Bio-Fuel Activities
in
UTTRAKHAND
for
Ecological Restoration,
Energy Production &
Sustainable Development

OIL Sector :

- Total Oil requirement -120 MMT
- India produces(25%) - 29 MMT
- India imports (75%) - 85 MMT
- At Crude oil prices of $90 per barrel
- Import Cost of Oil 180,000 Crores.

Fossil Fuel Price Impact:

- Increase of $ 1 per barrel will cost the country more than Rs.1700 Crores additionally
- Think about balance of payment ?
- Fossil fuel imports need to be minimized
- True energy independence shall be a major shift from fossil to renewable energy sources.

Energy Thirsty India

Given this large share in the incremental world supply, India would need to tap

- All available energy supplies

- All available & emerging energy technologies.

Future Energy Demand

Total primary energy need could range between 1550 MTOE to 1858 MTOE by 2031-32:

Detail Sector wise

	%	MTOE
Coal	43 - 54	650 - 994
Oil	23 - 26	350 - 486
Gas	5 - 11	100 - 193
Non-Commercial	10 - 12	185 - 185
Nuclear	4 - 6	76 - 98
Hydro	1 - 2	13 - 35
Bio fuel	2 - 6.1	2 - 97

Indian Renewable Energy Resources

Resources		Unit	Present	Potential
Hydro power		**MW**	**30936**	**1,50,000**
Biomass				
	Wood	**Mtoe/year**	**140**	**480**
	Biogas	**Mtoe/year**	**0.6**	**4**
			0.1	**15**
Bio Fuels				
	Bio-diesel	**Mtoe/year**	**-**	**60**
	Ethanol	**Mtoe/year**	**02**	**125**
Solar				
	Photovoltaic	**Mtoe/year**	**-**	**120**
	Thermal	**“**		**1200**
	Wind Energy	**Mtoe/year**	**<1**	**10**
	Small Hydro Power	**Mtoe/year**	**<1**	**5**

Bio Fuel (Bio Diesel & Ethanol)

- Derived from vegetable oil
- Similar to fossil diesel.
- Can be used as substitute for or additive to diesel.
- Renewable & Biodegradable
- Require minimum or no engine modification
- Potentially cleaner burning than fossil diesel.

Bio Fuel Emission Reduction:

- One liter of Bio-diesel is obtained by processing 3 kg of Jatropha seed (35% oil)
- Each Kg of Biomass fixes 1 kg of CO_2 from atmosphere.
- One liter Bio Diesel emits about 250 gram of CO_2 hence can give large reduction in pollution

Action: Blending Level to reduce Import Dependence & have Market

- Ist phase 2% blending.
- IInd phase 5% blending.
- IIIrd phase 10% blending.
- IVth phase 15% blending.
- Vth phase 20% blending.

Former President's (Dr Kalam) Concern

- Mission should be to realize 60MMT/year of Bio diesel by 2030.
- In first phase 6MMT/year production by 2010.
- Progressively increasing the Jatropha cover and yield towards achieving 30MMT by 2020.

Dr. Kalam's Advice (9th June 2006)

There is a need to form

- **Central Bio Diesel Authority** for National Bio Diesel Mission

- **State Level Bio Diesel Boards**

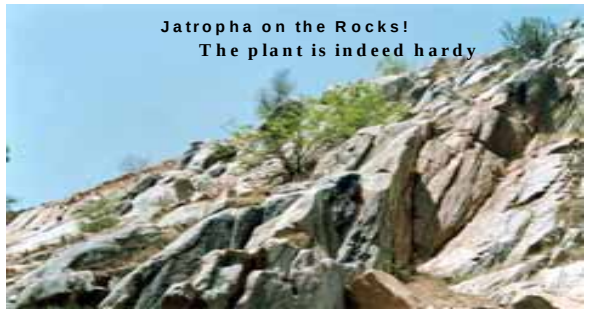
  to coordinate the development of TBO's including Jatropha Plantations & Transesterification technologies.

Indian on Bio Diesel Path

- Planning Commission of India launched Bio Fuel Mission in 2002.
- Four Lakh hectares demonstration phase project is being launched by MoRD.
- Indian Railways have run various important trains like Shatabdi Express on Bio Diesel.
- Andhra Pradesh & Karnataka Road transport Corporation has started blending 5% Pongamia oil in diesel used by their buses.

Why Jatropha?

- Very hardy, requires less nutrition and water.
- Grows almost in all types of soils even on gravely, sandy and saline soils.
- Most suited potential plant for waste land.
- Suitable for preventing soil erosion and arresting desertification.
- Fruiting starts from 4th year of plantation.
- Oil percentage one of highest among TBOs



Jatropha – An Employment tool

- 55 M ha waste land if planted with Jatropha would created 27 million Jobs.
- Shall induct Rs.67500 Crores/ year in national rural economy.

