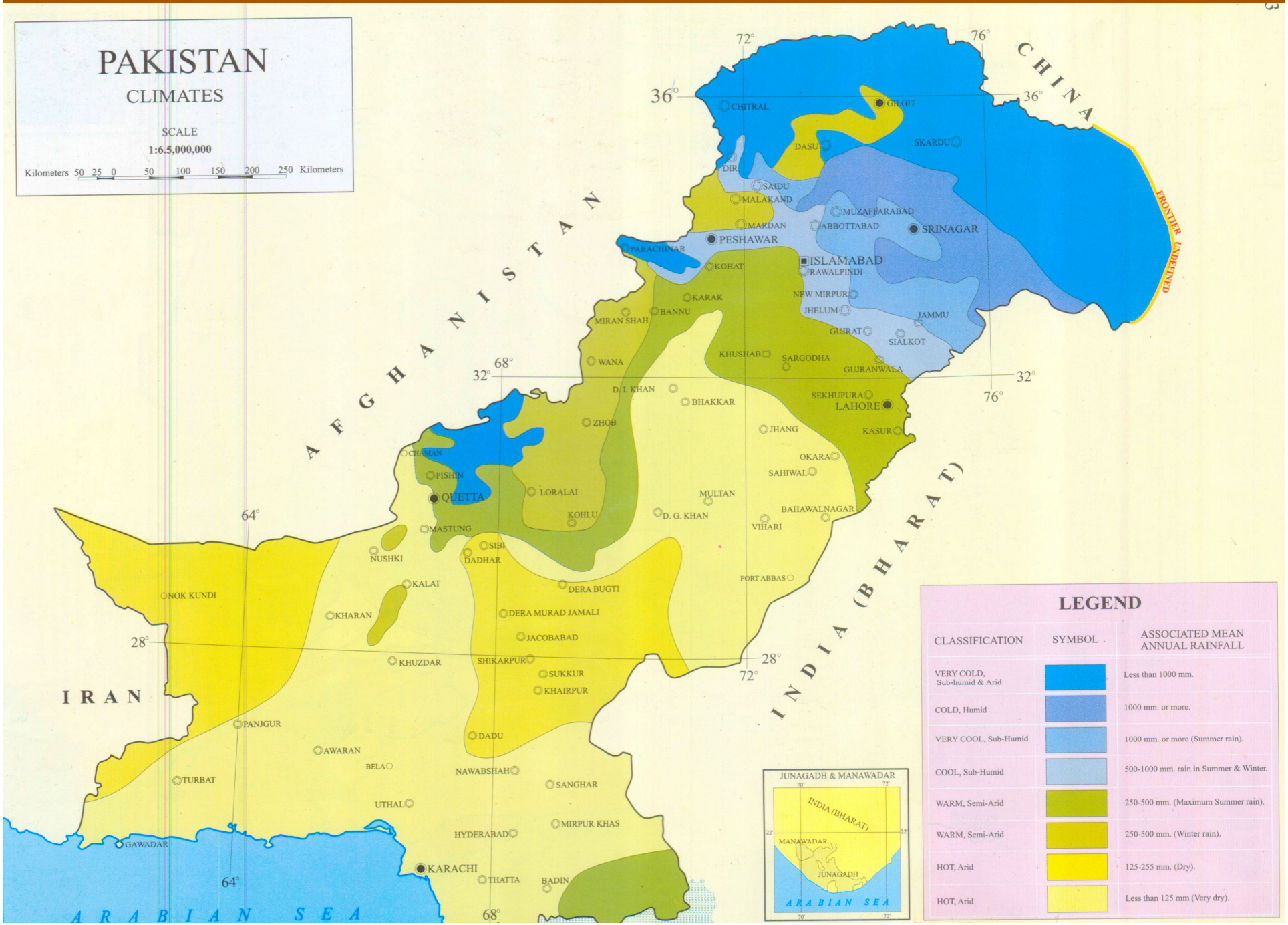
CULTIVATION OF *JATROPHA CURCAS* IN PAKISTAN

INTRODUCTION OF PAKISTAN

- Geographical location : 24^{o} – 37^{o} N latitude
  61^{o} – 75^{o} E longitudes
- Population : About 170 Million
- Area : 87.98 million ha
- Climate
  - Precipitation : Highly varied 50 mm to 1500 mm
  - Temperature : Very hot in plains (upto 50^{o} C)
    – 12^{o} C in the mountainous regions
  - Winds : Hot and desiccating winds in plains with dust storms in summer
- Arid & semi arid area : > 70%

