IGNFA

"Agro forestry as a means for increasing Tree Out side Forests(TOF)"-Prospects and Challenges

Arial view of the landscape near hoshiarpur division

Mind Boggling facts

- ITC Bhadrachalam is supplying more than 2 crore seedlings annually(6000 m)

- Average Productivity of these clones is about 20-25 m³/ha/year under rainfed condition

- Some farmers getting trend setting productivity of about 50 m³/ha/year under irrigated conditions.

Mind Boggling facts

- Trees out side forests in Punjab
  - Stems out side forests are 612 lac
  - Growing stock out side forest area in Punjab is 20.012 million m^3
  - Harvested Timber from out side forests in Punjab is 15 lac m^3 /year. (From government forests is 1.2 lac m^3 /year)

Mind Boggling facts

– In Haryana, the area under trees on farmlands grew at a rate of 53% per annum between 1975 and 1984.

– In Haryana Timber harvested from community and farm lands is 28 lac m3/year (From government forests is 1.9 lac m^3/year)

– Over 200 factories in the twin cities of Jagadhari and Yamunanagar produce poplar and other timber products worth over

- Rs 1000 crores per year.

Policy Imperatives & scope.

- National Forest Policy envisages 33 % tree cover(Total land available in the country-328.7 M. ha)
- NFAP envisages that by 2010 : 25 % of the area should be under tree cover.
- In 2013 -24.01%,2015-24.16%
- In 2017 achieved 24.40%(21.54+2.85)
- Total Forest cover and tree cover in the country
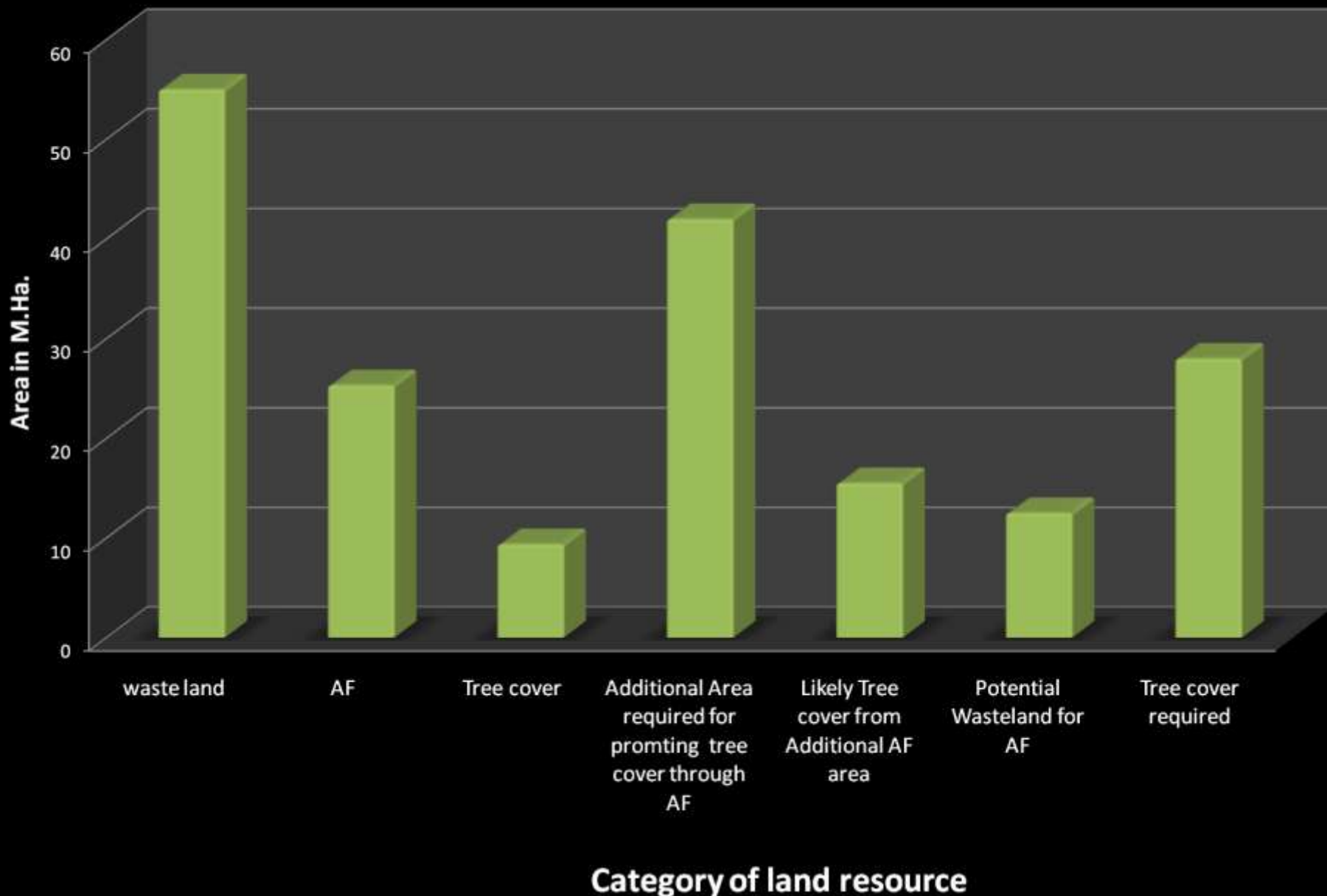 – 70.80 M.ha +9.38 M. ha =80.20 M.ha.