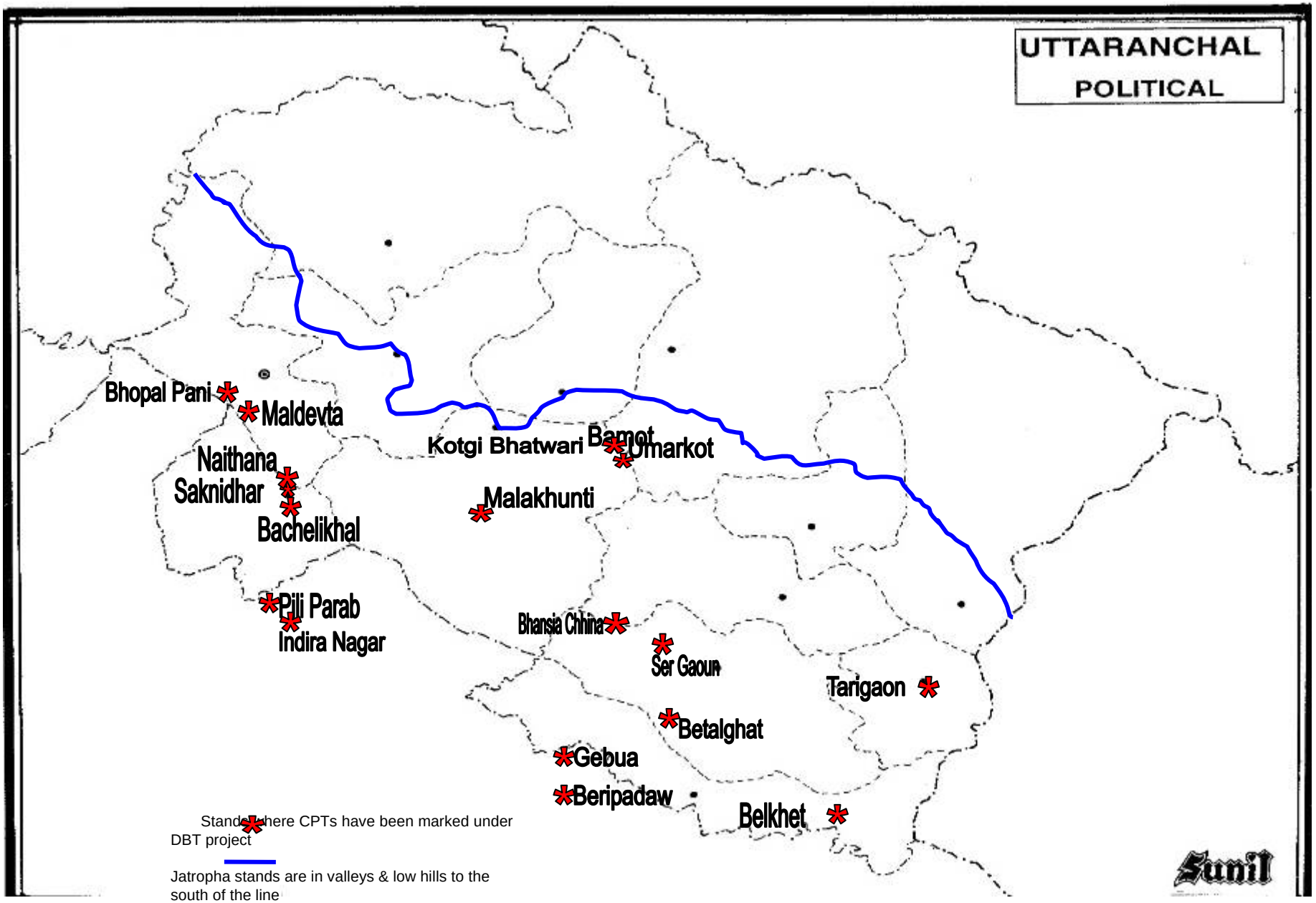
Jatropha - Turns Waste Land to A resource

- India has about 55 M ha of waste land suitable for Jatropha.
- Presently has poor productivity
- If Jatropha tree cover is created over this waste land it shall yield 55 MMT of Bio-Diesel.
- At $ 90 per barrel it shall save Rs.77650 Crores/year.

Uttrakhand has Scope

- Jatropha in Existence
- Has Degraded Area
- Poor People habitual of plantation working
- Sunlight is available
- Needed Rainfall & Soil Moisture exit
- Has participatory System as Van Panchayat
- Need of energy & Biomass exist

Map showing location of Jatropha CPTs in UA



List of Jatropha stands in Uttrakhand

Sr. No	Name of the site	Range or division	No. of CPTs selected
1.	Tarigaon village	Didi-haat Range Pithoragarh division,	9
2.	Belkhet village	Boom Range,Champavat division	8 (5+3)
3.	Umrakot	Atagarh Range	9
4.	Bamoth	Pogtha Sari Range	8
5.	Kothagi Bhatwarhi	Pogtha Sari Range	8
6.	Daangi	Mandakini Range	8
7.	Pili Parab & Indiranagar	Shyampur Range & Chriyapur Range of Haridwar Div.	8 (6+2)
8.	Bhopal Pani Coupe VIII & IX	Mussoorie Range, Mussoorie Forest Div.	8
9	Mal Devta	Raipur Range, Mussoorie Forest Div.	8
10.	Gebua N-1	Ramnagar range, Ramnagar division	20
11.	Beri-padao	Haldwani, Central Tarai	10
12.	Betal ghat	Betalghat range, DFO-soil	8
13.	Naithana	Kirtinagar Range, Narendra nagar divsion	8
14.	Bacheli-khal, Sankhni dhar	Kirtinagar Range, Narendra nagar divsion	11 (5+6)
15.	Bhansia Chhina	Kanari Chhina Range, Civil Swayam Almora Div.	8
16	Seer Gaoun	Dhaula Devi Block, Civil Swayam Almora	10