MAP OF PAKISTAN

CLIMATIC REGIONS



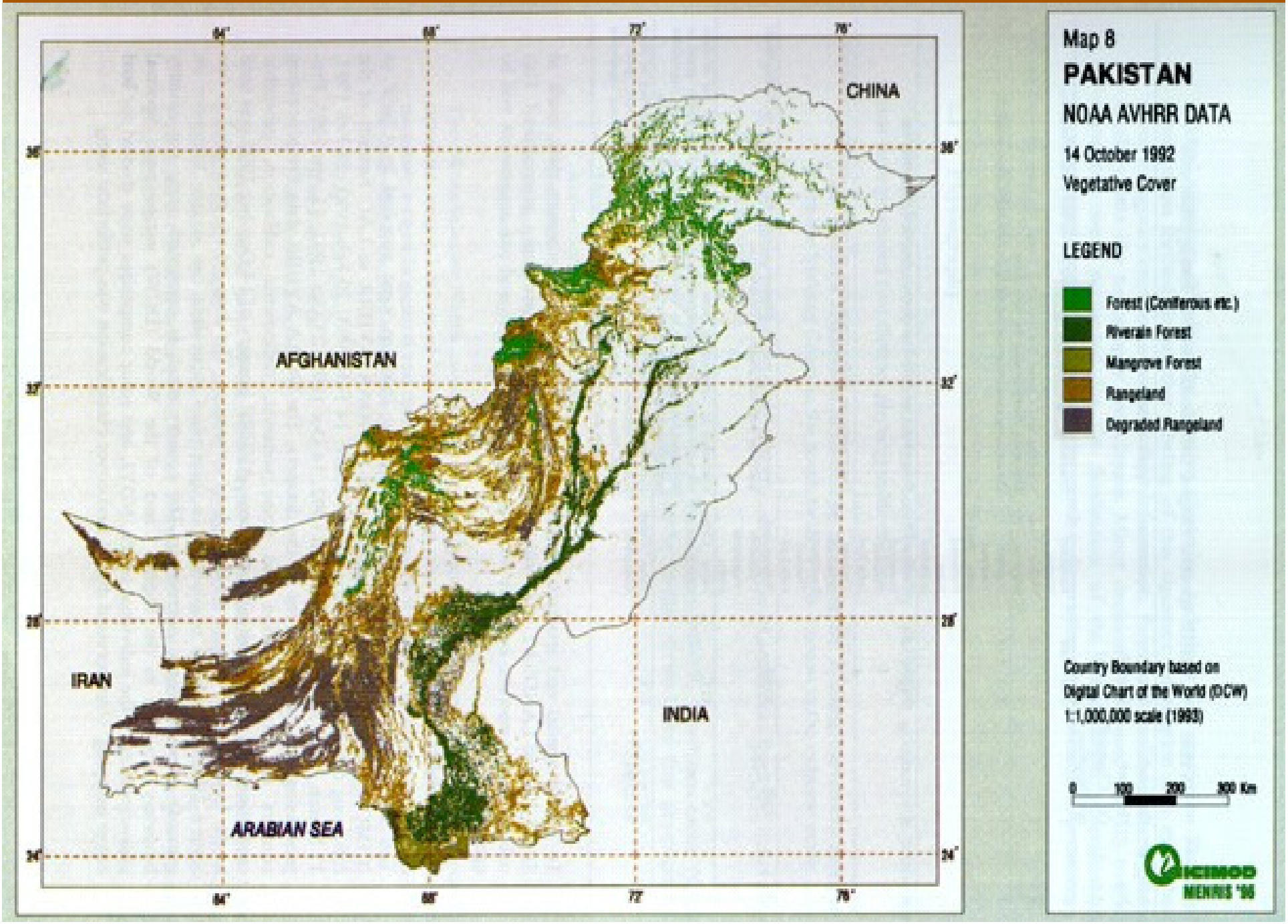
STATE OF FORESTRY

- Forest types and area

(Million ha)

Forest types	Total area	Percentage
Coniferous	1.930	40.92
Irrigated	0.259	5.49
Riverain	0.332	7.03
Scrub	1.639	34.75
Coastal	0.512	10.86
Mazri land	0.024	0.51
Linear plantations	0.021	0.44
Total	**4.717**	**100.00**

FOREST TYPES



MAJOR ENVIRONMENTAL ISSUES IN PAKISTAN

- **Deforestation**

  Causing serious consequences to environment as well as food security. According to an estimate deforestation rate was estimated as 2.1%.

