



DIRECTION OF HEMP RESEARCH AND HEMP MARKET IN REFERENCE TO INDIAN CONTEXT

Prepared for: EIHA (13th International Conference)

Prepared by: Rohit Sharma - (President IIHA)

18 January 2016

Proposal number: EIHA-0001

## TOPICS

- ▶ IIHA VIDEO PROFILE
- ▶ REGULATORY GOVERNMENT BODIES & PROVISIONS
- ▶ SUITABLE CLIMATE FOR GROWING HEMP IN (INDIA)
- ▶ HEMP RESEARCH WORK BY IIHA AND OPPORTUNITIES



REGULATORY GOVERNMENT BODIES &  
PROVISIONS

**FOR HEMP IN INDIA**

# MINISTRY OF 'HOME AFFAIRS'

- ▶ Ministry of Finance & Revenue
- ▶ Central Excise/ State Excise
- ▶ Central Bureau Of Narcotics (CBN)
- ▶ Narcotics Control Bureau (NCB)
- ▶ Crime Branch
- ▶ Ministry of Agriculture and Horticulture
- ▶ Department Of Ayush
- ▶ Ministry of Textile (For Fibre )
- ▶ FSSAI (For food products)



### **flavouring agent**

Notwithstanding anything contained in section 8, the Central Government may permit, with or without conditions, and on behalf of Government, the cultivation of any coca plant or gathering of any portion thereof or the production, possession, sale, purchase, transport, import inter-state, export inter-state or import into India of coca leaves for use in preparation of any flavouring agent which shall not contain any alkaloid and to the extent necessary for such use.

### **14. Special provisions relating to cannabis**

Notwithstanding anything contained in section 8, Government, may, by general or special order and subject to such conditions as may be specified in such order, allow cultivation of any cannabis plant for industrial purposes only of obtaining fibre or seed or for horticultural purposes.

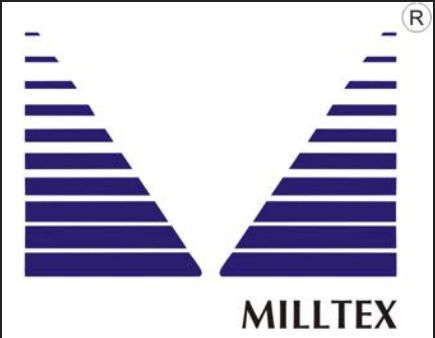
## **Chapter IV**

### **Offences and penalties**

### **<sup>1</sup> [15. Punishment for contravention in relation to poppy straw**

Whoever, in contravention of any provisions of this Act or any rule or order made or condition of a licence granted thereunder, produces, possesses, transports, imports inter-state, exports inter-state,

Consortium



## Government Bodies with IIHA



**APEDA**  
**Agricultural & Processed Food Products**  
**Export Development Authority**  
Ministry of Commerce & Industry, Government of India



भारत सरकार  
Government of India

केन्द्रीय नारकोटिक्स ब्यूरो  
Central Bureau of Narcotics

वित्त मंत्रालय  
राजस्व विभाग  
Ministry of Finance  
Department of Revenue



NATIONAL INSTITUTE OF FASHION TECHNOLOGY  
Ministry of Textiles, Govt. of India

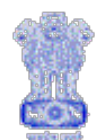


MINISTRY OF  
**FINANCE**

GOVERNMENT OF INDIA



Food Safety and standards  
Authority of india



Govt of India

**Ministry of Textiles**



**CSIR**  
COUNCIL OF SCIENTIFIC & INDUSTRIAL  
RESEARCH



सत्यमेव जयते

**DSIR DEPARTMENT OF SCIENTIFIC & INDUSTRIAL RESEARCH**

# IIHA Core Team



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Vice President (IIHA)



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**VIPUL SAREEN**  
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Product Knowledge Expert (IIHA)(Canada)



**VARUN SUDAN**  
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**DR. K.M. CHACKO**  
Chairman (Shriram Institute for Industrial...