Open forest land in the country 30.17 M.ha(25%= 7.5 M.ha)

- Out of 676 Districts in the country
  - 262 have less than 10% of forest cover
  - 175 have less than 5% of forest cover
  - 48 have less than 1% of forest cover (SFR 2017)
- The productivity of the forests is very low and the average MAI is less than 1m^3/ha/year

An additional 28 million ha required..?

– 55 M.ha waste land (25 %=12.5 M.ha)

– 143 M.ha agricultural land

a) 25.32 M.ha under AF , @18 % of Agri.Land- Dayani *et al*)

b) CAFRC-13.75 M.ha

c) FSI- 9.38 M.ha(42 M.ha agri.land need to be under AF 15.5M.ha)

Potential Area Available for promoting TOF

Area in M.Ha. (y-axis)

Category of land resource (x-axis)

Categories: waste land, AF, Tree cover, Additional Area required for promting tree cover through AF, Likely Tree cover from Additional AF area, Potential Wasteland for AF, Tree cover required

Change in Tree Cover

Andhra Pradesh	**2141.59 sq.km-**	**Conservation of plantation in forest and outside forest**
Assam	**567 sq.km**	**Outside Forest**
Bihar	**4551 sq.km-**	**Due to plantation and TOF**
Goa	**19 sq.km**	**TOF**
Gujrat	**47 sq.km**	**Plantation & conservation in forest & outside forest**

Haryana	859 sq. Km	Expansion outsided tree forests
Karnataka	1101 sq. Km	Mainly palm plantation outside forest area & Density improvement in scrub forests & Expansion of management forest
Kerala	1043 sq. Km	Commercial plantation TOF and better resolution
Punjab	66 sq. Km	TOF
Telengana	565 sq. Km	Mostly TOF
Uttarakhand	23 Sq. Km	TOF
West Bengal	21 Sq.Km	TOF
Dadra & Nagar Haveli	1 sq. Km	TOF

Growing Stock

❖ Total Growing Stock is estimated to be 5822.377 million cubic meters

❖ Less than 1% increase in 2 years

❖ 54.97 cubic meters Average Growing Stock per ha in Forests

Forest 4218.380 million cum

TOF 1603.997 million cum

5822.377 million cum

FORESTS 72.45%

TOF 27.25%

STOCK-present

- In two years 23.33 M.cum stock in forest over a area 7,64,500 sq.km(0.305 cum/ha) has increased

- Whereas, 30.6 M.cum increased in TOF over a area of 93,815 sq.km(3.262 cum/ha) which is thrice more than the forest stock.

Potential production of timber from TOF

❖ TOF plays an important role in production of timber and fuel wood

❖ About 80% of people's demand of timber and fuel wood is met from TOF.

❖ As per the latest assessment, total annual production of timber from TOF is estimated as 74.48 m.cum.