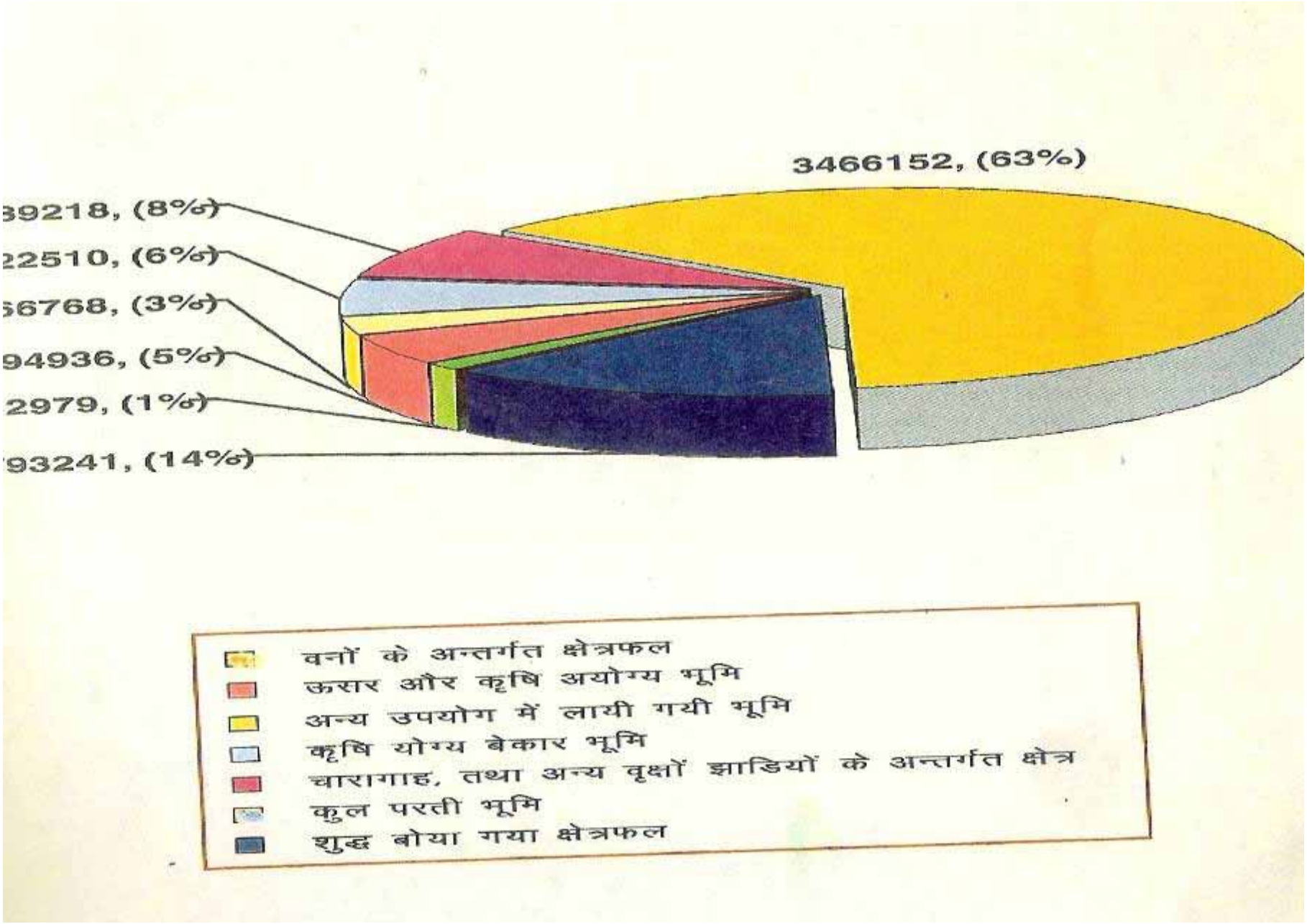
Seed samples from Jatropha stands in Uttrakhand and their oil %

Sr. No.	Seed sample Code	Place of collection	Seed Oil %
1.	JC-FRI-1	Lansdown	35.49
2.	JC-FRI-2	Pogdha sari	31.96
3.	JC-FRI-3	Saknidar	38.29
4.	JC-FRI-4	Atagad	40.17
5.	JC-FRI-5	Pitthora Garh	39.35
6.	JC-FRI-40	Saknidhar Narendra Forest Division	Report awaited from TERI
7.	JC-FRI-41	Bandal class-2 Mussourie Forest Division	-do-
8.	JC-FRI-42	Dhar(gandiyal veet).Satpauli range Civil soyam, Pauri	-do-
9.	JC-FRI-43	Mathada Alakhnanda soil conservation, Forest Division	-do-
10.	JC-FRI-44	Raipur Range, Mussorie Forest Division	-do-
11.	JC-FRI-45	Gangali Champavat Forest Division	-do-
12	JC-FRI-46	Ramnagar Reserved Forest Division	-do-
13.	JC-FRI-47	Bel padhav Tarai Western Forest Division	-do-
14.	JC-FRI-48	Bhupalpani class-8 Mussorie Forest Division	-do-

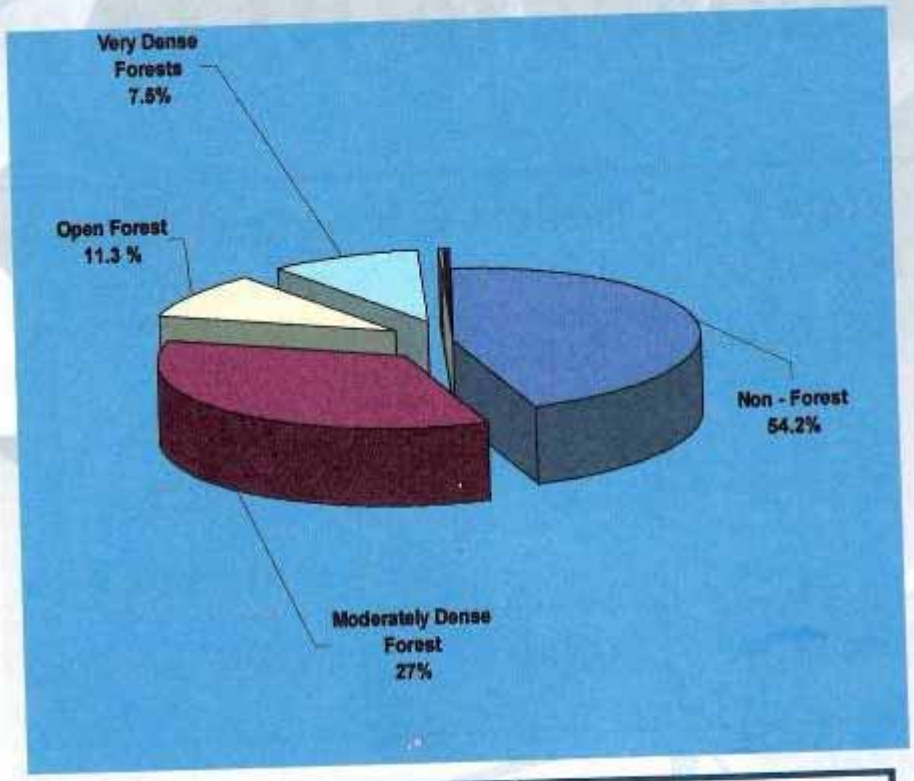
Report of Oil Analysis

- **Reports of 84 seedlots have been received so far.**
- **Seedlots with >35% oil content: 27**
- **Seedlots with 30-35% oil content: 44**
- **Seedlots with <30% oil content: 13**

Land use in Uttarakhand



Forest Cover Of Uttaranchal



Total Area	53483Sq.Km
Dense Forest	18422Sq. Km
Open Forest	6043Sq.Km.
Scrub Forest	320 Sq.Km.
Non Forest	28698Sq.Km.