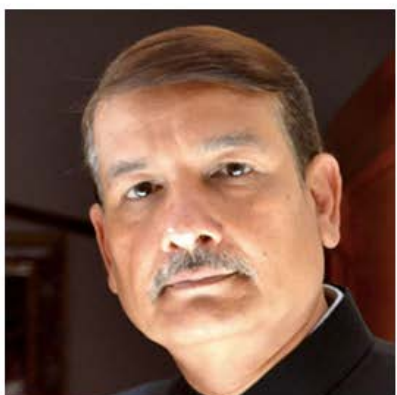
**DR. VINAY TYAGI**  
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(INSIST)



**MR. SAUMAN DAS GUPTA**  
(INSIST)



**DR. KAVYA DASHORA CABI SOUTH A...**  
India Office



ROAD MAP FOR

# HEMP CULTIVATION

## PUBLIC PRIVATE PARTNERSHIP (PPP) MODEL

- ▶ Providing technical expertise and Lab support on behalf of the State Govt.
- ▶ Involving State Government with the Hemp cultivation project as partners with IIHA
- ▶ Providing Sub-Licence to the IIHA members for cultivation of HEMP.
- ▶ Setting up of centralised Hemp processing plant in every state.
- ▶ Support to Import and Export of the Hemp products.

## UPCOMING HEMP PILOT PROJECT CULTIVATION STATES

- ▶ **UTTARAKHAND** - Area upto 1000 hectares (Finalised Medicinal And Industrial)
- ▶ **JHARKHAND** - Area upto 3000 hectares (Finalised)
- ▶ **MDHYAPRADESH** - (Under Screening)
- ▶ **ANDHRA PRADESH** - (Under Screening)
- ▶ **MANIPUR** - (Under Screening)



WITH UTTARAKHAND CHIEF SECRETARY - IIHA TEAM DRAFTING OF POLICY FOR GROWING HEMP



With Chief Minister of Jharkhand Shri Raghubar Das, for Mega Hemp Project in the State.



जारी  
16/3/2016

संख्या: 265/XXIII/2016/04(11)/2012TC

प्रेषक,

डॉ० रणबीर सिंह,  
अपर मुख्य सचिव,  
उत्तराखण्ड शासन।

सेवा में,

आबकारी आयुक्त,  
उत्तराखण्ड।

आबकारी अनुभाग

देहरादून: दिनांक: 16 मई, 2016

विषय :- मेडिकल हैम्प (Medical Hemp) की खेती के सम्बन्ध में।

महोदय,

उपरोक्त विषयक शासन के पत्र संख्या-147/XXIII/2016/04(11)/2012 दिनांक-11.03.2016 का संदर्भ ग्रहण करने का कष्ट करें, जिसके द्वारा पी०एच०डी० चैम्बर (प्रोग्रेस हामोनी डेवलपमेन्ट) के पत्र दिनांक-26.02.2016 एवं एक अन्य फर्म के पत्र की छायाप्रति उपलब्ध कराते हुए बिन्दुवार आख्या एवं प्रस्ताव शासन को उपलब्ध कराने की अपेक्षा की गयी थी, जो अभी तक अप्राप्त है।

अतः इस सम्बन्ध में मुझे पुनः यह कहने का निदेश हुआ है कि प्रश्नगत प्रकरण के सम्बन्ध में आख्या एवं प्रस्ताव शासन को उपलब्ध कराने का कष्ट करें।

भवदीय,

13/5/2016  
(डॉ० रणबीर सिंह)  
अपर मुख्य सचिव 01/1

संख्या: 265/XXIII/2016/04(11)/2012TC तददिनांकित

प्रतिलिपि: क्षेत्रीय, निदेशक पी०एच०डी० चैम्बर्स ऑफ कामर्स और उद्योग, शिवा पैलेस  
द्वितीय तल 57/19 राजपुर रोड देहरादून को सूचनार्थ प्रेषित।

जा.स.

आज्ञा से,

(जीवन सिंह)  
अनु सचिव 01/1

## Now, farmers can cultivate hemp in state

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### Tribune News Service Dehradun, October 10

Chief Minister Harish Rawat has directed for providing licences to farmers for cultivation of hemp, commonly known as bhang.