Demand and supply of timber for Furnitures, Agriculture and Industry (m cum)

Particulars	1985	1996	2001	2006	2010	2020	2025
Demand	50	64	73	82	89	107	116
Supply from forests	24	12	12	12	12	12	12
Supply from plantation and Agroforestry	0	41	47	53	61	90	100
Deficit	26	11	14	17	16	5	4

NCRAF 2007

Demand and supply of timber in india over the years
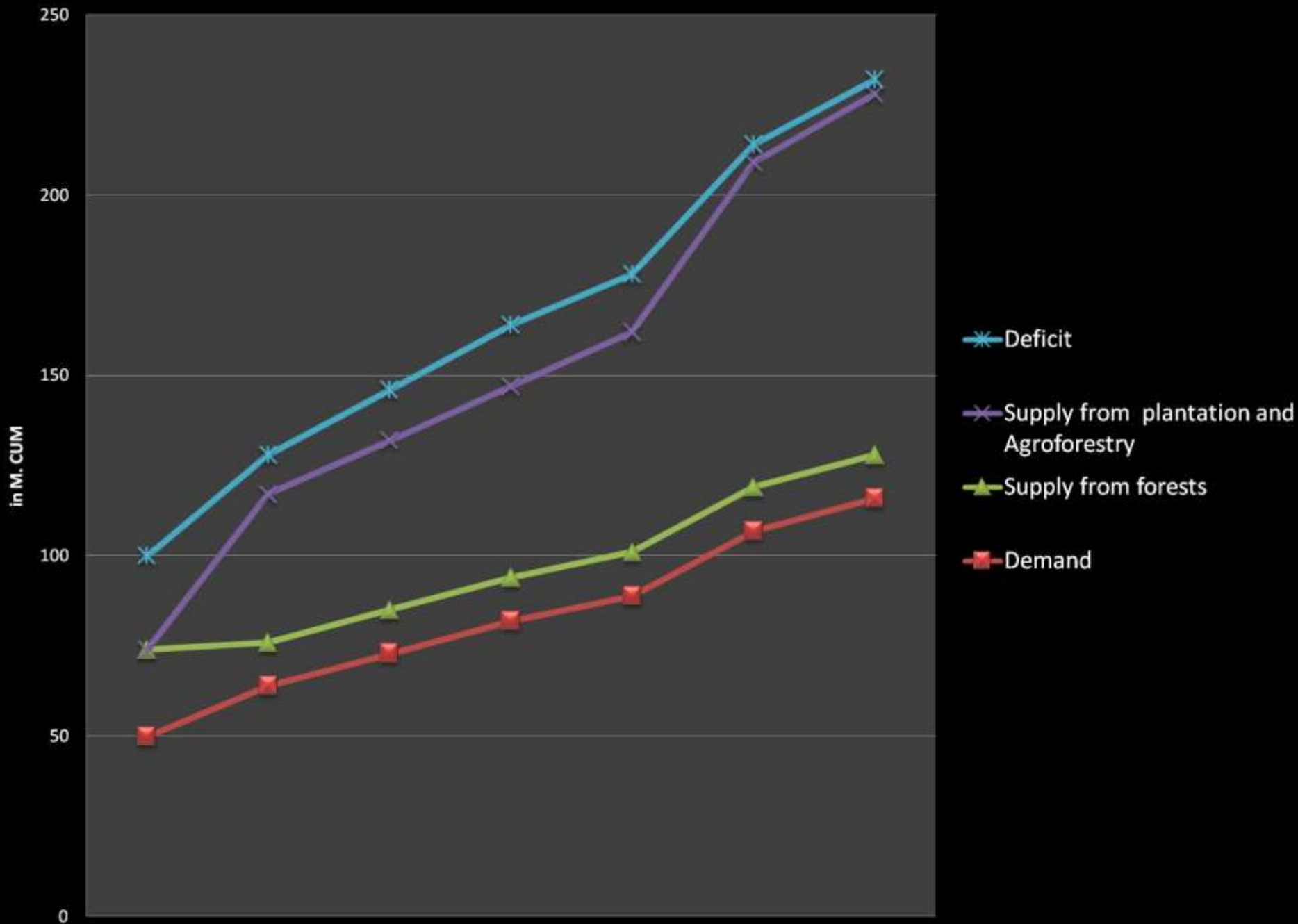
Constraints