Land Use Status of Uttaranchal

District	Geographic area	2003 Assessment of Degraded & Unused Land Area			Total Degraded Land (ha)
		Culturable fallow land (ha)	Non-Culturable Agri. Land* (ha)	Degraded Forest (ha)	
Almora	313900	46797	25031	44000	115828
Chamoli	803000	20767	102716	73400	196883
Dehradun	308800	13889	2076	44200	60165
Pauri	532900	46127	35584	75600	157311
Haridwar	236000	2075	1989	27200	31264
Nainital	425100	25502	2853	60200	88555

Land Use Status of Uttaranchal

District	Geographic area	2003 Assessment of Degraded & Unused Land Area			Total Degraded Land (ha)
		Culturable fallow land (ha)	Non- Culturable Agri. Land* (ha)	Degraded Forest (ha)	
Pithoragarh	709000	36547	17579	37800	91926
Tehri Garh	364200	78515	13179	65600	157294
Uttarkashi	801600	3140	21152	67400	91692
Rudraprayag	198400	11670	57715	33600	102985
Udham Singh Ngr.	254200	3633	1196	17700	22529
Champawat	176600	15057	7243	23000	45300
Bageshwar	224600	12381	6623	34600	53604
Total	**5348300**	**322510**	**294936**	**604300**	**1221746**

VANPANCHAYAT STATUS IN UTTARANCHAL

District	Van Panchayat	Area (ha.)	VP < 1500 mt.	Area < 1500 mt.
Pauri	2431	52880	254	10312
Rudurprayag	574	15446	100	5000
Chamoli	1082	166595	119	11437
Almora	2199	69853	1500	40000
Bhagashwer	822	38782	474	10863
Champawat	629	31232	190	13216
Pitoragarh	1666	87053	743	8000
Tehri Grh.	1332	12952	489	4573
Uttarkashi	646	7264	200	4000
Dehradun	215	7658	150	6000
Nainital	496	28067	200	12000
Total	**12092**	**517782**	**4419**	**125401**

VISION OF UTTARANCHAL

Employment generation on sustainable basis through Bio Fuel plantation mainly Jatropha

- Help to alleviate poverty,
- Ecological Restoration &
- Energy Production

MISSION OF UTTARANCHAL

Resource strengthening for Bio-Diesel through

- Bio Fuel Plantation mainly Jatropha curcas on about One Lakh hectares of degraded land by beneficiaries of Van Panchayat.

- Produce Bio diesel in Trans- esterification unit established on Public Private Parternership basis

Plantation Program is…

Plant Maintain & Earn where

- Selected Beneficiaries will Plant
- Maintain Jatropha Plantations
- Earn through seed collection & sale to Forest Dev. Corp.

Mission BIOFUEL Launched

ON

3rd AUGUST 2004

BY

Hon. UNION MINISTER OF

FORESTS & ENVIRONMENT

AND

Hon. CHIEF MINISTER OF UTTARANCHAL.

Objectives

- Create Employment Opportunities for rural poor on Sustainable basis.
- Strengthen the Common Property resource through Productive Forestry.
- Resource Strengthening for alternate Fuel
- Improve the Environment through Land Reclamation
- Create Carbon Sink through plantation.

Approach Adopted

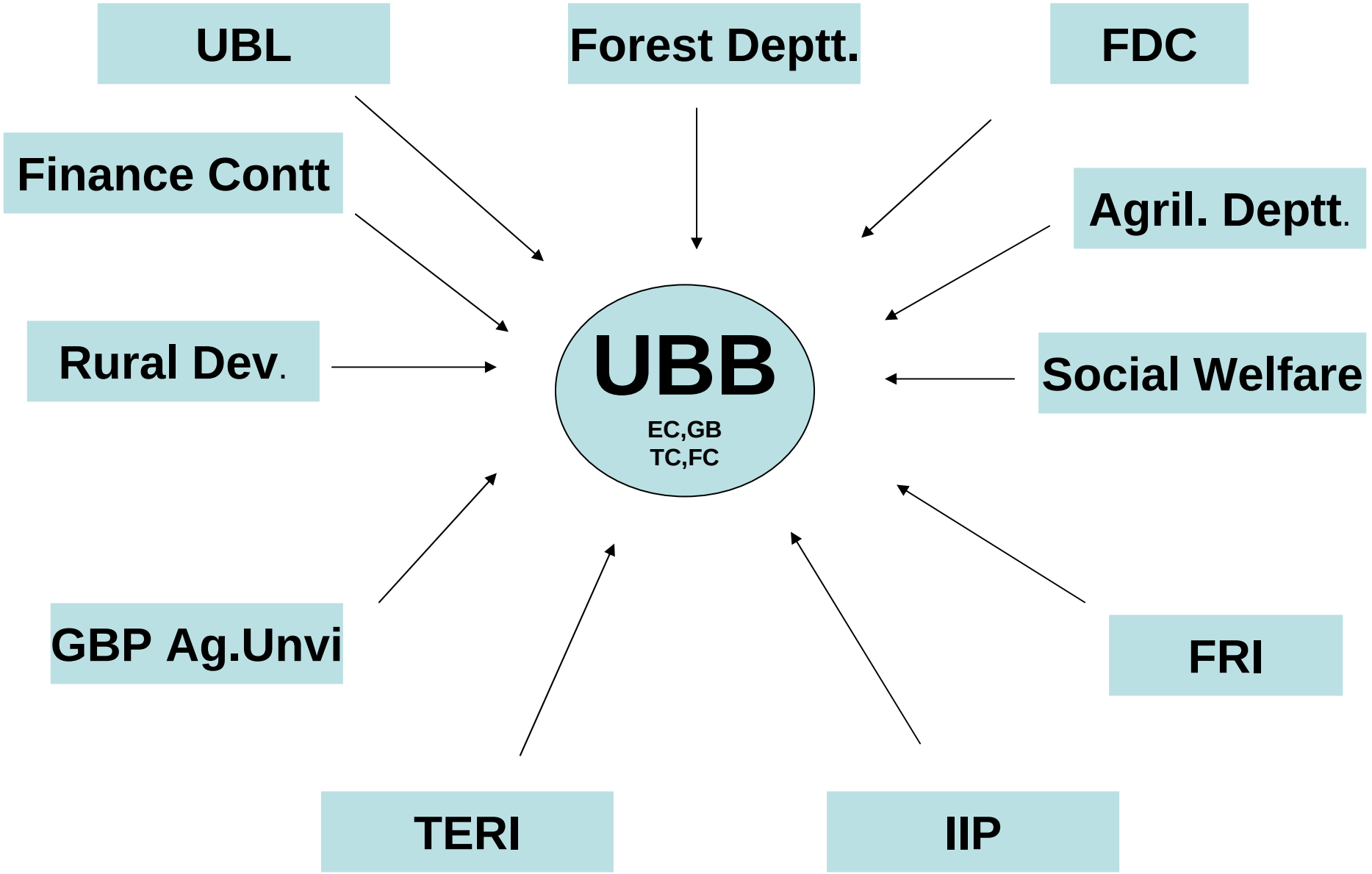
- **Participatory Approach for Planning & Plantation**
- **PPP – External Investment for Processing**
- **Nodal Agency – Uttrakhand Bio Fuel Board**
- **Vision & Mission for Bio Fuel**
- **Motivation & Monitoring by External Agencies**
- **End to End Linkage for Buy Back of Seeds**
- **Promotive & Helping attitude**
- **Transparency in Payments & Services**

