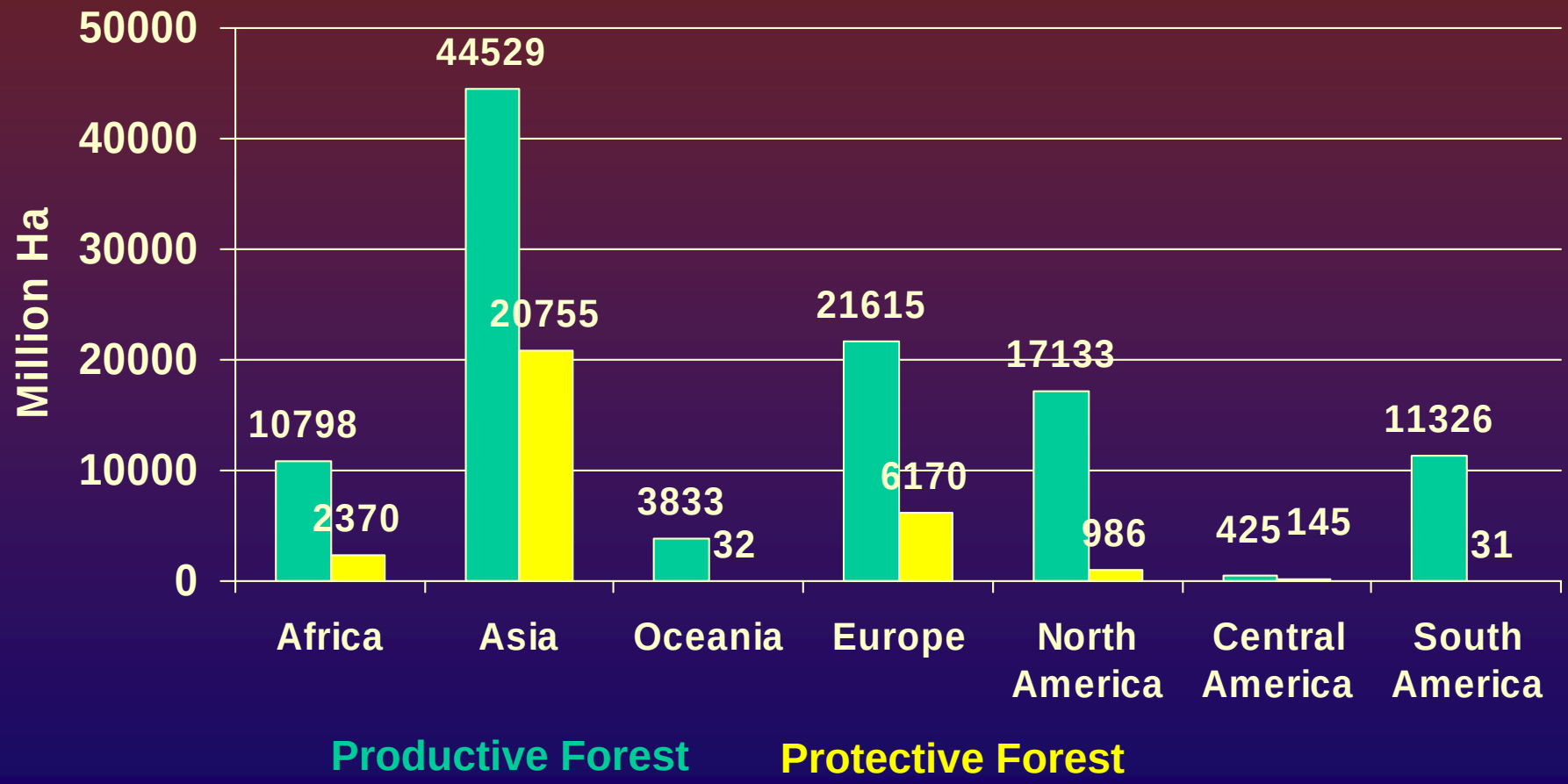


Natural Forest
3.812 billion ha

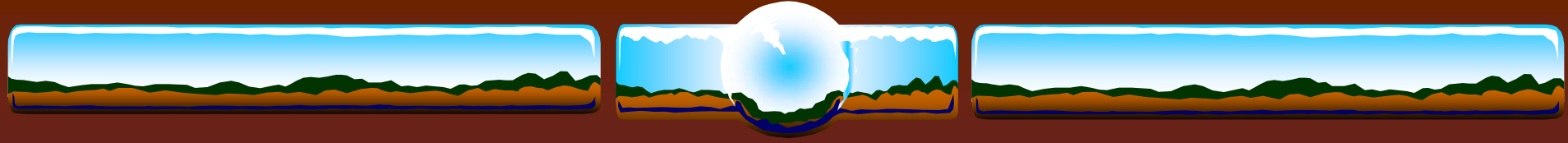
Planted Forest
140 million ha; 3.5% of world forests

FAO 2005

Area of Planted Forests by Function, 2005



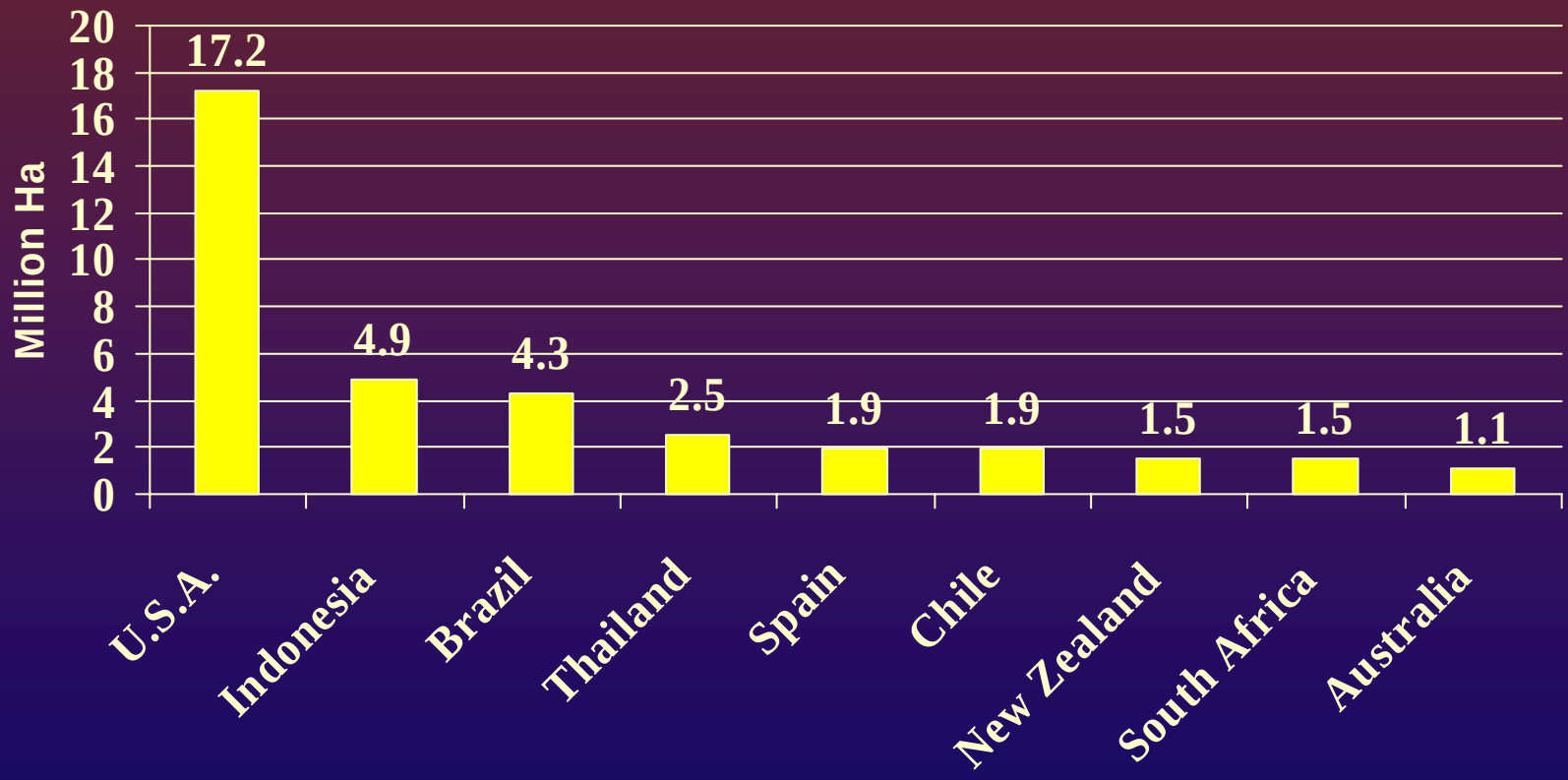
FAO 2005; 109,659 ha productive; 30,489 ha protective; 140,148 ha total



Fast-Grown Industrial Plantations

- Our criteria
  - Industrial plantations growth rates of greater than 5 m^3/ha/yr
  - Rotations of less than 30 years
  - Greater than the 1 to 4 m^3/ha/yr that is typical of most unmanaged natural stands
- Data
  - FAO 2003 plantation data as base
  - 0% of the FAO data for Canada, N. Europe, 50% of Asia, 75% of Latin America as fast-grown
  - 100% in cases where reported – EFI, FAO, consulting reports
- Result: 72 million ha, or 1.8% of the world's forests