1. **Lack of market information**

2. **Lack of financing options**

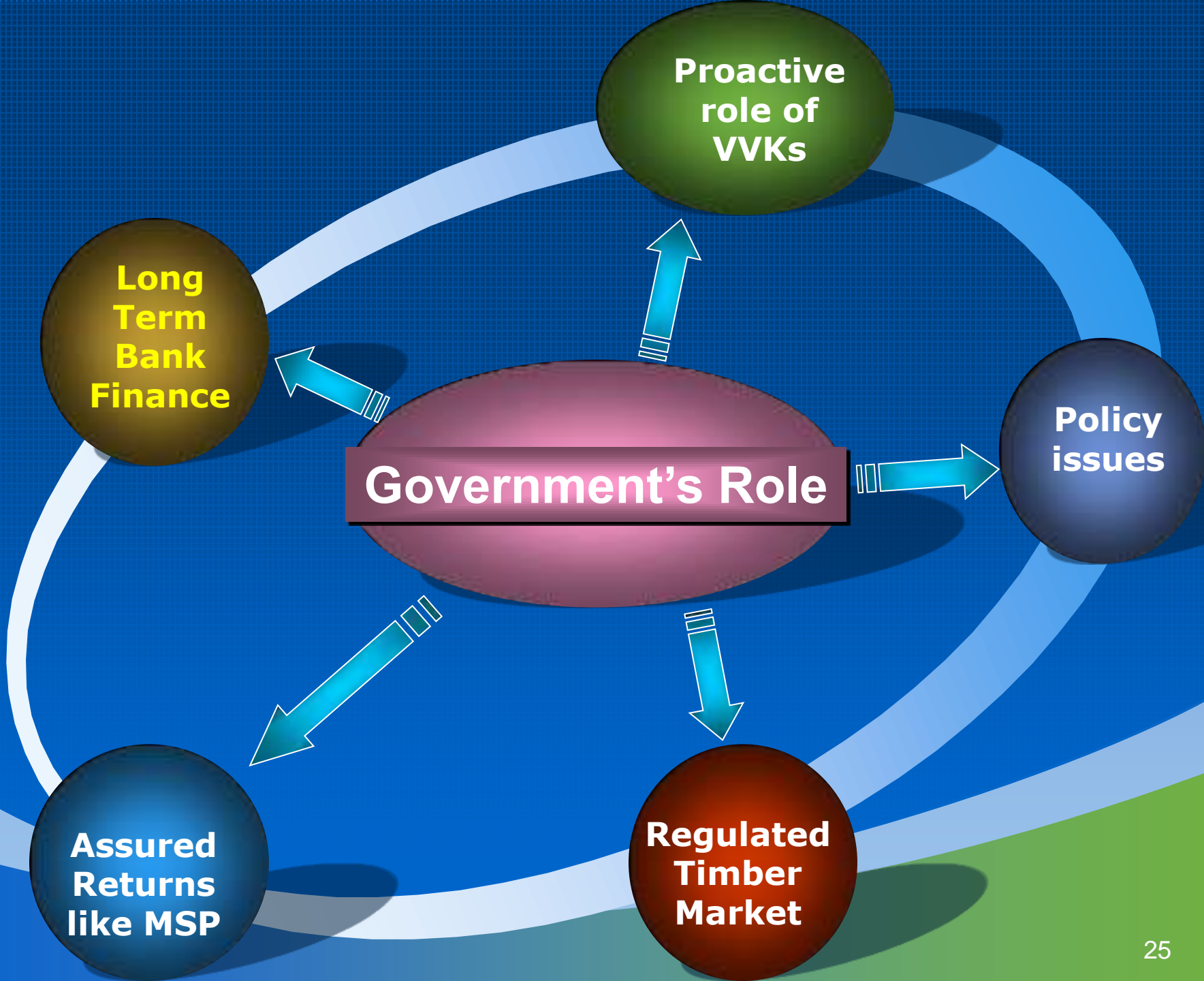3. **Information of buyers not with farmers**

4. **Margins of middlemen quite high**

5. **Assured Quality and Quantity problem for buyer**

6. **Highly unorganized sector**

7. **Lack of Volume tables/productivity of species**

Proactive role of VVKs

Long Term Bank Finance

Government's Role

Policy issues

Assured Returns like MSP

Regulated Timber Market

25

Way ahead…..