Implementation Strategy

- **UK Biofuel Board (UBB) as Nodal Agency**
- **UBB has wide representation from Govt. & Non Govt.**
- **Van Panchayats identified as Grass Root Implementing Unit & BPL in VP as Beneficiaries (I Card issued)**
- **Transparent payment to beneficiaries through ECS/Banks**
- **Backward & Forward linkages established for seeds**
- **Price policy for Jatropha Seeds**
- **Proper Motivation & Monitoring by NGOs and Funding Agencies**
- **Finance & Technical Committees**
- **Follow Proper Accounting & Auditing system**
- **R & D Task Force of Res. Institutes with UBB**
- **Bio diesel processing unit by Private Partner under establishment**
- **Diversified activities on Renewable Energy**

Uttrakhand Bio Fuel Board

- Forest Department (CCF).
- Forest Development Corporation (CF)
- Agricultural Department (Addl. Secretary/Director)
- Rural Department (Addl. Secretary)
- Social Welfare Department (Addl. Secretary)
- Finance Controller (Forest Department)
- Director IIP
- Addl. Director TERI
- Scientist Pant Nagar University
- Head Silviculture FRI
- Private Partner selected through Expression of Interest (Company)
- **Roles of Stakeholders defined**


UBL
Forest Deptt.
FDC
Finance Contt
Agril. Deptt.
Rural Dev.
UBB
EC,GB
TC,FC
Social Welfare
GBP Ag.Unvi
FRI
TERI
IIP

Modus Operandi

Van Panchayat	-	Constituted by Revenue Deptt.
Beneficiaries	-	Chosen by V.P (Issued Photo identity)
Land Identification & Micro Planning	-	By Van Panchayat/Forest deptt..
Nursery	-	By Beneficiaries/ Board/ forest department.
Plantation	-	By Beneficiaries
Protection	-	By Beneficiaries
Seed collection	-	By Beneficiaries
Transportation to motor head	-	By Beneficiaries
Transportation to processing unit	-	By Private Partner.
Price Payment	-	By Private Partner.

Forest Dev. Co.

↓

Van Panchayat

↓

Beneficiaries

Economic Cycle

Expected Yield	-	4500 Kg/ha = Rs.13500/- per ha.
↓		
Cost at Processing Unit	-	Rs.5/- per Kg.
↓		
Seed /Lts oil	-	3.3 Kgs.
↓		
Cost Of Seed	-	Rs. 16.50/- Per Lts of Oil.
↓		
Tranesterification	-	Rs.9/per Lts
Less Cake Produced	-	Rs.2.23 (2.23 Kgs)
↓		
Less Cost of Glycerol	-	Rs.3.80/- per Lts. (.09 kgs)
Cost Of Bio Diesel	-	Rs.20per Lts.
Local Transport	-	Re. 1/per lts.
Processor Profit	-	Rs.4/- per Lts.
Total Cost/ Lts	-	Rs.25 Per Lts.

Criteria for selection for beneficiaries & Areas

- **Priority had been given to following beneficiaries:-**
  - ✓ **Female.**
  - ✓ **B.P.L.**
  - ✓ **S.C.**
  - ✓ **S T**
  - **The Targeted area in the first phase will be Van Panchayat degraded Lands**

Identity Card Issued to Beneficiaries

igpku i=k dk izk:i

ID CARD	पहचान-पत्र
Date of registration : 15-10-2004 Name: Father's name: Address: Family members: Name of Sarpanch:	

UHBB nominee:
Forest guard:

Bank A/C No. ----------

Capacity building of Van Panchayat Sarpanch and beneficiaries

- Meetings with Sarpanch and beneficiaries village level.

- Training & workshops are organized at Division & State level

- Technical demonstration to execute the works.