Area of Fast Growth Industrial Plantations in Selected Countries, ~2000

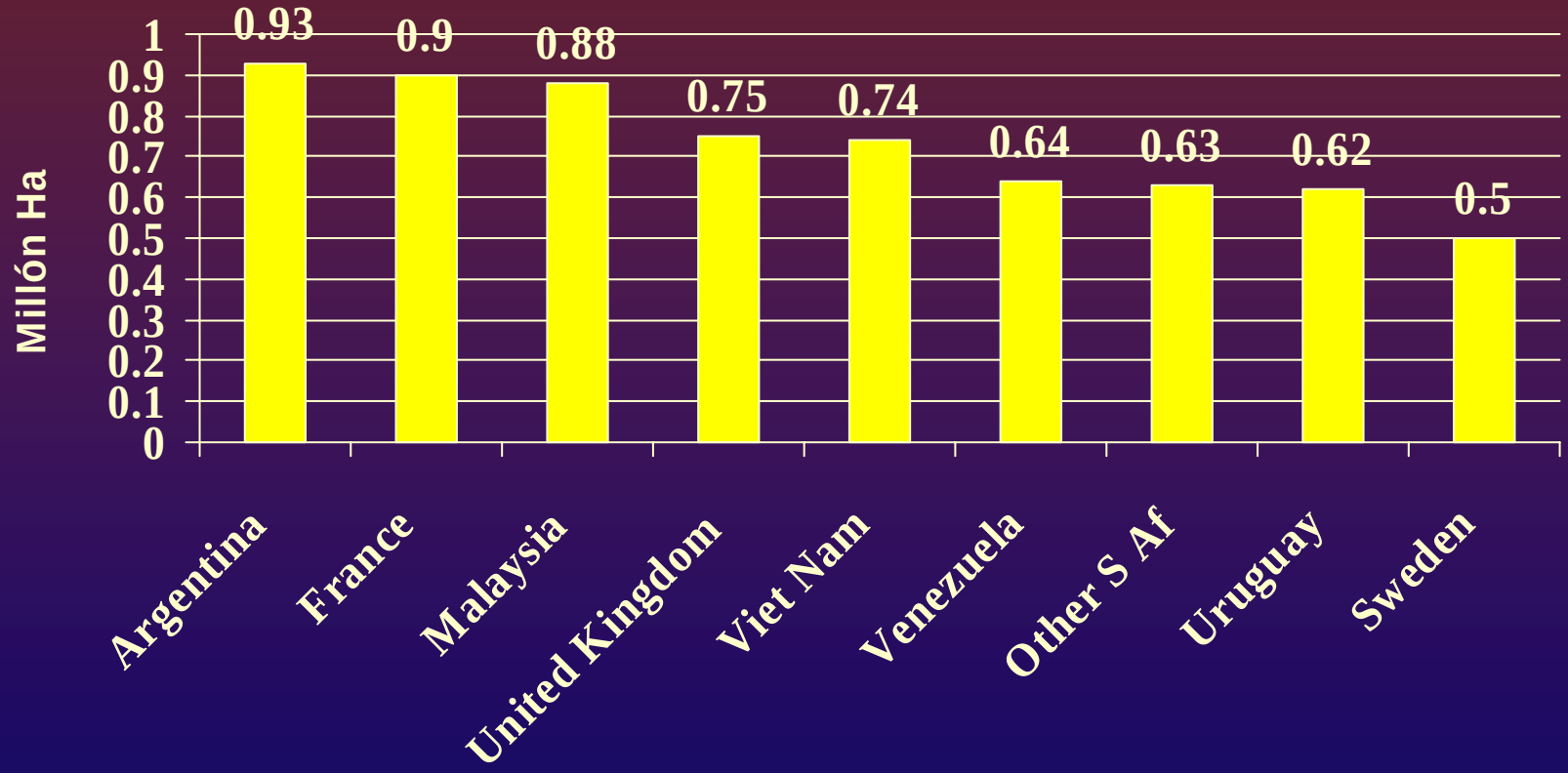


FAO 2003, Siry et al. 2005

Fast > 5 m^3 / ha / yr

Note: excludes China and India d.t. poor data reliability

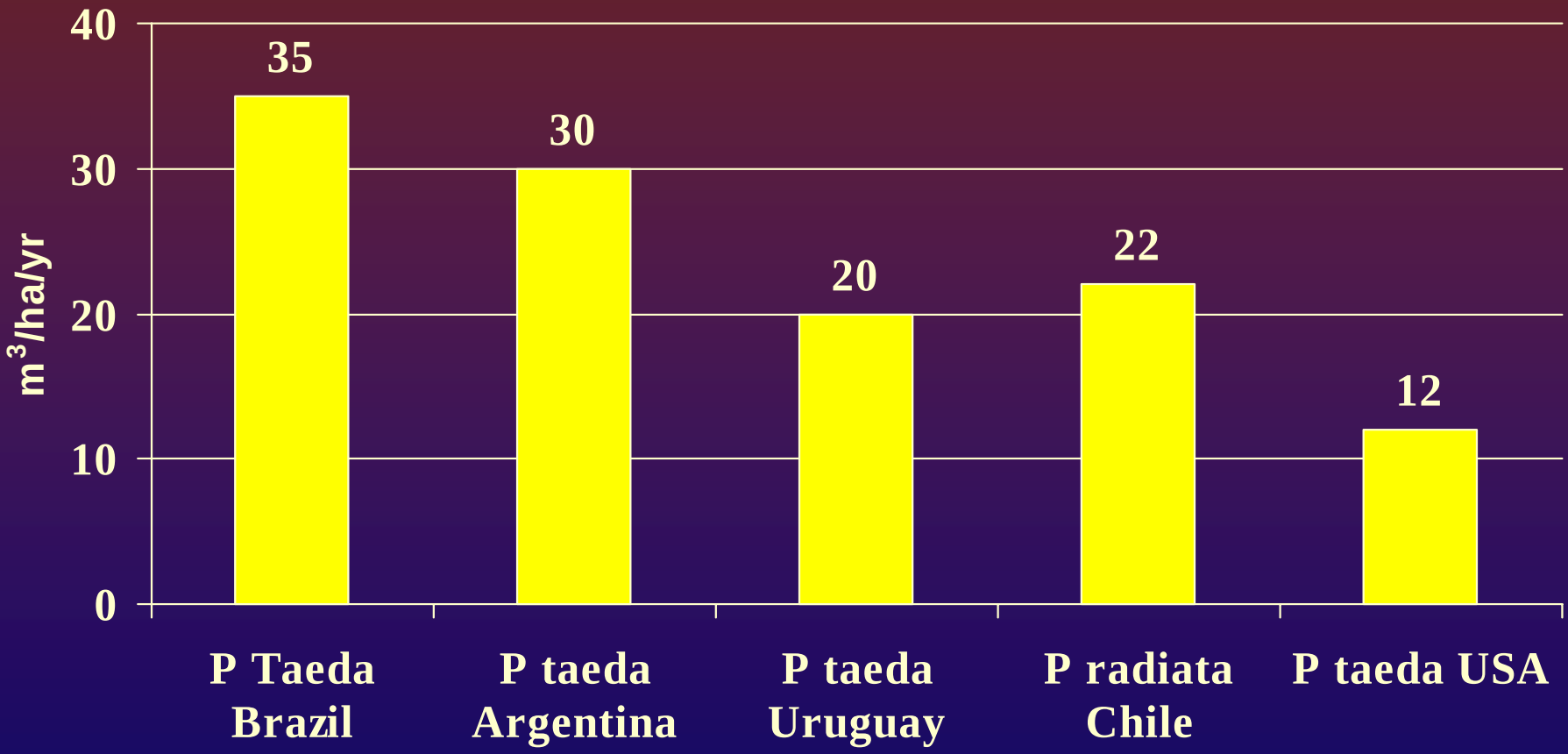
Area of Fast Growth Industrial Plantations in Selected Countries, ~2000