Insurance

AF plantation Insurance- TN- United India Ins.

– Kerala- coconut,rubber

– Agricultural Insurance Company India Limited

Bio fuel plant /tree

- Credit and market facility.

- PPP- Model TNPL,ITC,West Coast Paper, JK paper,WIMCO

- Agroforestry tree manual.
- Region based model for small, marginal &large farmers.
- Uniform regulatory regimes
- Need to focus on PES of agroforestry system.

Carbon Sequestration potential and likely CDM benefits

Plantation model	Annual sequestration potential (t/ha)	Likely Annual benefits (Rs/ha)
Rupnagar, Punjab Poplar bund Eucalyptus bund	1.42 1.62	298 340
Bazpur Uttarakhand Eucalyptus bund	1.64	344

Assumption 1 t c= 5$ and one US$ = Rs.42/-

Gera et al., 2006, Hooda et al., 2005

- Average carbon storage by Agroforestry systems
  - Semi arid - 9Mg C /ha
  - Subhumid -21Mg C /ha
  - Humid   -50Mg C /ha
  - Temperate- -63Mg C /ha
- Contribution of agro forestry to global carbon sequestration is 1.9 Pg of carbon over 50 years.(world wide estimates of 1023 M ha)

- NAF Mission/Board- Target oriented
- Strengthening zone based research on species.
- Create a base line agro forestry plot in term of no of trees and size of plot under AF for subsidies &incentives.
- Precession assessment –GIS(Area,stock availability)- i-Hariyali
- Certification- seed,planting material in long turn lead to less to zero input farming-

- Contract farming modal- TN
  - Credit
  - Research Institute(material,site specific Tech.)
  - Contract with industry.

  Revive &replicate time tested sustainable model.
  - Convergence of Govt. scheme

Queries ??
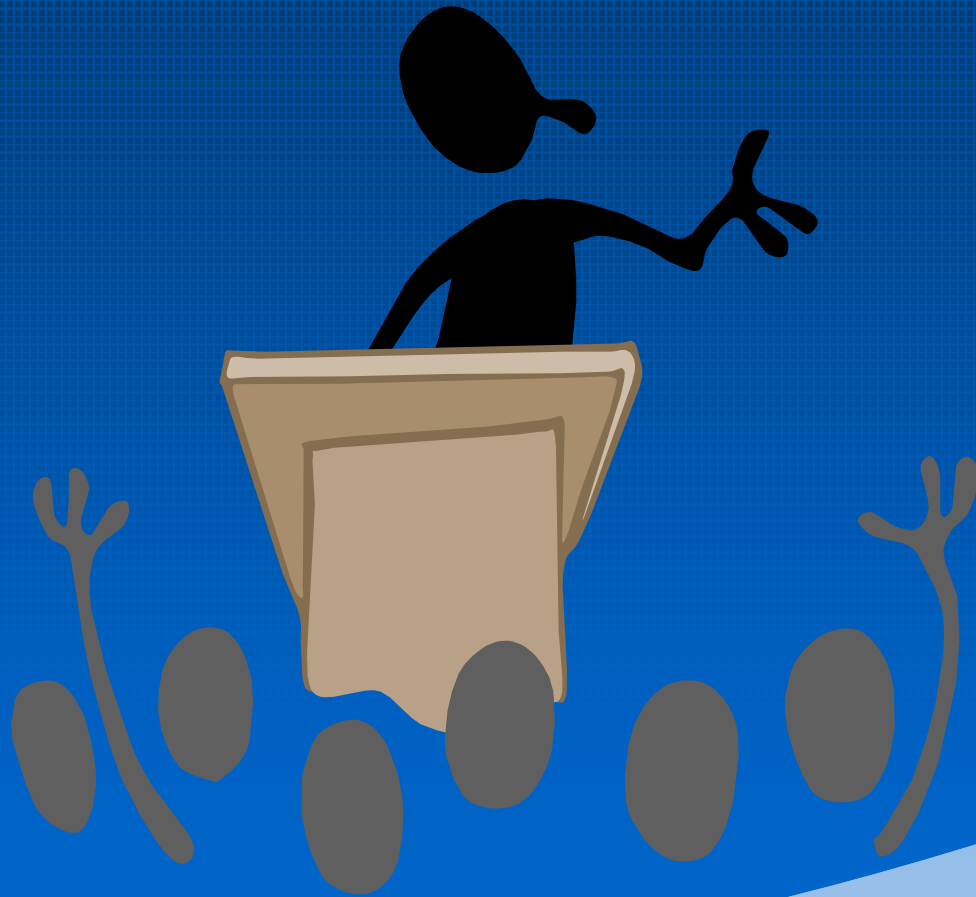
Contributions of Agroforestry produce to national demand by 2025