The Chief Minister at a meeting here today directed for exploring possibilities of using 'kandali' and 'bheemal' in fibre-based industries. He said the rural economy could be strengthened substantially by promoting fibre-based industry in the state. The Chief Minister directed for maintaining the Tetrahydro- cannabinol (THC) intoxication element in hemp as per international standards.

Excise Commissioner Vinayshanker Pandey said, according to international standards, hemp with 0.3 to 1.5 per cent THC can be used industrially. According to the NDPS Act, licences may be given to farmers of all regions, excluding the Bhabar area of the state, but on the condition that the government could buy the yield.

The Chief Minister said Pantnagar University, Vivekanand Research Institution, Almora, and Bharsar University should conduct research to develop such hemp seeds which contain THC elements of 0.3-1.5 per cent in conformation with the international standards. The international market has very high demand of hemp fibre, which is used as bio-fibre. Significantly, the hemp is grown in hill areas.

### Also in this section

[State to recruit doctors from Tamil Nadu, Orissa](#)

[Authorities airlift construction material to Kedarnath](#)

[Inmate's 'rape': Social Welfare Dept to inspect all Nari Niketans](#)

[Hotel Alaknanda to get facelift for Ardh Kumbh](#)

[MP couple fakes death of children to get flood relief](#)

### TOP STORIES

- PM Modi invites Sonia, Manmohan to discuss GST
- ED summons Himachal Chief Minister in money laundering case
- Capt pads up as Bajwa, Jakhar quit
- Kejriwal may shift base for Punjab battle
- Adolescent deaths from AIDS tripled since 2000: UNICEF

### CITY FOCUS

Chandigarh



### HC nod to construction of booths in Sec 15 book market

27 Nov 2015 | 1:56 AM

CHANDIGARH: Opening a new chapter in the scholastic and intellectual history of the city, the Punjab and Haryana High Court has given the green signal for the construction of booths in the Sector 15 book market.

- 33 stolen vehicles recovered from gang
- Rs 2.5 lakh looted from petrol station
- Army jawan booked for raping minor
- 3 doctors offer Rs 2 lakh each to victim Suman to settle case
- Youth hit by vehicle, dies
- Man convicted of 4-year-old girl's rape