FAO 2003, Siry et al. 2005

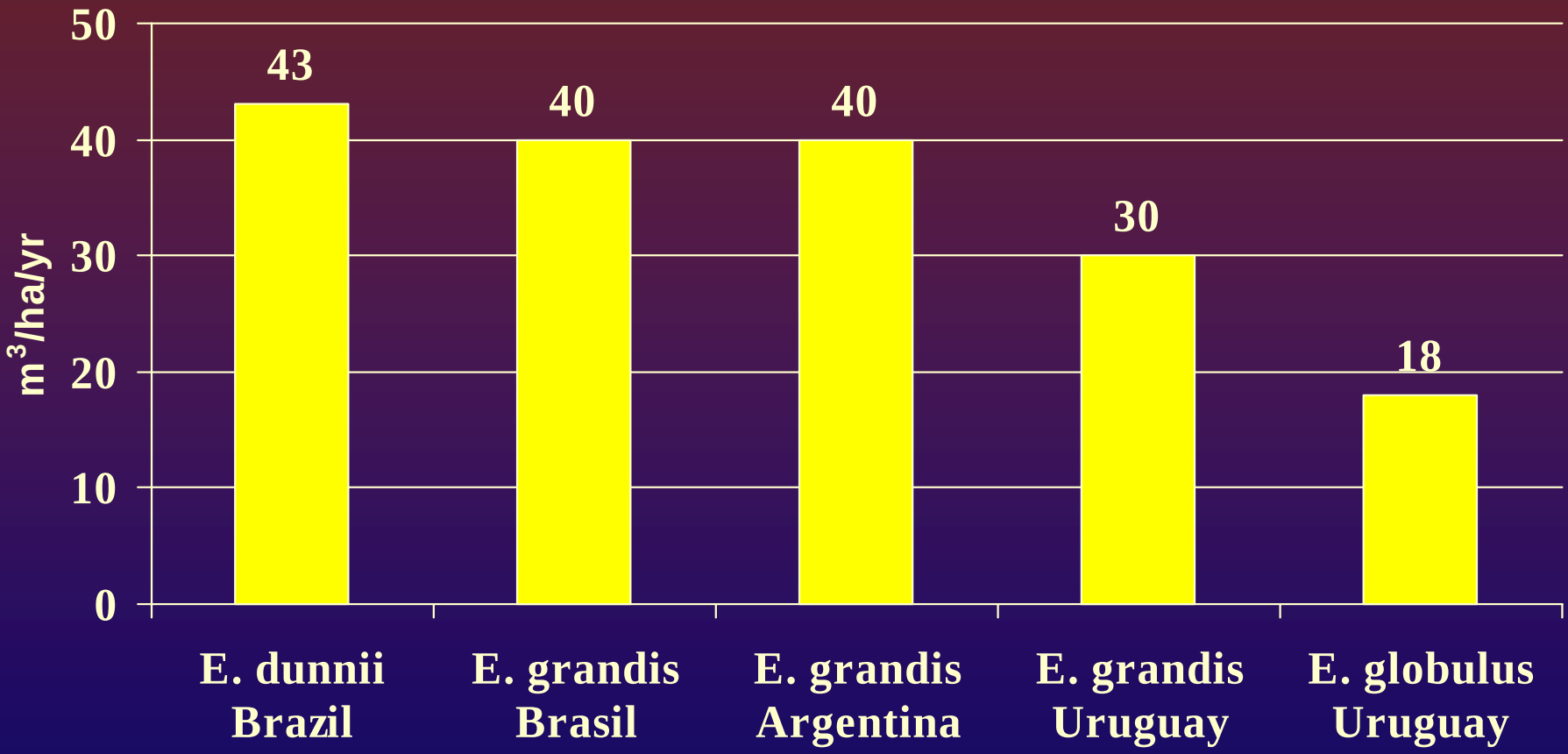
Fast > 5 m^3 / ha / yr

Productivity of Plantations
Pine



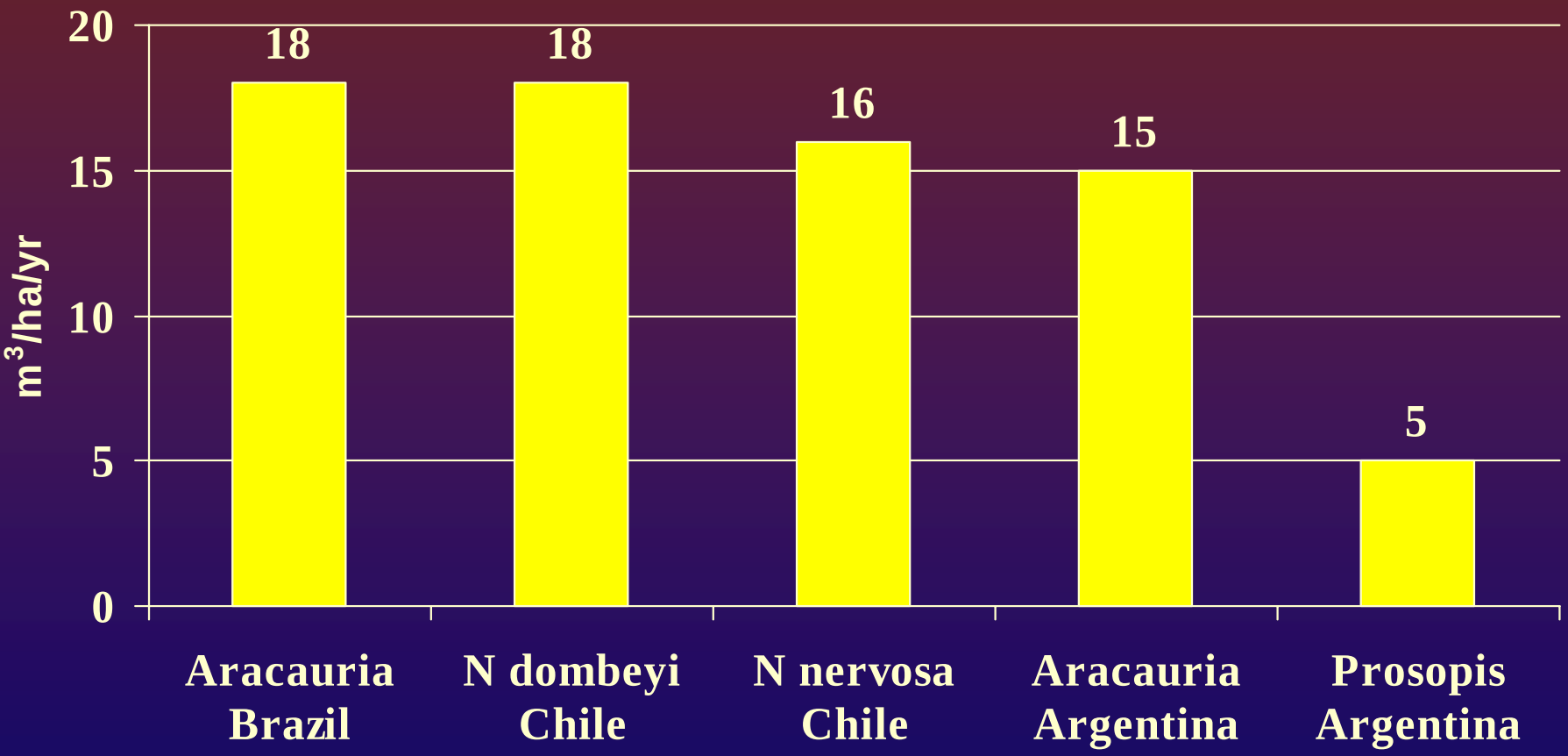
Cubbage et al., 2006

Productivity of Plantations
Eucalyptus



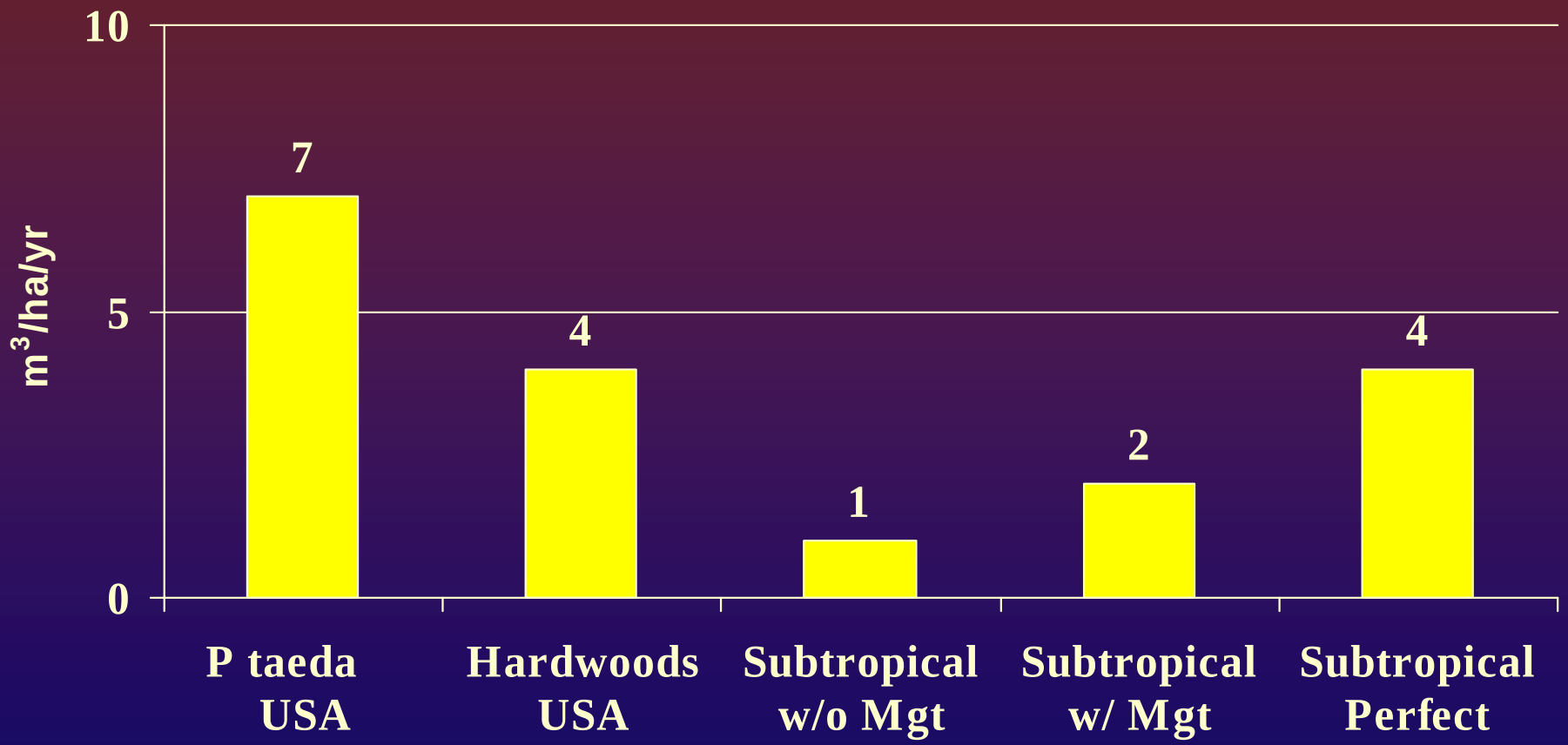
Cubbage et al. 2006

Productivity of Native Plantations



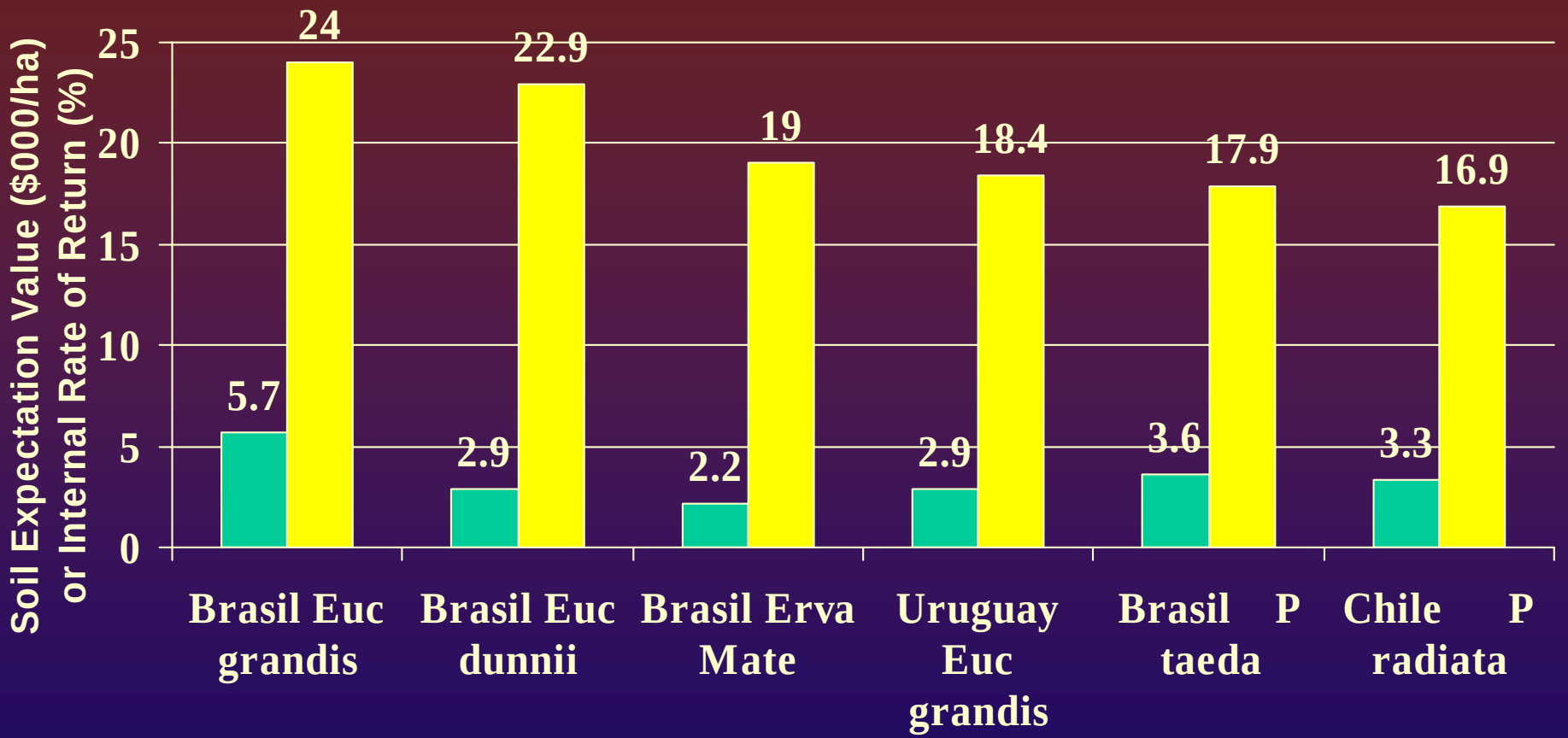