Product Category	Total Demand	Contribution from Agroforestry			Contribution from Agroforestry(%)
		Traditional	Improved	Total	
Timber(M cu m)	116	52	48	100	86
Fuel Wood(MT)	330	60	13	73	22
Fodder(MT)	1040	100	12	112	11
Fruits(MT)	43	1.5	4.4	5.9	14
Bio fuel(million of bio-diesel)	10	0.5	5.4	5.9	59
Food(MT)	308	7	15	22	7
Bioenergy(MW)	16000	4000	1000	5000	3

NCRAF 2007

Yes....possible

Species	Variety	Spacing (in feet)	Density / ha	Period (In years)
Casuarina	MTP 2	5x5 ft	3200	3
Eucalyptus	MTP 1	6x6 ft	3000	3
Melia	Melia CL26	6x6 ft	3000	2
Subabul	FCRI LL15	4x4 ft	5500	3
Dalbergia	MTPDS18	6x6 ft	3000	3
Kadam	AC 13	6x6 ft	3000	3
Jatropha	CJH12	10X10ft	1100	Annual after 3 years

Governments Interventions

Facilitate → **Propagate** → **Sustain**

- Protection to farmers from import in initial stages

- License process for new wood based industries be eased in areas where raw material is not forest produce.

- **Permit Raj**

- Ceiling limits be revised for the waste lands

- **Tax Benefits be given to attract more investment in the sector**

Governments Interventions

Facilitate → **Propagate** → **Sustain**

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4. Ceiling limits be revised for the waste lands

5. Tax Benefits be given to attract more investment in the sector

1. Ensure higher economic returns

2. Involve corporate sector in producing High quality planting stock

3. Subsidies for farm/agro forestry from NABARD

4. Government should supply only high yielding varieties to farmer

Governments Interventions

Facilitate → **Propagate** → **Sustain**

1. Protection to farmers from import*
2. License Raj be eased
3. Permit Raj be stopped
4. Ceiling limits be revised for the waste lands
5. Tax Benefits be given to attract more investment in the sector