Jatropha Nursery

Different stages of Seed Germination

Patethi Nursery

Jatropha Nursery SHG

Uttaranchal Organic Commodity Board

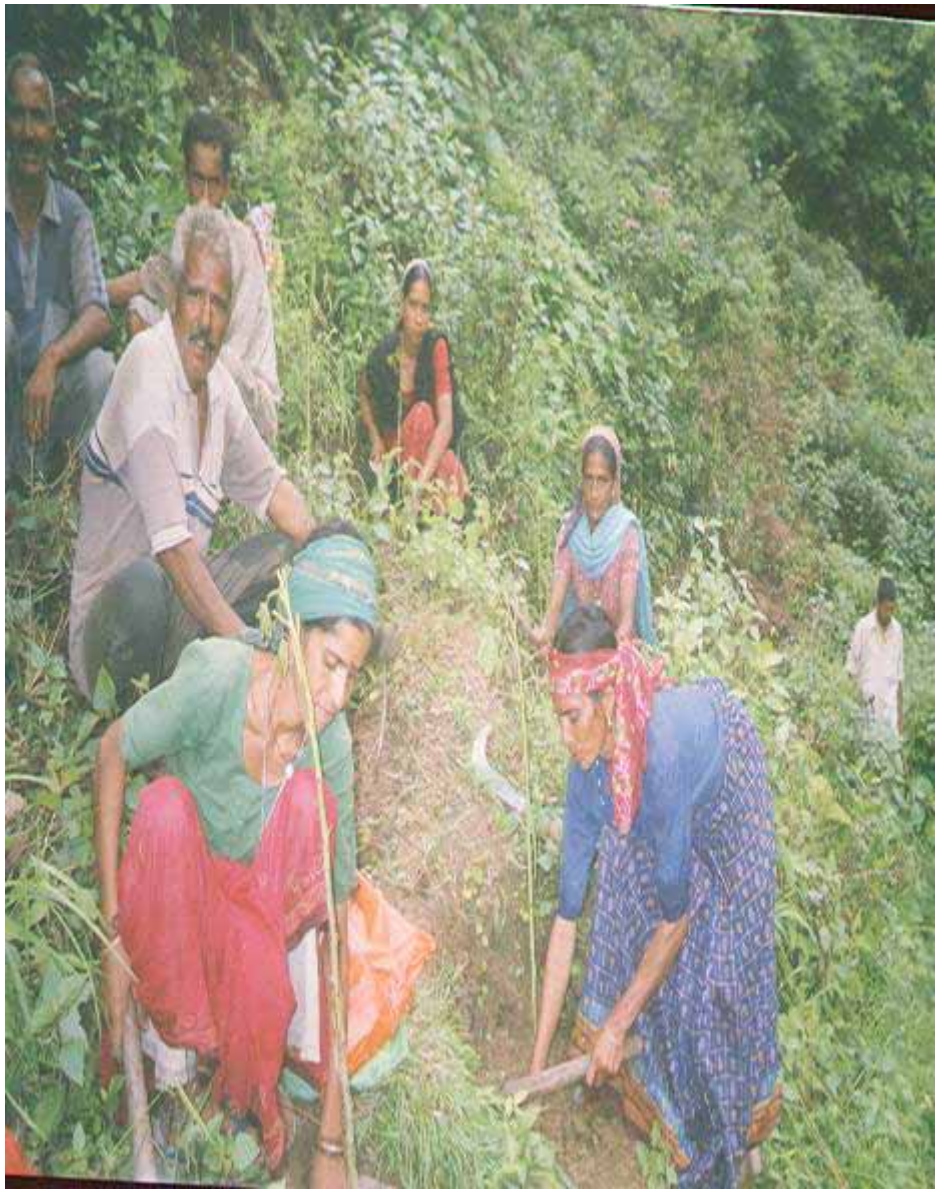
- **Vermi Culture**
- **Biodynamic Composting**
- **E.M. Composting**
- **Nadep Composting**
- **Phospho Composting**

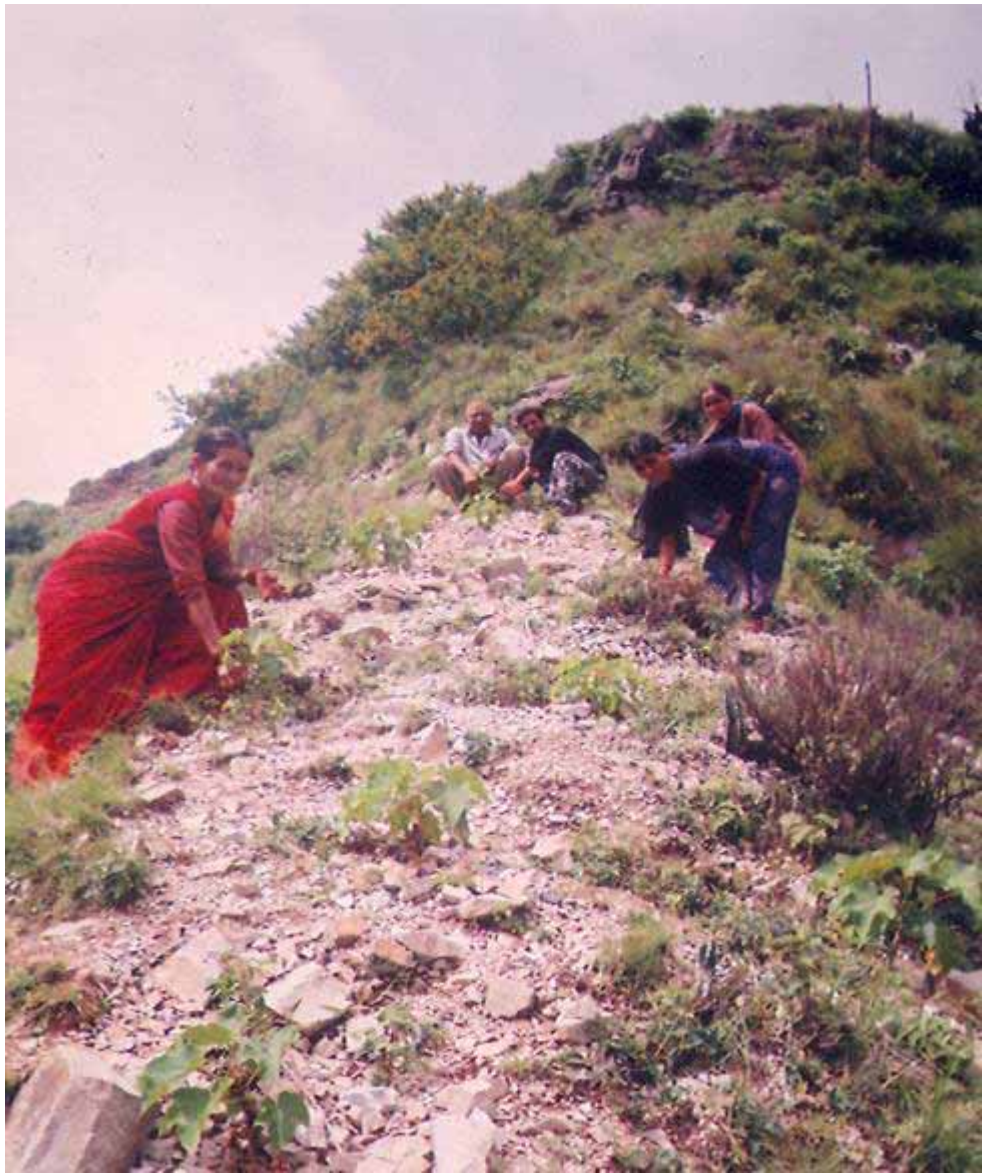
Now Stakeholder in Jatropha Plantation

Jatropha plantation with People participation

Jatropha Plantation Through Community Participation

Plantation by Women





Jetropha plantation in degraded Land

Jatropha Plantation & Monitoring

Motivation & Monitoring

ACTION FOR WOMAN AND RURAL DEVELOPMENT (AWARD)