Cubbage et al. 2006

Productivity of Native Forests



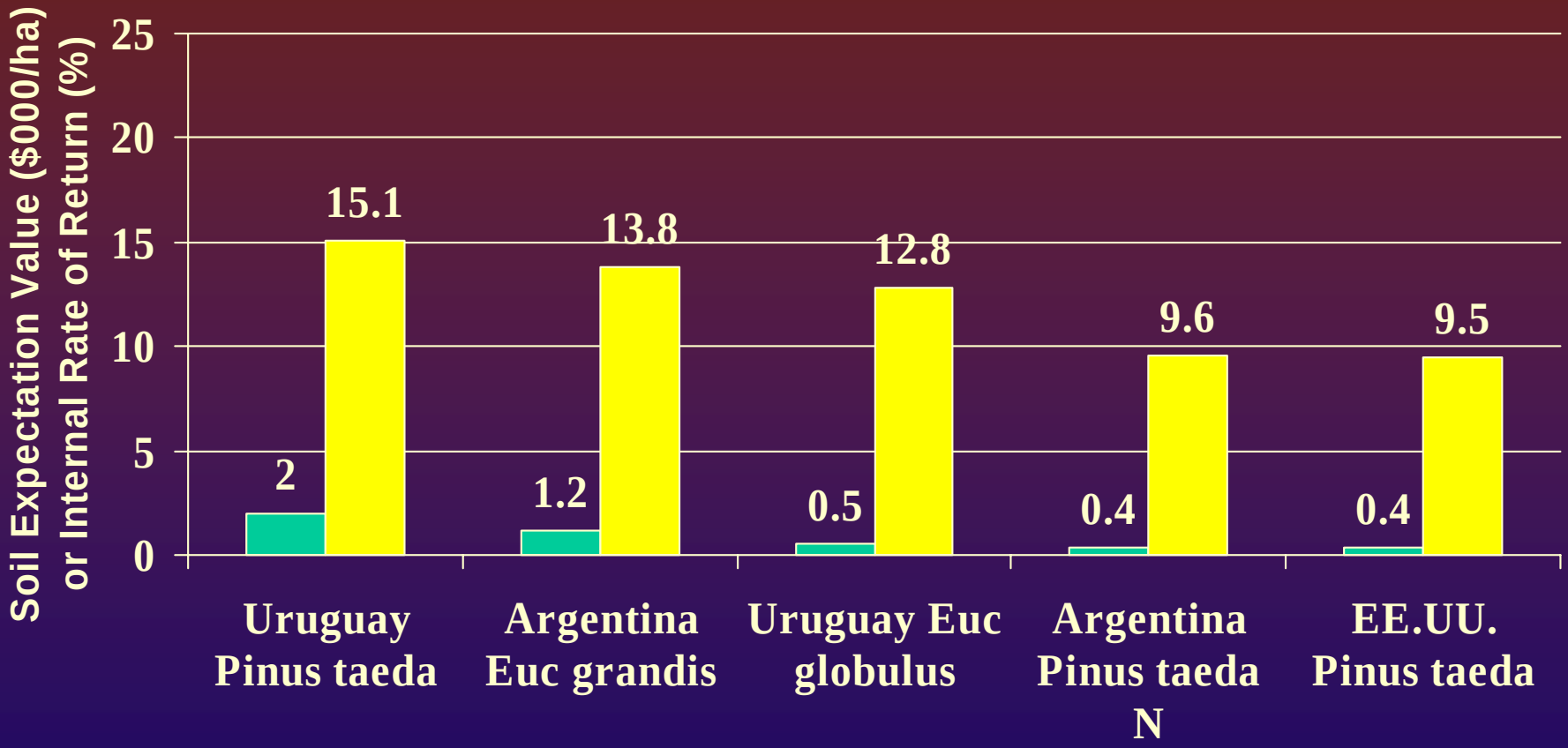
Cubbage et al. 2006

Returns of Plantations, 2005



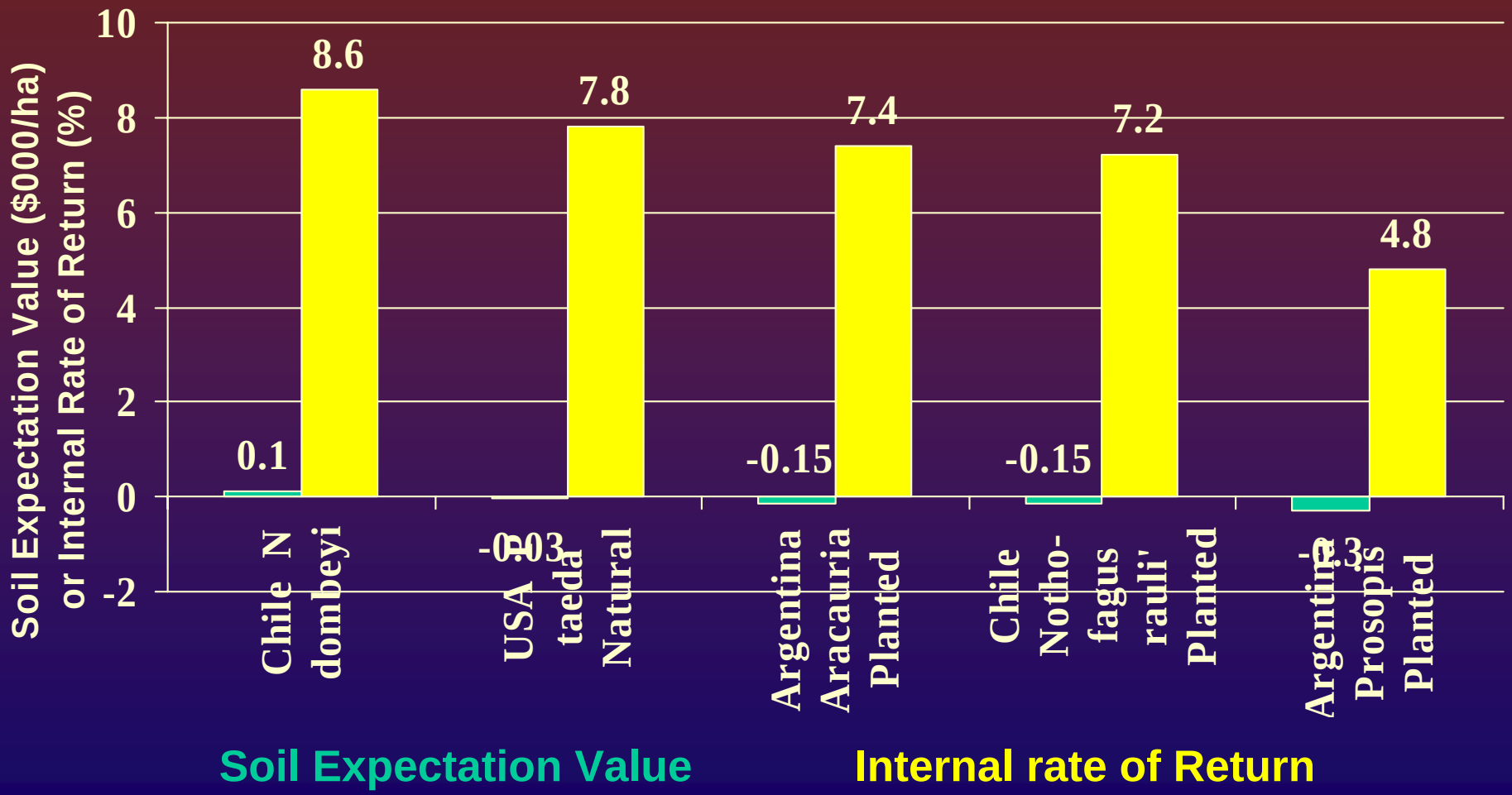
Cubbage et al. 2006; 8% rate of discount

Returns of Plantations, 2005



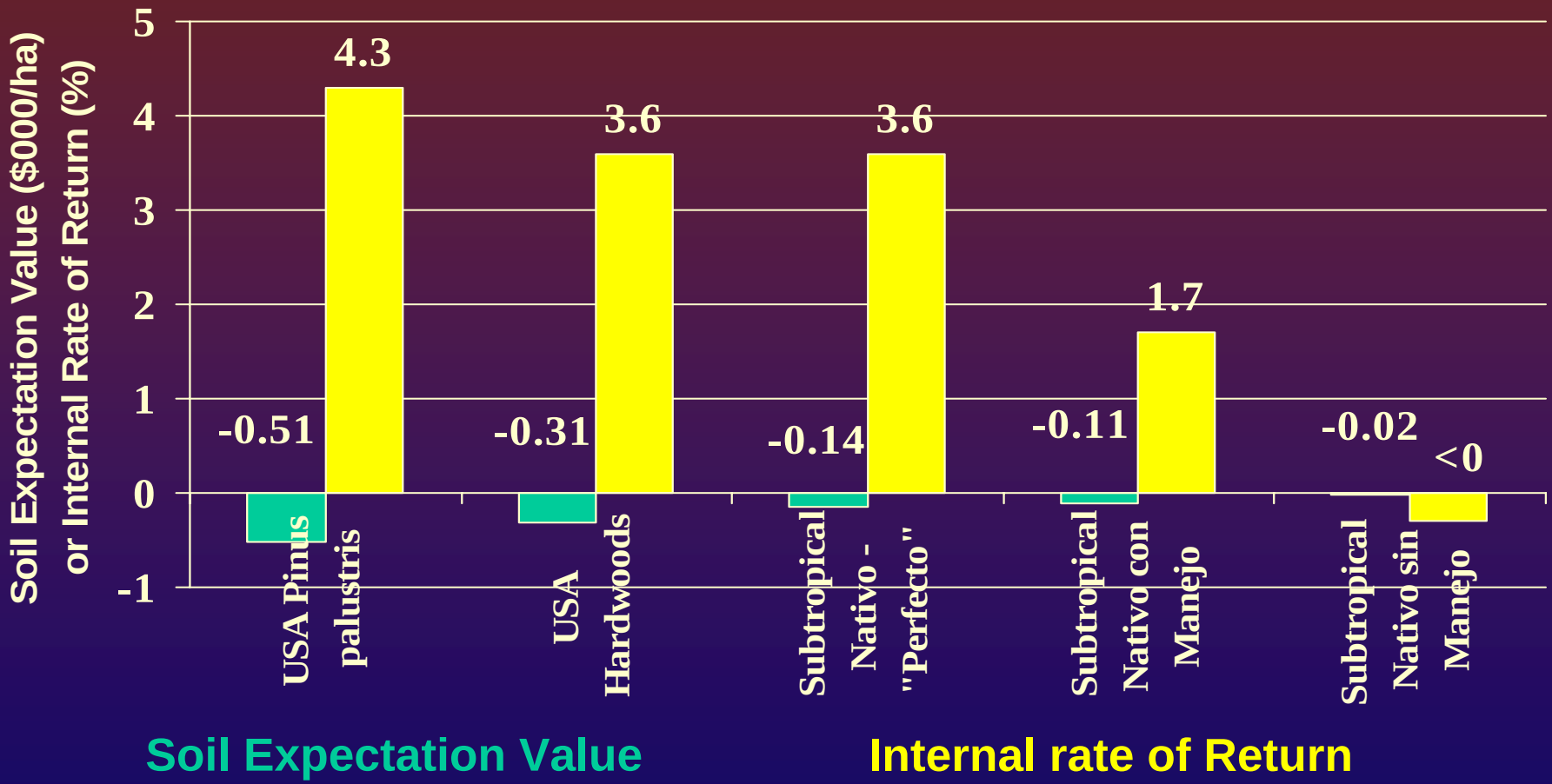
Cubbage et al. 2006; 8% rate of discount