- **Desertification**
  - land degradation due to deforestation, overgrazing, extreme climatic variations such as prolonged drought, flash floods
  - 11.2 million ha. of land affected by water erosion
  - 2.0 million ha affected by water-logging
  - 6.0 million ha affected by salinity
  - 3-5 million ha of land is affected by wind erosion in desert regions
  - rangelands cover about 60 % of the country, 48 % of which are degraded

- Loss of biodiversity
- Degradation of unique forest ecosystem e.g. Mangroves, Juniper forests
- Depletion of range areas productivity and renewable energy sources
- Climate Change
- Environmental Pollution

STEPS TAKEN BY THE GOVERNMENT FOR CONSERVATION AND REHABILITATION OF NATURAL RESOURCES

- A number of initiatives have been taken and many developmental programmes were launched including:
  - Forestry Sector Master Plan
  - National Environment Policy
  - National Forest Policy
  - Biodiversity Action Plan
  - Sustainable Land Management Project
  - Watershed Management Projects

WHY BIOFUELS?

- Pakistan facing extreme shortage of energy
- According to an estimate the energy demand may increase from 60.4 to 129 million tones of oil equivalent in the next 15 years
- High cost of oil import bill
- High rate of desertification
- Loss of vegetation cover

SELECTION OF JATROPHA CURCAS FOR BIOFUEL

- Suitable to many site conditions in arid and semi-arid areas of the country
- Easy propagation
- High survival rate
- Non-palatable
- Early economic returns

EXPERIMENTAL WORK ON *JATROPHA* CULTIVATION BY PAKISTAN FOREST INSTITUTE (PFI)

1.	Title of Study	:	Comparative growth study of different provenances of *Jatropha curcas*
2.	Location	:	Dera Ismail Khan (NWFP)
3.	Objective	:	To select the best performing provenance of *Jatropha* under local site condition
4.	Treatments	:	11 Provenances (Including 10 Indian and one Australian)
5.	Planting material	:	Polythene tube plants
6.	Total No. of plants	:	330 at 3 x 3 spacing
7.	Date of planting	:	25th October, 2009

BLOCK PLANTATION OF *JATROPHA CURCAS*

Plantation No. 1

1.	Location	:	Rakh Dagar Kotli (Punjab)
2.	Objective	:	To assess the growth performance of Jatropha plants under sandy desert conditions and establish seed source
3.	Planting material	:	Polythene tube plants
4.	No. of plants	:	988 at 3 x 3 m
5.	Seed source	:	Tamil Nado (India)
6.	Date of planting	:	5th March , 2009
7.	Survival	:	99 % (after two months of plantation)

Plantation No. 2

1. Location : Rakh Dagar Kotli (Punjab)

2. No. of plants : 4,000 at 3 x 3 m

3. Date of plantation : August 15, 2009

4. Survival % : 50% (severe damage by porcupine)

NURSERY RAISING OF JATROPHA CURCAS

Nursery No.1

1.	Location	:	Pakistan Forest Institute , Peshawar
2.	Sowing method	:	Polythene tubes (18x5 cm)
3.	Sowing date	:	July 9, 2009
4.	No of tubes sown	:	1000
5.	Germination of seed	:	84%