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NGO Association with UA Biofuel Board

- ✓ Motivation
- ✓ Monitoring & Evaluation of plantation
- ✓ Trainings & Orientation of beneficiaries & VP members
- ✓ Liaisoning

ESTIMATED AVERAGE INCOME PER FAMILY/ 2 ha

Wage supplement for Nursery raising	One Time	Rs.7000/-
Plantation	One Time	Rs.20,000/-
Protection & Maintenance	Annually	Rs. 2,500/-
Sale Of Produce from 5th year.	Annually .	Rs. 25,000/-

Cheque Distribution – 28/09/05

Cheque Distribution By DFO to Beneficiary

Distribution of cheque by Block Pramukh to Beneficiary

UTTARANCHAL BIOFUELS Ltd
establish a Unit of 600 TPD Production at Haridwar

Achievements of UBB

- Districts : 9
- Van Panchayats: 873
- Beneficiaries: 7860
- Plantation Area: 13530 ha

Jatropha Plantation Progress

Sl.No.	District	VanPanchayat	Beneficiaries	Area(ha)	No. of Plants
2004-05					
	Dehradun	29	187	360	557924
2005-06					
	Dehradun	170	1994	2786	4652406
	Tehri	28	317	630	1417500
	Pauri	65	436	907	2055498
	Chamoli	54	413	745	1705500
	Rudra Prayag	21	154	300	675000
	Champawat	45	345	1162	2614500
	Nainital	25	196	477	1073250
	Total	437	4042	7367	14751578

Jatropha Plantation 2006-07

Distt.	V.Panchayats	Beneficiaries	Area (ha)	**No.Of Plants(lakh)**
Dehradun	52	357	700	17.50
Tehri	15	150	300	07.50
Pauri	22	160	300	07.50
Nainital	42	414	800	20.00
Almora	69	575	700	17.50
Total	200	1656	2800	70.00

Research

&

Development

on

Jatropha

R & D---FERTILIZER, CUTTING & PRUNNING

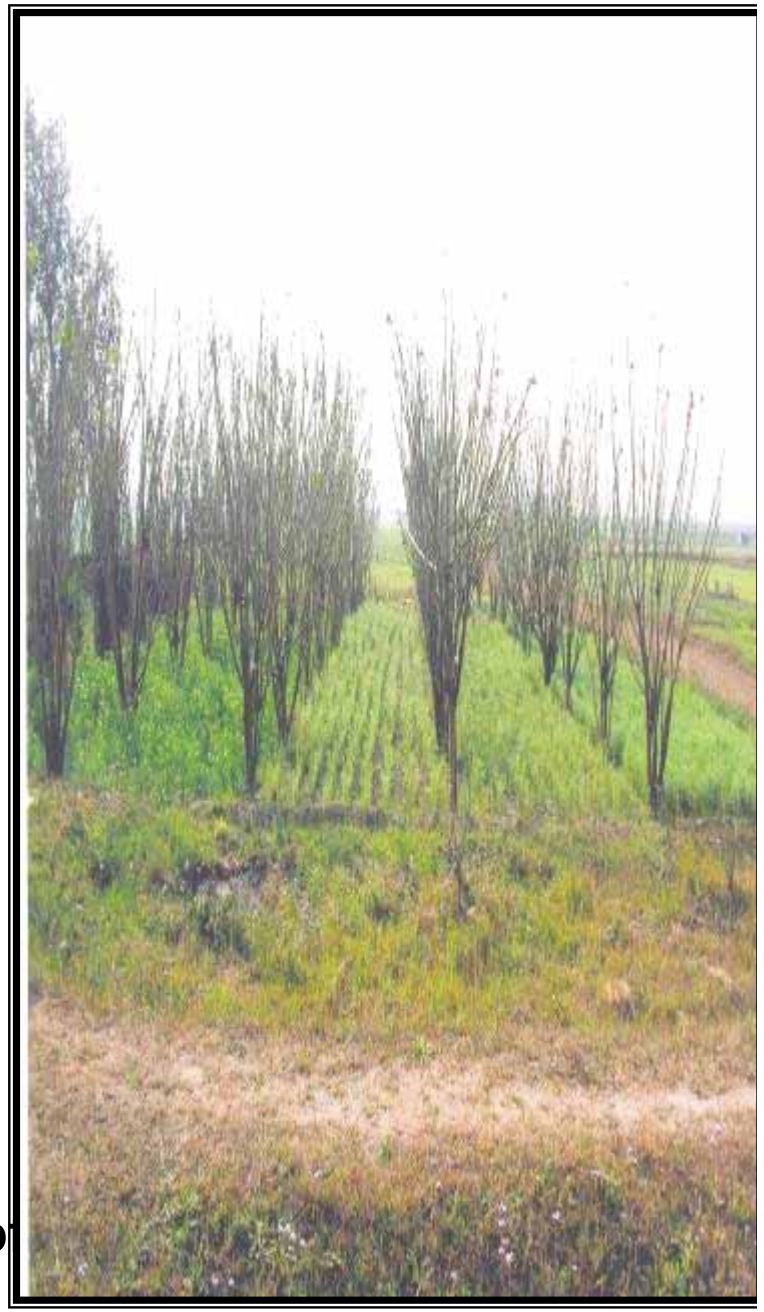
Ist year plantation (June-July)	Pruning @ 50% pni branches (Feb.)
IIst year plantation	@ 50% sec. branches (Feb.)
FERTILIZER	
Ist year Plantation pits 5kg compost+100g SSP PSB+Azeto+Trichoderma	5kg compost + 100g SSP PSB + Azeto
IIst year	5kg compost + 100g SSP PSB + Azeto

Pruning of branches

R & D---PLANTATION DISTANCE & INTERCROPPING

Tractor/Bullock drawn **3 × 3 m**

Manual **2 × 2m**



INTERCROP OR MAIN CROP ?