Returns of Native Plantations, 2005

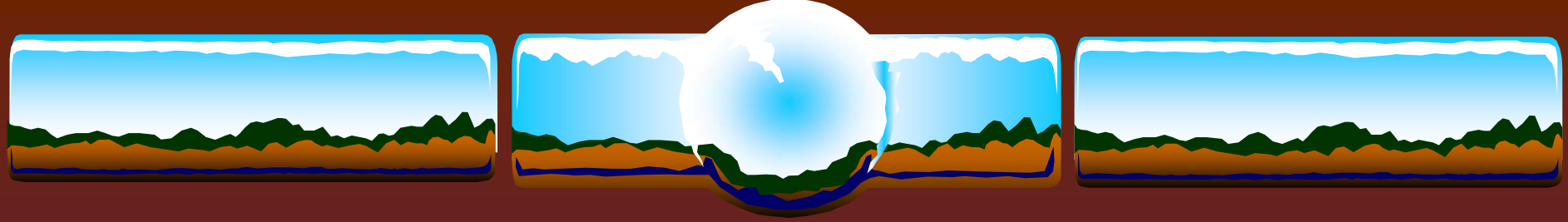


Cubbage et al 2006; 8% rate of discount

Returns of Native Forests, 2005

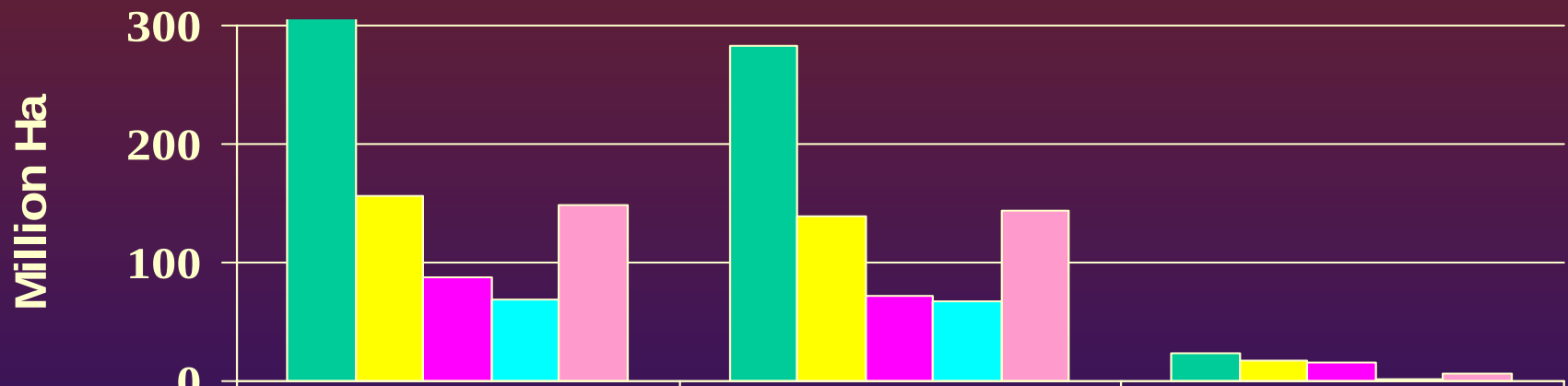


Cubbage et al. 2006; 8% rate of discount



Southern U.S. Forest Types, Areas, and Removals

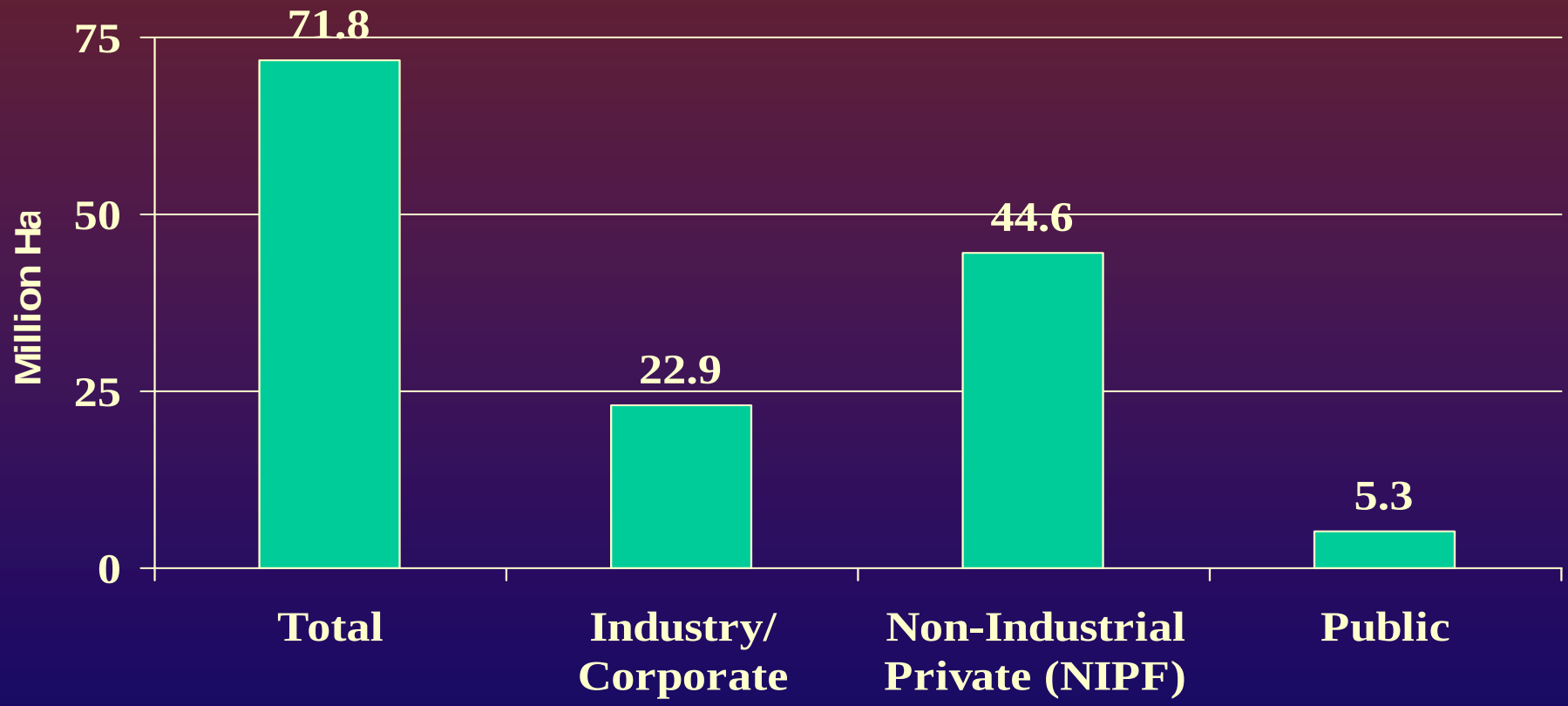
United States Area of Natural and Planted Forests, 2002



	Total	Natural	Planted
U.S.	306	283	23
East Total	157	139	17
South	88	72	15
North	69	67	2
West	149	143	6

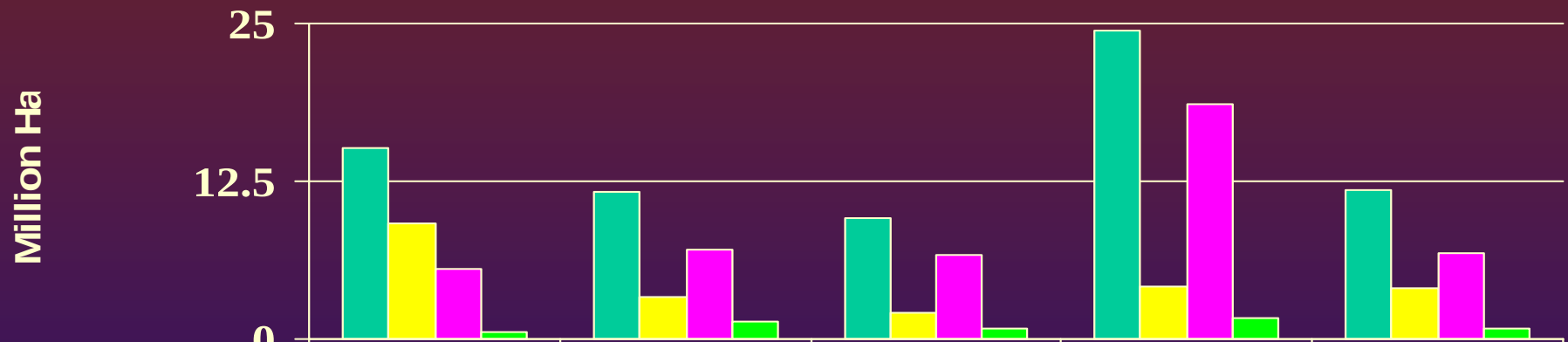
Smith et al. 2004

Southern U.S. Forest Area by Ownership Class, 2002



Forest Inventory and Analysis (FIA) Data

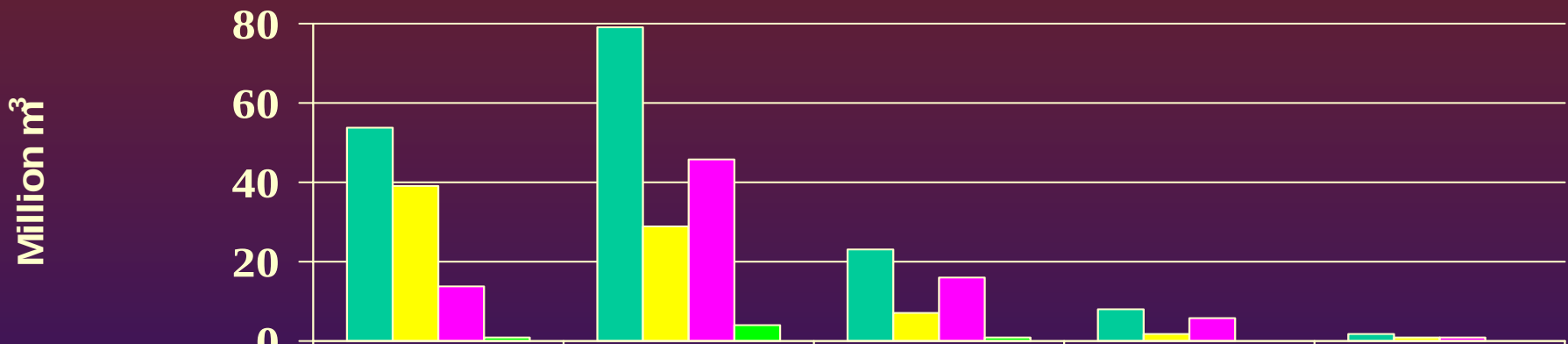
Southern U.S. Timberland Area by Forest Management Type, 2002