1. Ensure higher economic returns
2. Involve corporate sector in producing High quality planting stock
3. Financing for farm/agro forestry from NABARD
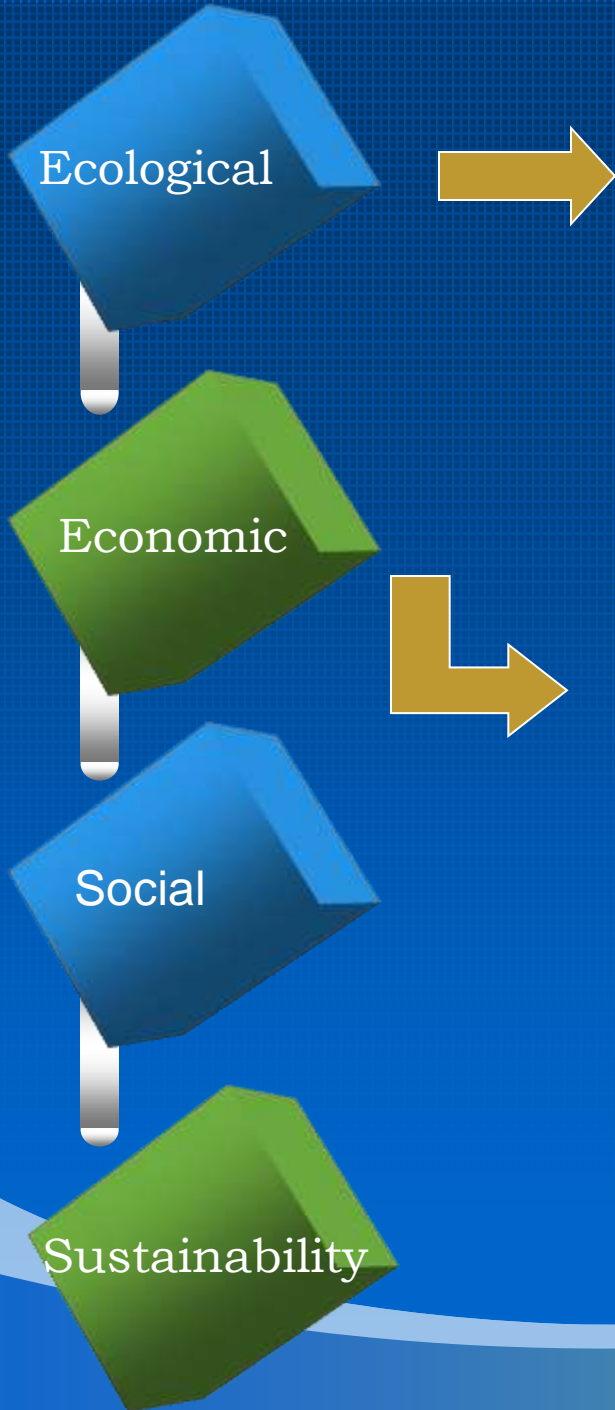4. Government should stop supplying poor planting material*