# IIHA 1st INTERNATIONAL HEMP CONFERENCE Nov. 2014 - 120 Participants attended the conference



## 2nd IIHA International Conference - Nov. 2015 with 250 Participants.



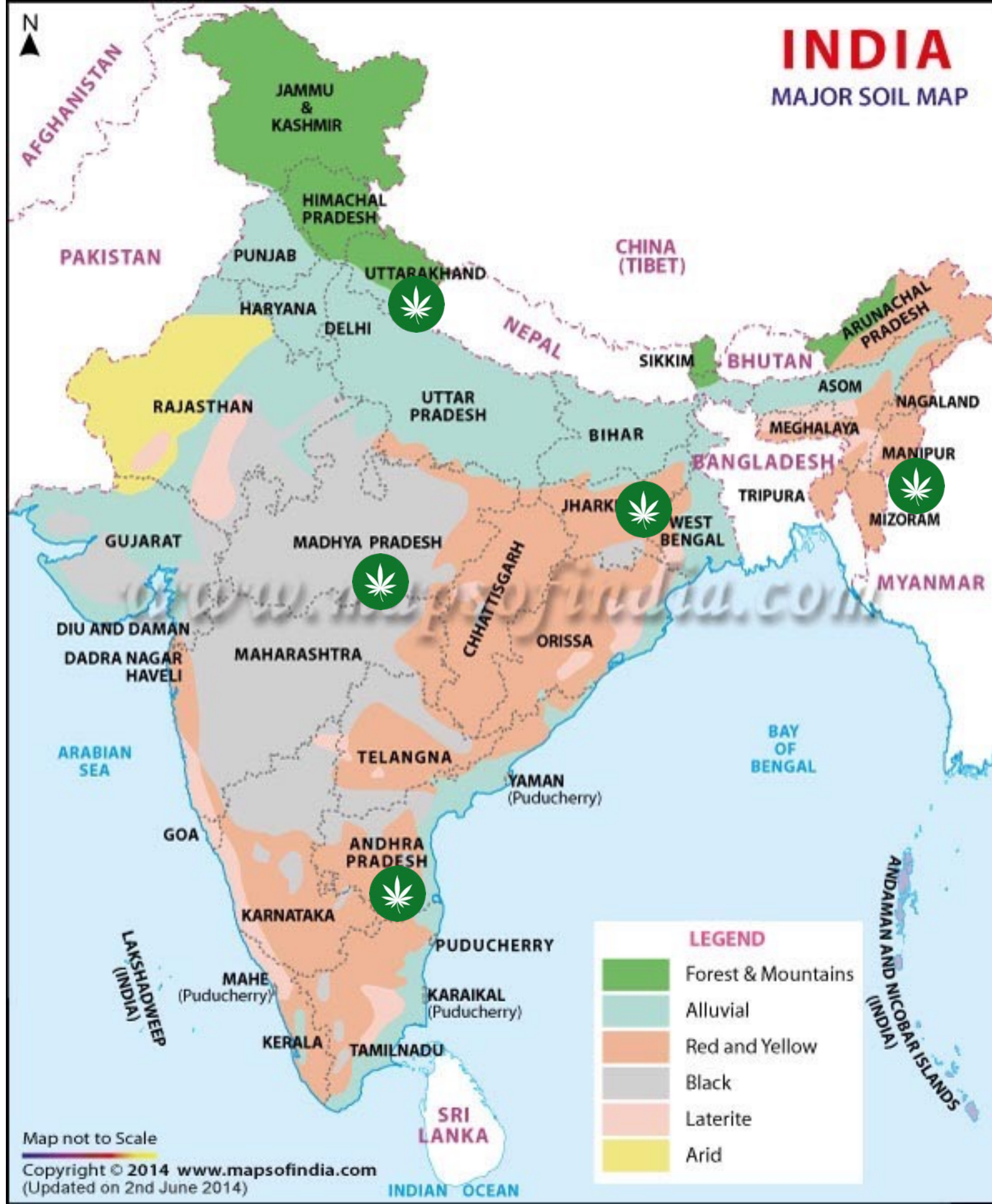
**INTERNATIONAL CONFERENCE  
INDIAN  
INDUSTRIAL  
HEMP  
ASSOCIATION**

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**30<sup>TH</sup>  
NOVEMBER**