	Planted Pine	Natural Pine	Mixed Pine-Hdwd	Upland Hardwood	Bottomlnd Hdwd
Total	15.2	11.7	9.6	24.4	11.8
Industry	9.2	3.3	2.1	4.2	4
NIPF	5.5	7.1	6.6	18.6	6.8
Public	0.6	1.4	0.8	1.6	0.9

Forest Inventory and Analysis (FIA) Data

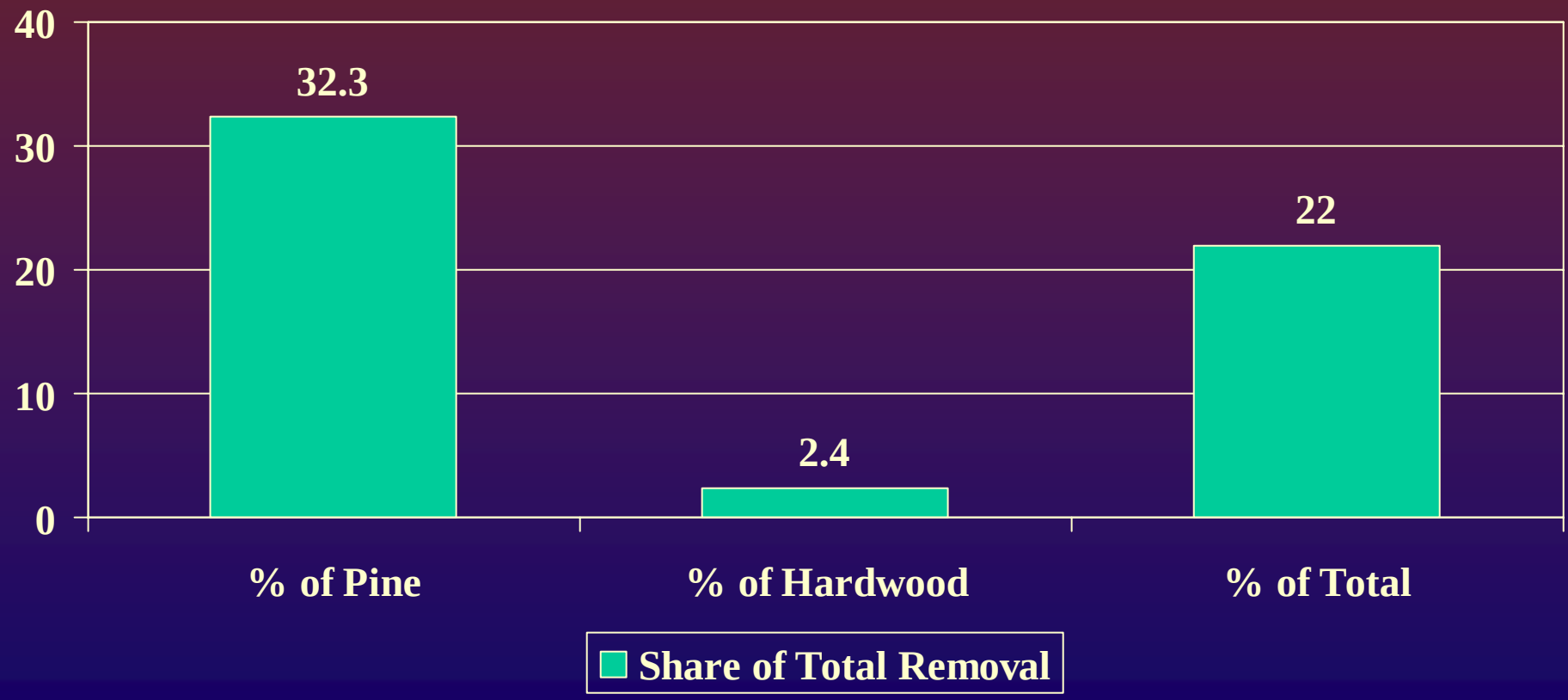
Southern U.S. Pine Timber Removals by Forest Management Type, 2002



	Planted Pine	Natural Pine	Mixed Pine-Hdwd	Upland Hardwood	Bottomlnd Hdwd
Total	54	79	23	8	2
Industry	39	29	7	2	1
NIPF	14	46	16	6	1
Public	1	4	1	0	0

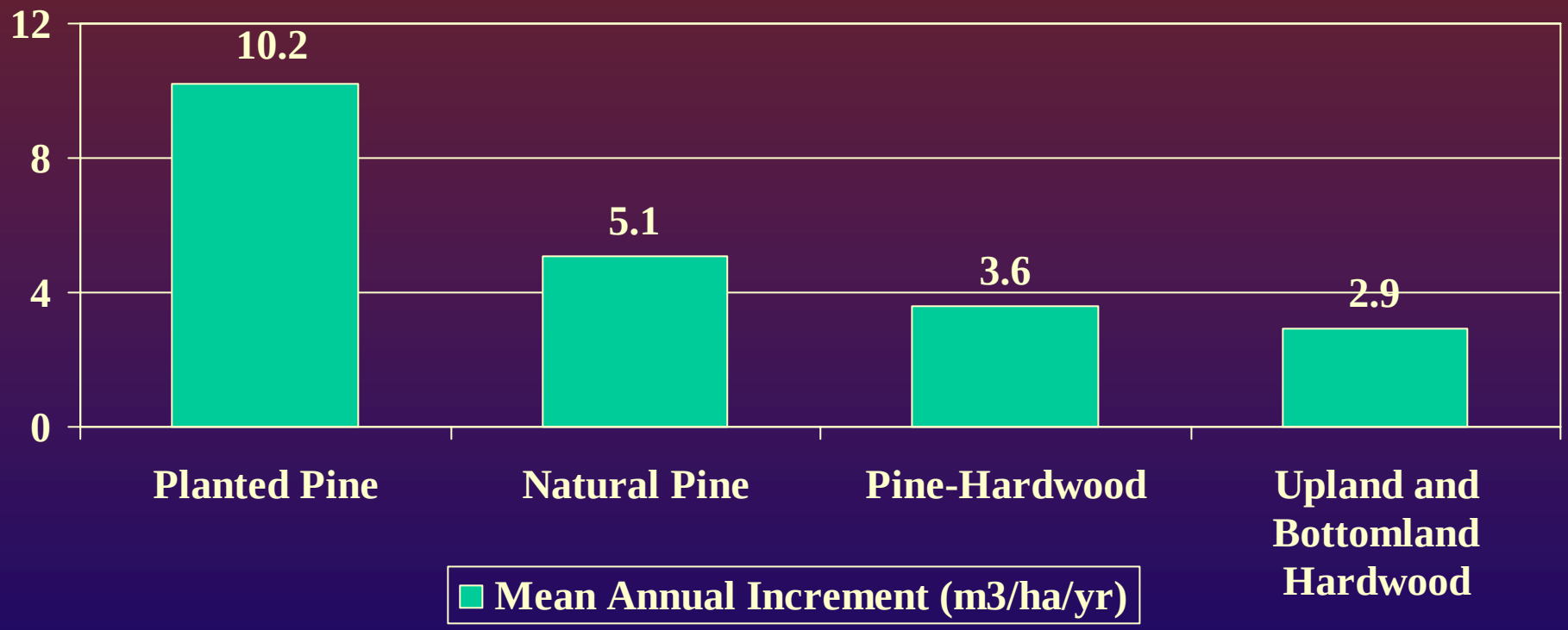
Forest Inventory and Analysis (FIA) Data