1. Market regulation by government to
   - Avoid price crash
2. Create long term demand

Need for Agro forestry

Ecological

Economic

Social

Sustainability

→

1. Higher productivity

2. Soil conservation

3. Cycling of nutrients,
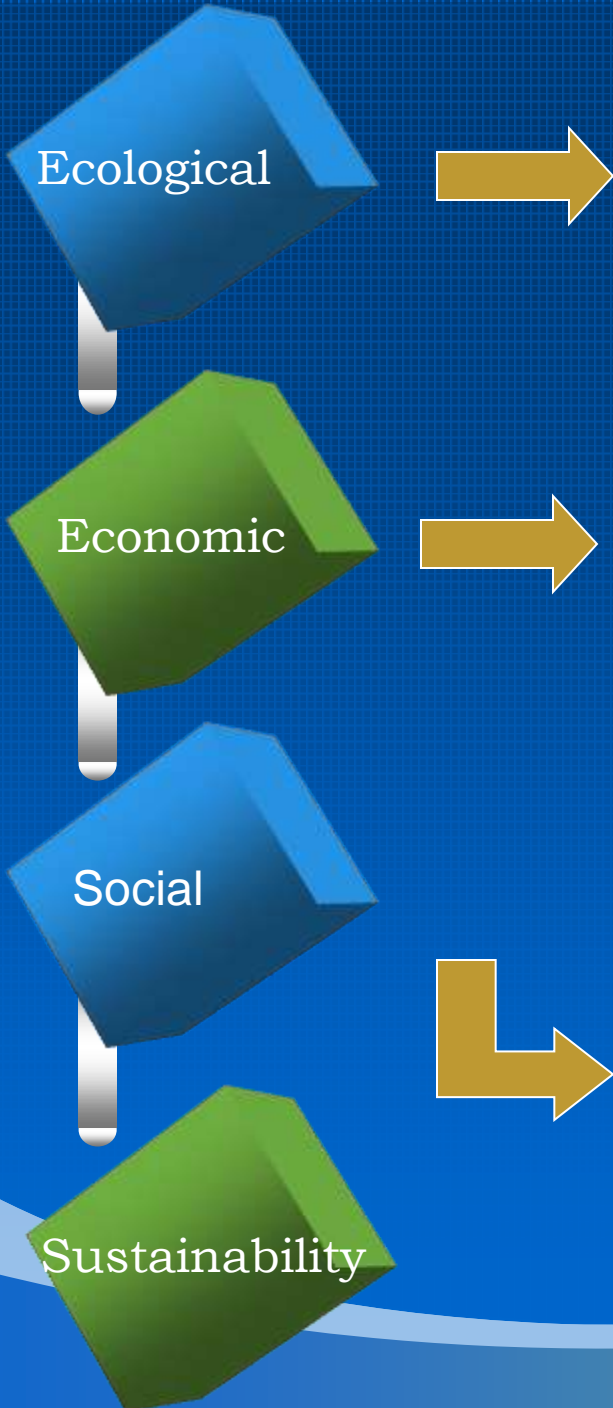
4. Better microclimatic conditions for crops

Need for Agro forestry

Ecological →
1. Higher productivity
2. Soil conservation
3. Cycling of nutrients,
4. Better microclimatic conditions for crops

Economic →

Social

Sustainability

1. Better economic yield, Insurance against floods and droughts
2. Reduce timber demands from natural forests
3. For the development of wastelands
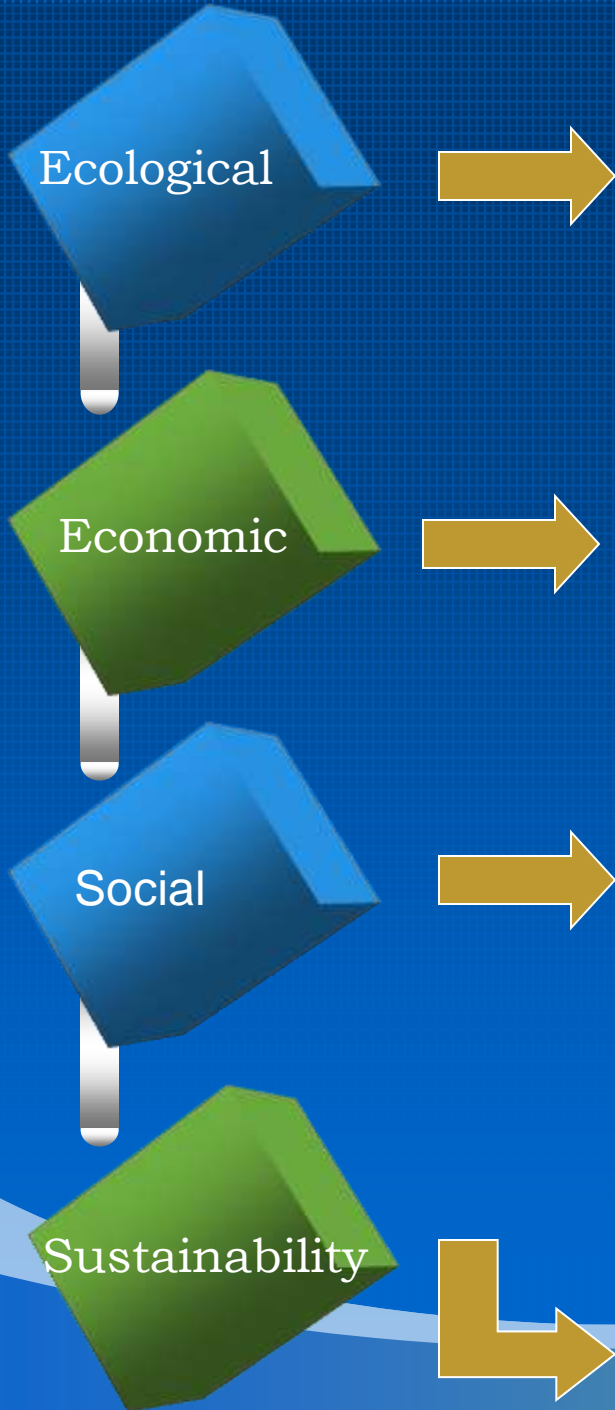4. To reduce demand supply gap

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Social

Sustainability →
1. Rural dependency on fodder and fuel wood
2. Reduce biotic pressure on natural forests
3. Pollution reduction
4. Climate change

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Sustainability →
1. For Maintaining soil Productivity
2. For maintaining Ground water level