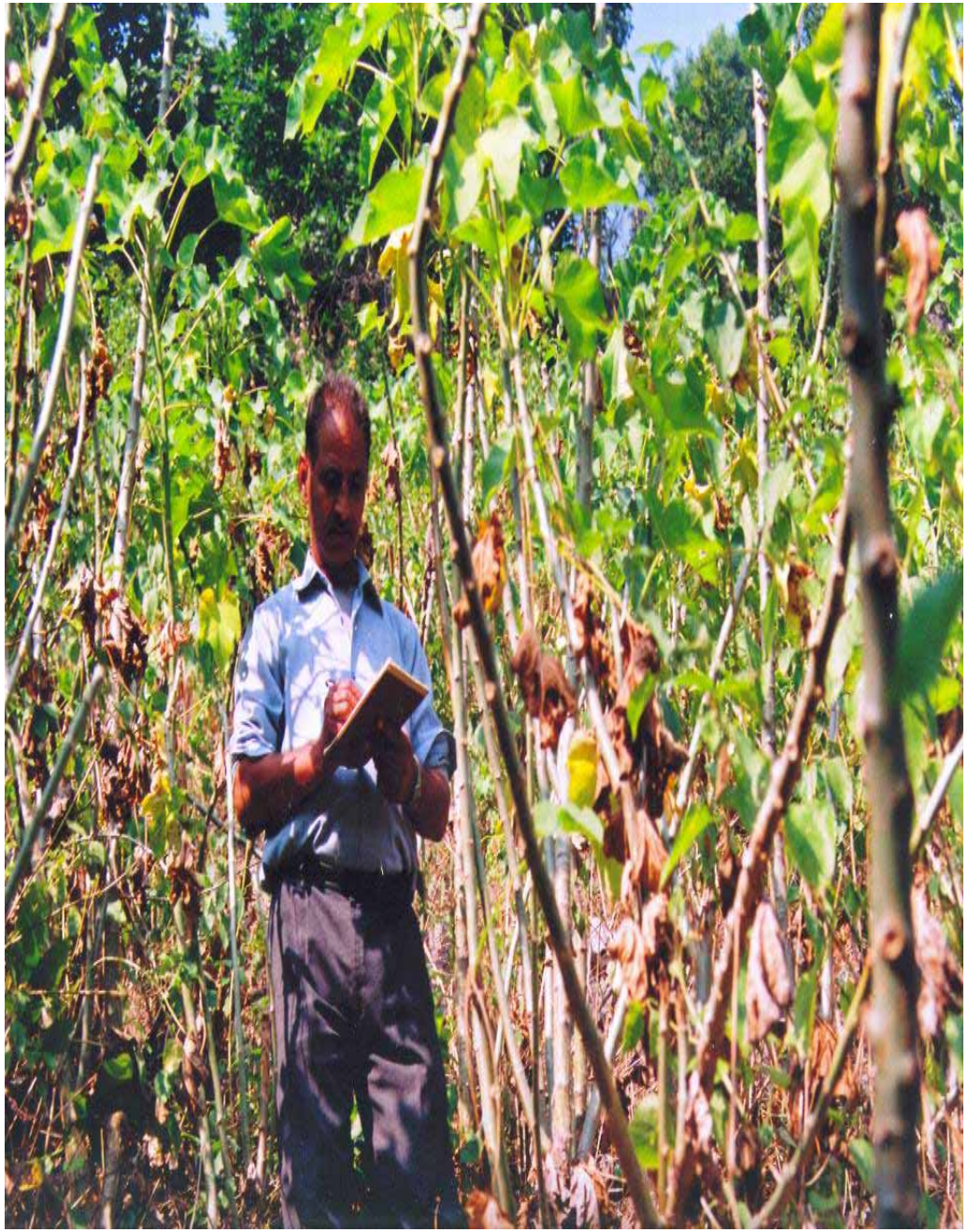
Intercropping necessary to sustain 1st to 5 yrs

The main economy will be from base crop and Jatropha be taken as bonus crop

June	November	March
Moong bean	Gram	M&AP crops
Urdbean	Lentil	Moong bean
Soybean	Pea	Urdbean
Lobia	Garlic	Lobia
	Onion	
	Coriander	

The base crop should not pass the canopy of Jatropha

Study of existing CPTs



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Participation & Results

- People
- Departments
- Corporation
- NGO & other Institutions
- Res.Institutes
- Banks
- State & Central Govt.
- Private Partner

RECOMMENDATIONS OF THE BIO-DIESEL CONFERENCE TOWARDS ENERGY INDEPENDENCE - FOCUS ON *JATROPHA*

HELD AT
RASHTRAPATI NILAYAM, BOLARAM
HYDERABAD
ON
9-10, JUNE 2006

Rashtrapati Bhavan
New Delhi

Implementation

24. The conference concluded that there is a need to co-ordinate the current fragmented approach practiced by different agencies in the *Jatropha* programme. It was urged that a well-conceived and an adequately empowered mission mode system should be adopted to coordinate and accelerate all efforts in the whole process of production, processing, marketing and research. This should also include awareness generation programmes about *Jatropha*, at all levels.

25. Towards the achievement of the target, each State should have a comprehensive plan to match the area coverage and seed material production plan at different levels so as to achieve the set target in bio-diesel production. This has to be monitored at the District, State and Central Government levels.

26. In each State, there should be a *Jatropha*/Bio-diesel monitoring and coordinating agency (e.g. Bio-Fuel Board in Uttaranchal). **At the national level, the setting up of a National Bio-fuel Mission is very urgent.** This Mission could be responsible for creating a network of bio-fuel production centres in the country through different agencies. The body may look into regulatory aspects to encourage blending and taxation at Central and State levels and also encourage market support and public-private partnerships. The mission may consider an appropriate name for bio-diesel to minimise excise, taxes etc.

27. Till productivity of seeds is improved and best cultivation practices are established, bio-diesel would not be cost-competitive at the

UTTARANCHAL MISSION TEAM WITH H.E. The PRESIDENT OF INDIA (2005)

Thank You

Dr. S D Singh IFS

Conservator of Forests/ Vice Chairman

UK Biofuel Board

UAFDC Dehradun

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