Southern U.S. Planted Pine Share of Timber Removals, 2002

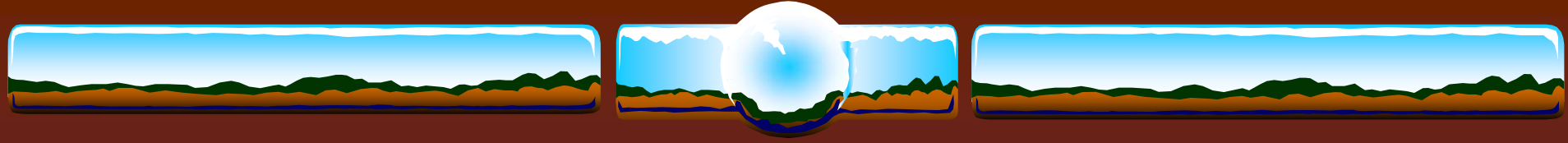


FIA data base; 65% of all southern removals are pine

U.S. South Average Growth Rates, ~2000

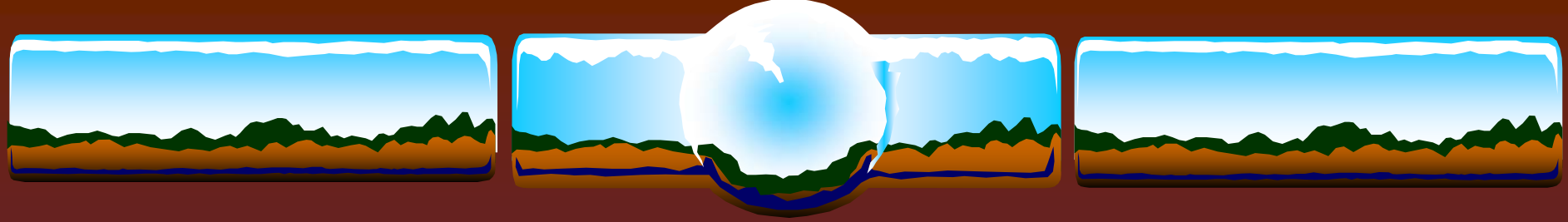


Plantations = 7.6–12.9 m^3/ha/yr based on intensity; others from FIA data base

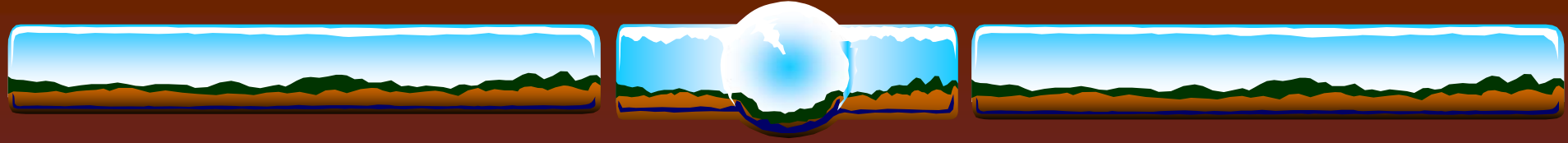


Summary: U.S. South and Plantations

- 15% to 20% of the world's industrial wood fiber supply from U.S. South (FAO 2003)
- One-fifth of the world's fast grown forests are in the U.S. South (Authors)
- One-fifth South's forest pine plantations (FIA)
- One-third of the softwood timber harvests in the South now come from pine plantations (FIA)
- Plantations will increase harvest share in the future (Abt and Prestemon 2003)
- Plantation area no longer increasing, 2006 (FIA/Abt)

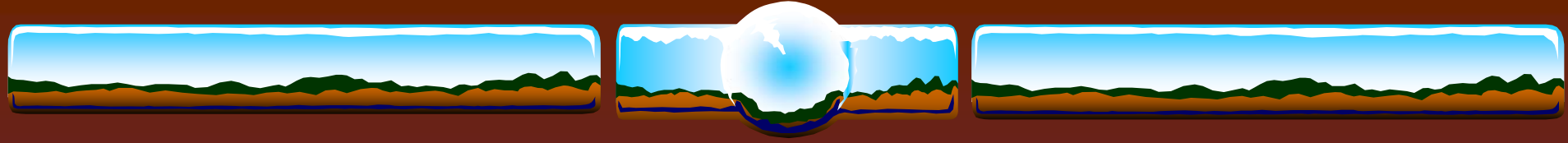


Plantations, the Environment, and Issues



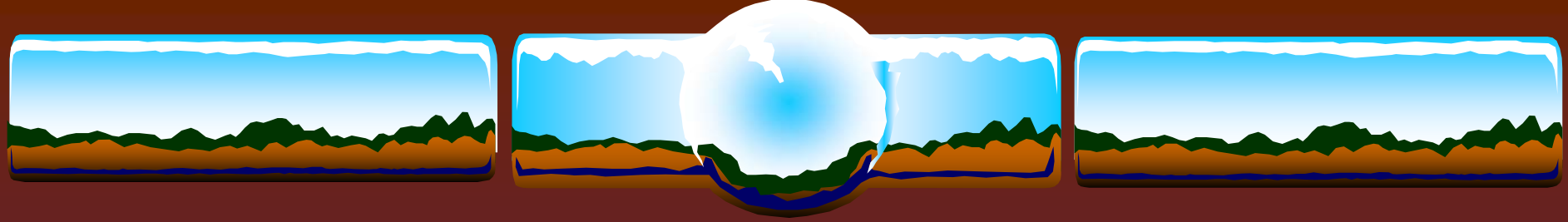
Plantation Advocates and Research

- More forest investments
- Rapid growth rates, less land use
- Good use of scarce resources
- Generally assured demand and markets
- High rates of timber investment returns
- Economic development and forest products industry
- Conserve natural forests through substitution of intensive management
- Tomberlin and Buongiorno 2001, Sedjo 2001, Sedjo and Botkin 1997, World Wildlfife Fund 2003, Cubbage et al. 2005



Plantation Critics and Research

- Biological deserts
- Destructive of communities and the environment
- Not really forests at all
- Create hydrological problems, especially water quantity
- Carrera 2003, Cossalter and Pye-Smith 2003, Dogwood Alliance 2005, World Rainforest Movement 2006



Forest Certification and Plantation Standards

World Forest Certification Systems and Area, ~2006 (million ha)

- Forest Stewardship Council (FSC) 76.5
- Sustainable Forestry Initiative (SFI) 50.4
- Programme Endorsement For Cert (PEFC/EU) 56.6
- Canadian Standards Association (CSA) 72.5
- American Tree Farm System (ATFS) 12.1
- Malaysian Timber Cert Council (MTCC) 4.7
- Certificación Forestal (CertFor) 1.6
- Certificação Florestal (CerFlor) 0.8
- Australian Forestry Standard (AFS) 5.7

~281 million has certified as of June 2006; 7% of 3.9 billion ha of world forests
PEFC world total of 191 million ha, including CSA, SFA, CertFor, CerFLor, Australian

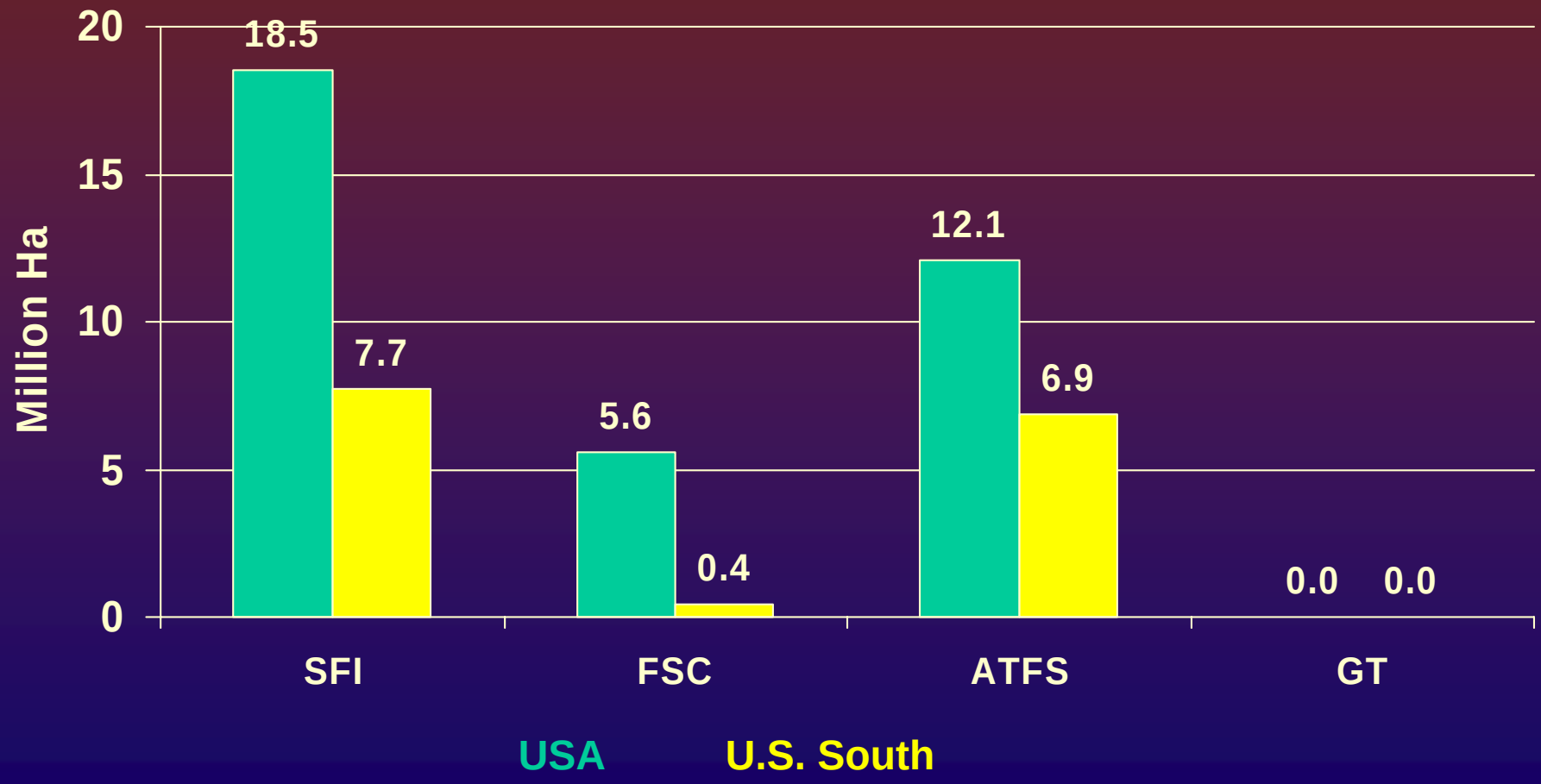
Note: ISO 14001 areas not included

Certified Forests in the Americas, 2006 (000 ha)

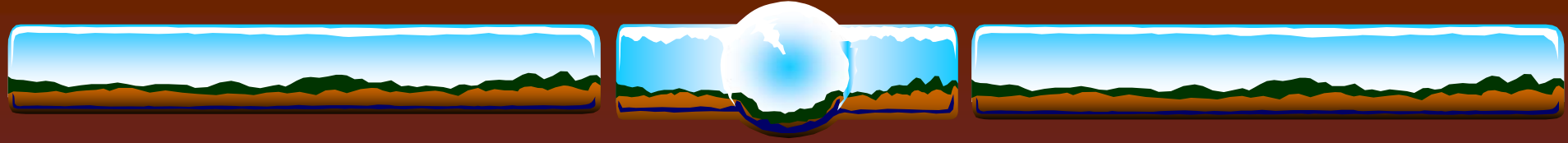
Country	Forest Area	FSC	SFI	ATFS, CSA, Cerflor, CertFor	Cert as % of Total
Canada	310 134	16 789	28 269	72 560	32.7
USA	303 089	7 579	22 164	12 100	14.4
Costa Rica	2 391	70	-	-	2.0
Guatemala	3 938	523	-	-	12.1
Brazil	477 698	3 034	-	763	0.8
Uruguay	1 506	213	-	-	5.0
Bolivia	58 740	1 994	-	-	2.6
Argentina	33 021	131	-	-	0.4
Chile	16 121	401	-	1 556	12.9
All Americas		33 119	50 443	86 879	11.4