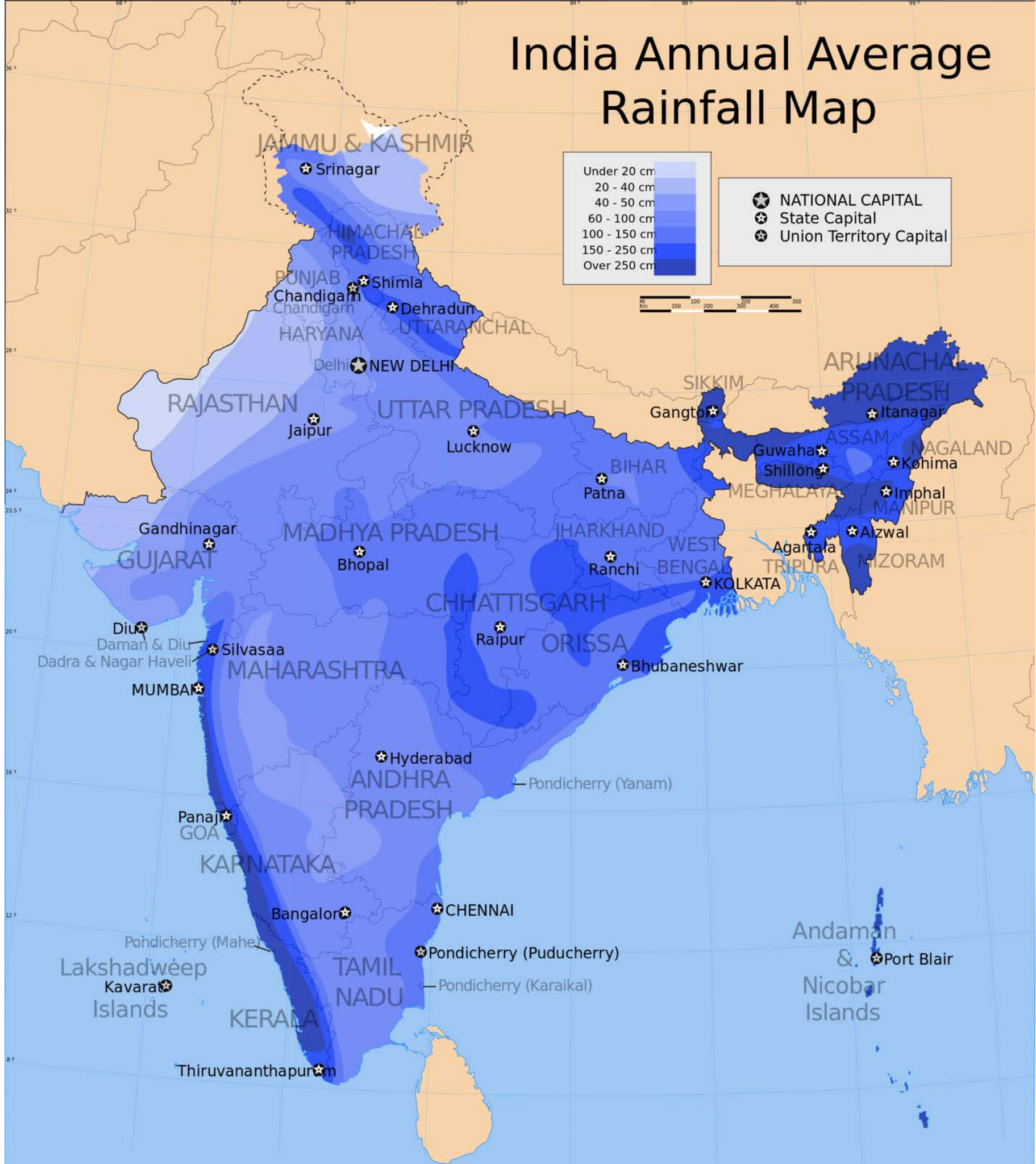
SUITABLE CLIMATE TO GROW

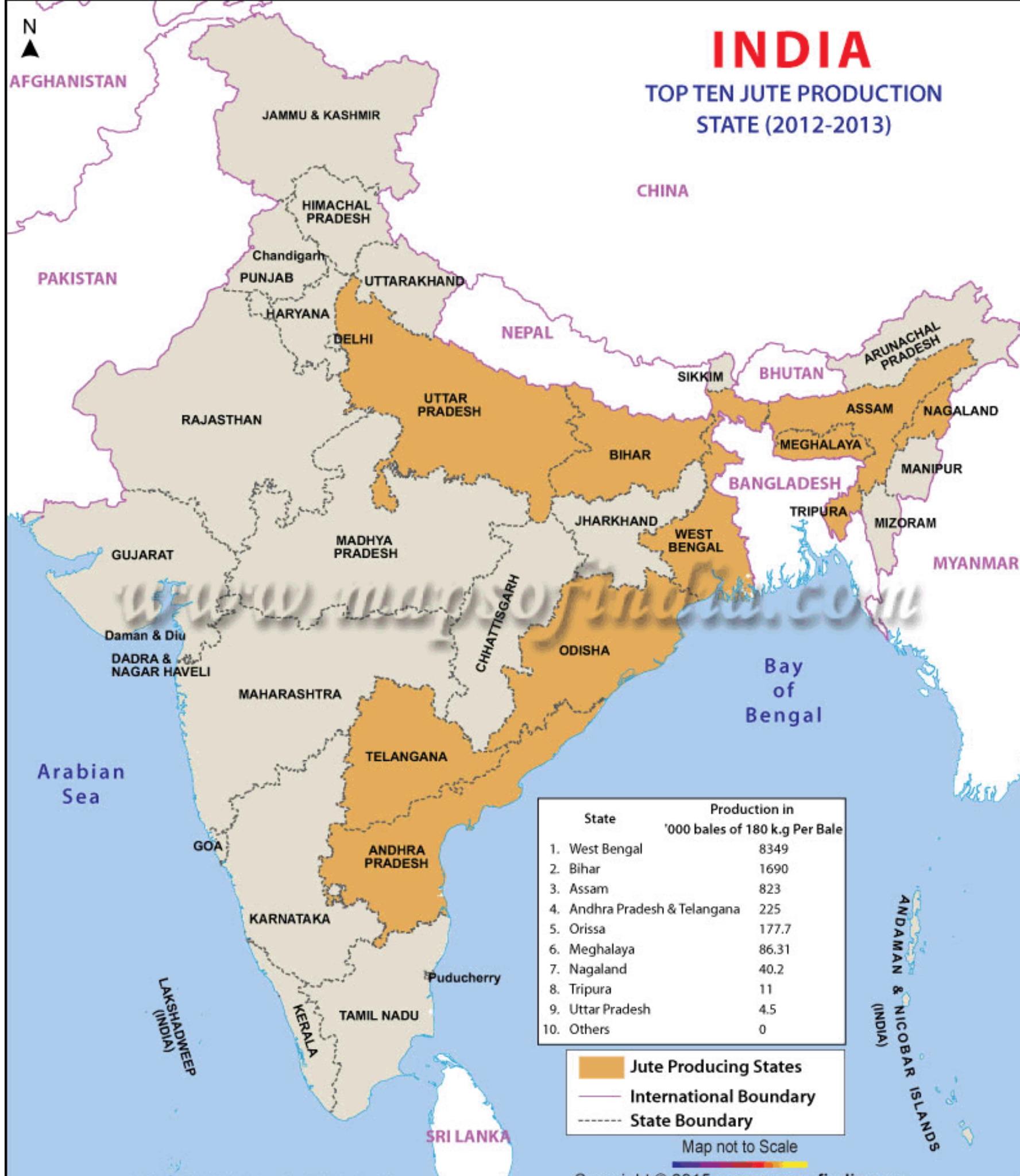
**HEMP IN INDIA**





# India Annual Average Rainfall Map



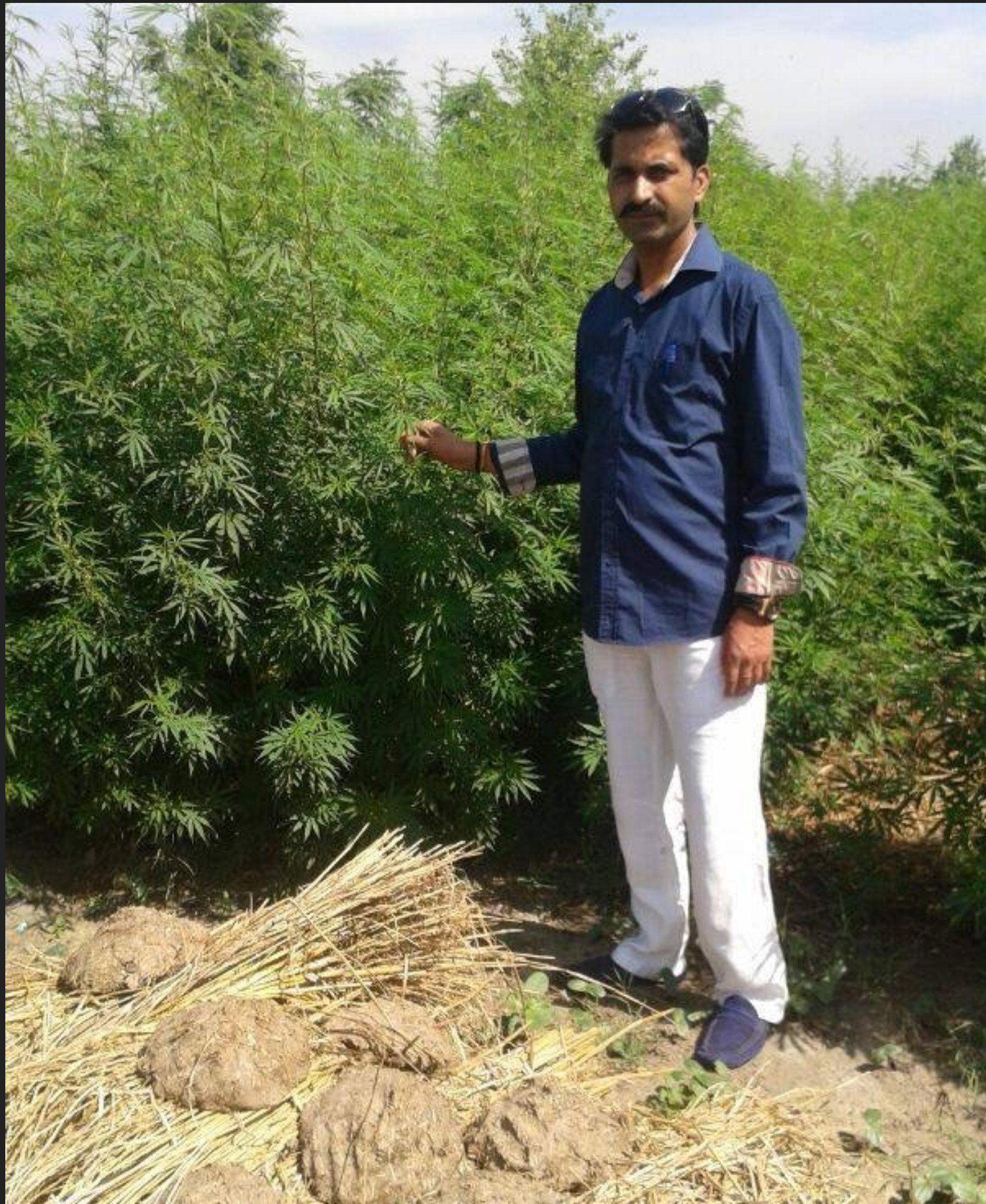




## WILD HEMP









## ILLECT MARIJUANA PLANTATION



# WHERE CAN HEMP BE GROWN IN (INDIA)





# DATA OF HEMP IN INDIA

Sunday, 26 June 2011 - 6:51pm IST Updated: Sunday, 26 June 2011 - 6:54pm IST | Place: Srinagar |  
Agency: dna

Ishfaq-ul-Hassan

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Alarmed by the phenomenon the Jammu and Kashmir government is working on two tracks to get rid of the illegal crops: they want to convince farmers to switch over to alternative crops and destroy the existing crops.

Forget rice and wheat, poppy, bhang and charas are virtually the newest cash crops in the south **Kashmir** bowl. Lakhs of kanals (20 kanal form one hectare) of land is under the cultivation of bhang and charas in south and central Kashmir. More than 200 kanals of land is under the illegal cultivation of poppy in four districts of south Kashmir. Figures released by the J&K government have revealed shocking details about the drug trafficking in the trouble-torn state.

In 2009 the law enforcement agencies seized, 168.775 kilograms of Charas, 01.390 kilograms of Opium and 10961.505 kilograms of Opium derivatives from the drug traffickers. Similarly, 51.974 kilograms of Charas, 02.414 kilograms Opium, 16577.550 kilograms of Opium derivatives, 68 kilograms of Bhang and 24 kilograms of Ganja were seized by April 2010.