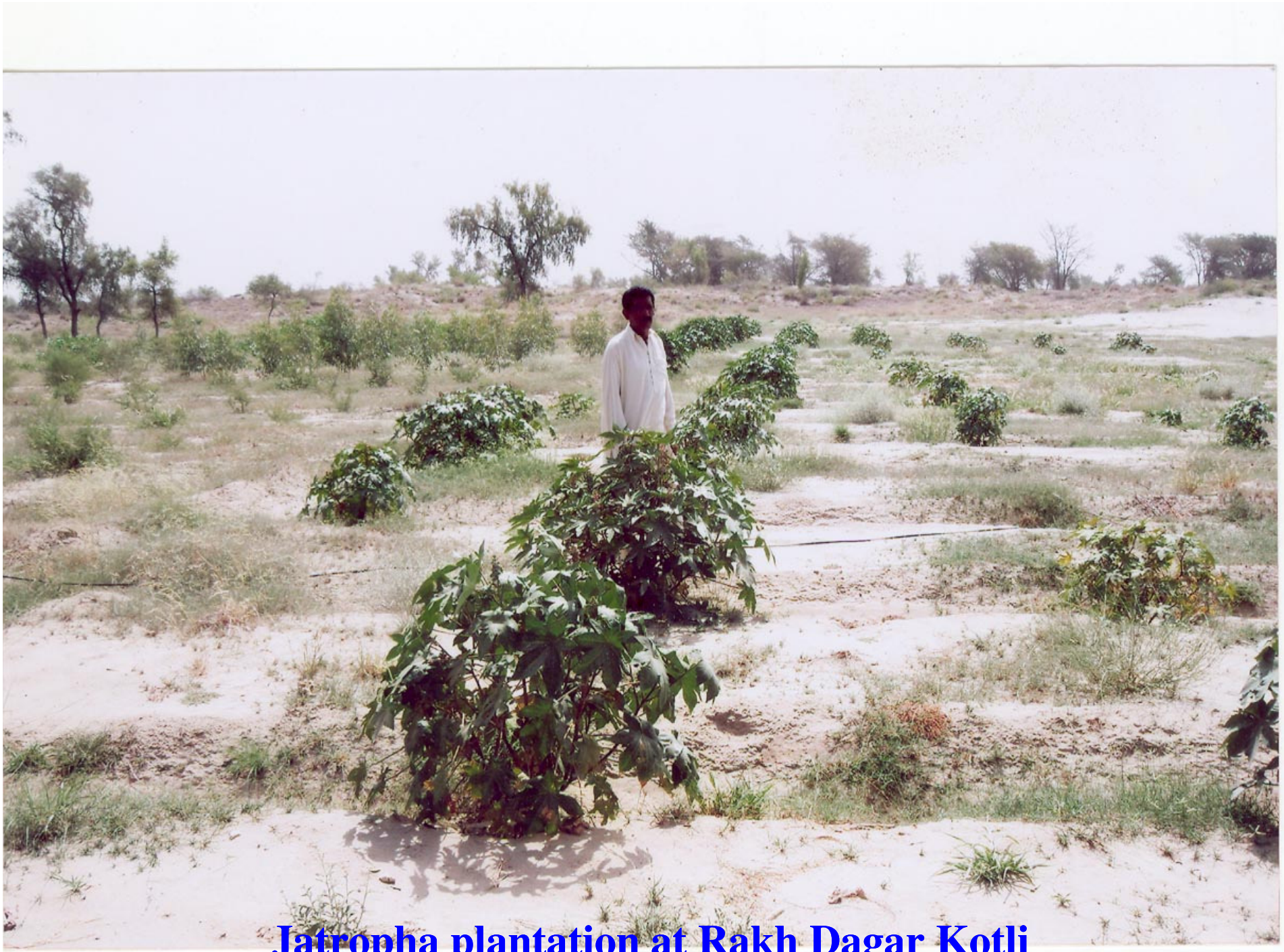

JATROPHA
CURCAS
SOWING: July 9,2009

Nursery No. 2.

1.	Location:	:	Dera Ismail Khan (NWFP)
2.	Sowing method	:	Polythene tubes (18x5 cm)
3.	No of tubes sown	:	8000
4.	Sowing date	:	July 13,2009
5.	Average size of seedlings	:	40 cm (after 4 months)

Sandy desert area of Rakh Dagar Kotli

Site preparation for Jatropha planting



Jatropha plantation at Rakh Dagar Kotli

SUGGESTIONS FOR SUSTAINABLE PRODUCTION OF BIOFUELS

- Organizing effective community based management system
- Participatory approach to develop joint ventures of government, private sector and farmers
- Association of plant scientists with the farming community for advising appropriate management of biofuel crops.

Contd…..

- Development of standard cultivation and harvesting practices, blending with indigenous technologies
- Land evaluation and demarcation of areas for production of biofuel crops
- Financial support to farmers through micro-credit schemes