170,541 ha in the Americas; Source: FSC, SFI, and PEFCProgram Web Sites 2006

Area of U.S and U.S. South Forest Certification Systems

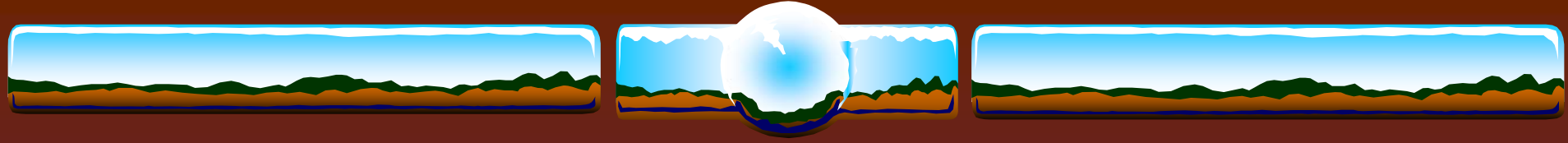


Program web sites and staff 2005



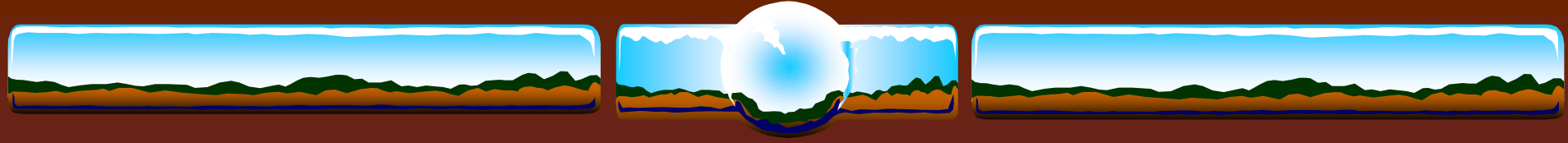
Forest Certification & Plantations

- Mandates and audits standards of forestry practice at the stand or ownership level
- Potential for a large impact on forest management and conservation
- SFI favors plantations with scientific bases and environmental safeguards
- Forest certification by FSC requires that managers favor natural stands and biodiversity
- FSC allows plantations and tree improvement with fairly extensive strictures to protect natural stands and ecosystems



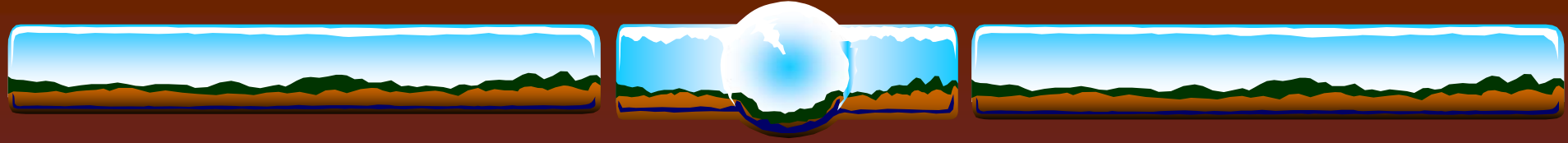
Forest Certification & Plantations

- Many individuals and groups remain skeptical of plantations
- Public certification debates will continue to place scrutiny on forest products firms and landowners
- Provides an imprimatur for intensive management that is typical in forest plantations
- Sound science, excellent forest practices, good public relations, and continuous improvement all will be required to ensure that plantations continue to receive public approval
- Forest certification provides a clear means to demonstrate this commitment on the part of forest landowners



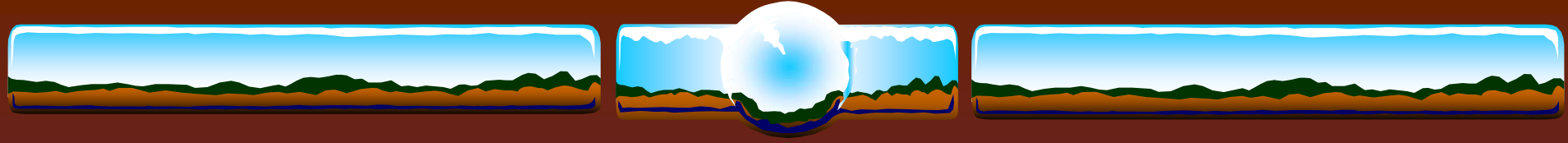
Forest Certification & Plantations

- Environmental management systems and certification
  - Authorize and monitor standards of forest practices
  - Plantations and biodiversity are critical
- Strict revisions reinforce rigorous standards
- Certification will influence governments, agencies, and public forests
- Assure sustainable forest management
- Assure access to international markets
- Certification helps ensure that industrial forest plantations are managed in a economically, socially, and environmentally acceptable manner



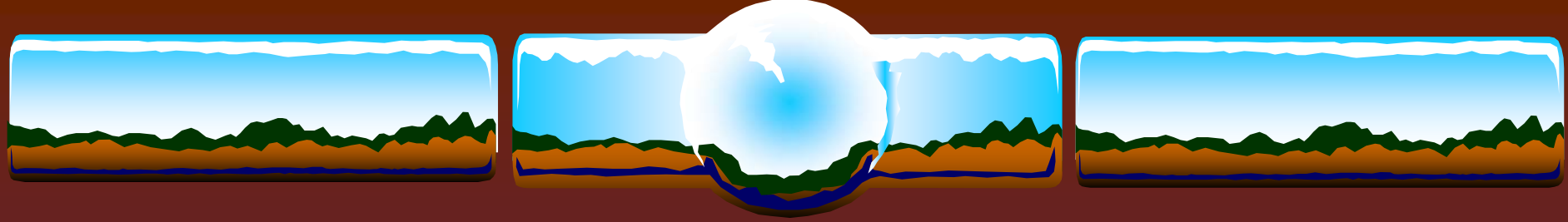
Plantation Certification Issues - U.S. South

- March 2005, the Dogwood Alliance and other ENGOs started a campaign against SFI, calling it the “Same-old Forest Industry” program
- National media releases, purchasing of ads, and a major joint protest letter against SFI that was signed by 90 scientists throughout the South and posted on the Dogwood web site
- Extensive amount of materials challenging the merits and credibility of SFI
- Alleged that SFI does not discourage buying of wood from biologically sensitive areas
- SFI allows conversion of natural to planted forests
- SFI allows harmful logging practices
- Instead, advocated the use of FSC

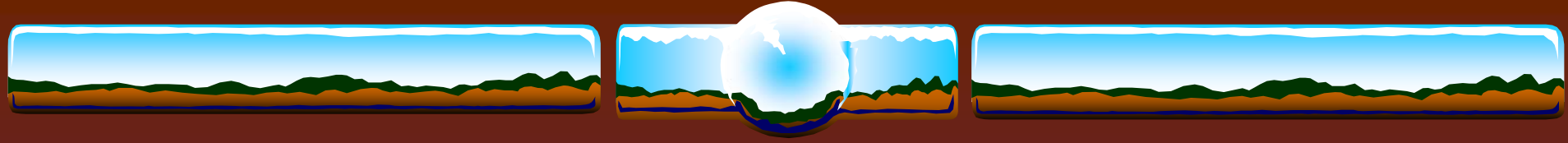


Plantation Certification Issues – U.S. South

- SFI responded with a letter on their web site
- Support the independence and accomplishments of SFI
- Pointed out minor flaws in the assumptions of the Dogwood Alliance letter
- Listed specific indicators in SFI standard that rebut the specific Dogwood claims
- Remains to be the largest southern U.S. area certified with SFI, and ATFS, by far



Conclusions

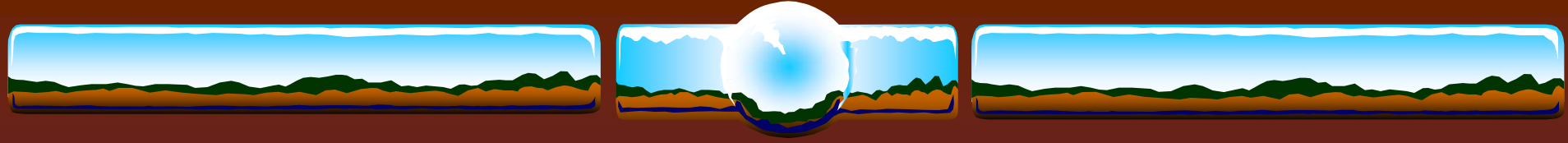


Conclusions

- 3.9 billion ha of forests - 26% of the world
- Lose about 10 to 15 million ha of forest per year
- Planted stands can help achieve more sustainable forestry
- 140 million ha of planted stands - 3.8% of world forests
- 72 million ha of fast grown industrial plantations – 1.8%
- Plantations provide ¼ world industrial wood fiber
- U.S. South
  - 15 million ha of plantations
  - 1/5 total southern forest area
  - Represents 1/5 fast-grown plantation area in the world

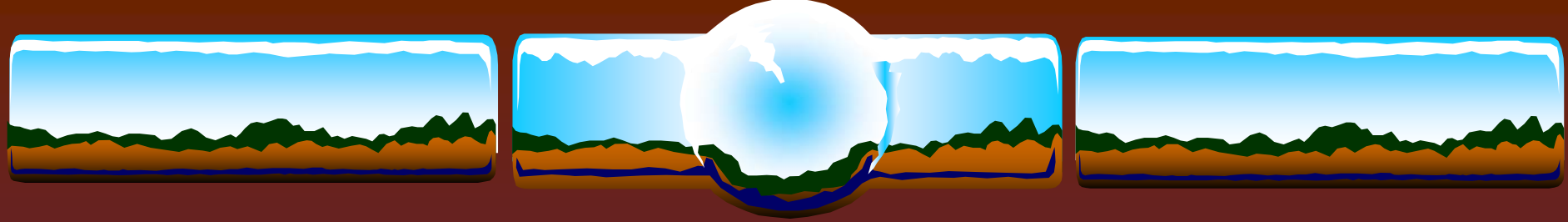
Forest Plantations Outlook

- Used for production (1/5) and protection (4/5)
- Planted area increasing
  - Faster in Asia
  - Moderate in South America
  - Very little in northern hemisphere
- Growth rates increasing
- New planting regions emerging
- 50% increase in industrial roundwood production by 2020
- Double industrial roundwood production by 2040



Forest Plantations Outlook

- Plantations involve tradeoffs
- Can we identify and measure these tradeoffs?
- Can we make tradeoffs that are necessary and beneficial to society?
- Can we develop an effective process for plantation development and assurances?
  - Certification?
  - Other?
- Can we make science-based solutions more acceptable?



Global Forest Plantations Assessment: Contributions to Sustainable Wood Supply and Resource Conservation

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