[CAR](#) CARDEKHO

**MARUTI BA**  
FIRST DRIVE REV

CLICK HERE  
TO WATCH



#### RECOMMENDED CONTE

Nawaz Sharif encouraging separatists by writing to Asiy Andrabi, says Congress

Bengaluru: Rain and cold weather to persist for next 2 hours, cricket fans disappointed

# Marijuana plants destroyed in bordering villages of Tripura

19 days ago

01-11-2015

ANI

Bishalghar (Tripura), Nov. 1 : **About 35,000 marijuana** plants were destroyed in the bordering villages of Tripura during a joint drive by the BSF, police, forest department, excise and the general administration.



Fri  
**06**  
Nov

## Over one lakh marijuana plants destroyed in Tripura

Submitted by [Marijuana News](#) on Fri, 11/06/2015 - 10:42



Agartala, Nov. 6 (ANI): The Border Security Force (BSF), along with state administration, police and forest officials, on Friday destroyed 1.25 lakh Marijuana plants worth approximately Rs. 19 crore at Sitakola Kamlasagar village in Sepahijala district of Tripura.

Based on a specific input from field G team of the BSF Gakulnagar, the forces seized Marijuana.

The team was led by N P Singh, DC (G) BSF, and assisted by police, TSR, civil administration and forest officials.

This is the third big destruction of marijuana plants in less than 15 days in Sepahijala district.

## ■ Ganja Worth Rs 72 Crore Destroyed

By Express News Service - PHULBANI | Published: 11th December 2013 09:16 AM

Last Updated: 11th December 2013 09:16 AM



Ganja valued at over `72 crore has been destroyed during joints raids in Kandhamal district in the last four days.

The raids conducted by Excise, police and Narcotic Control Bureau personnel led to destruction of about 7.23 lakh ganja plants in the district. The average worth of the product in the open market would be around `72.30 crore, said Excise Superintendent of Kandhamal, Siba Shankar Gantayat.

Four raids were conducted in areas under Phiringia, Khajuripada and Gochhapada police limits, Gantayat said, adding 190 officials and 60 labourers were engaged in the operation. He said as many as 11 joint raids were conducted last year wherein 8.30 lakh ganja plants were uprooted and set on fire.

Approximate cost of the contraband destroyed last year was nearly `115 crore.

Excise officials said many tribal villagers of Phiringia, Luisingh, Gochhapada, Balabadi Sasipadar, Burudibali, Sunamudi, Kanibali, Pallaburudi and Rakudi under Phiringia and Gochhapada areas have been found involved in the illegal farming.

"The ganja mafias, who are mostly from Jharkhand, Chhattisgarh and Mumbai get ganja cultivated in huge areas. The local villagers are coerced and cajoled to give up their traditional farming like turmeric, ginger and paddy and forced to opt for ganja plantation," Santayat said.

The criminals often advance hand loans to the poor and needy villagers and also provide them with high-yield ganja seeds for the cultivation. The raids were conducted as per the decision of the district multi disciplinary coordination committee to identify areas having ganja cultivation, he said.  
PTI

### Hemp Destroyed

Rairakhol: As many as 56,250 hemp plants valued at about `5 crore were destroyed in Khetrapur village of Ghusramal gram panchayat on Tuesday.

The plants were cultivated in over 25 acres of Government land. For the first time, mechanised bush cutting implement was put to use by the joint team of Excise, Police, Forest and Narcotic Control Bureau which undertook the exercise. However, no arrest has been made.

# Marijuana crop worth Rs.60 crore destroyed

Back Pain Treatment - Suffering from Back Pain? Get Best Back Pain Treatment @ Home  
[portea.com/Trained\\_Physiotherapists](http://portea.com/Trained_Physiotherapists)

Ads by Google

STAFF REPORTER

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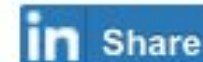
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Illegal marijuana plantations worth around Rs.60 crore have been destroyed during joint raids by police and excise departments in Kandhamal district of Odisha since October 19.

These plantations were located in remote pockets of Phiringia block of the district. It was revealed that marijuana was being cultivated in an organised manner in the region. Raids conducted at remote pockets near Dimiriguda and Rebingia villages under Phiringia police station on October 27 revealed that the cultivators had also established irrigation facility. The plantation was on over 190 acres and worth around Rs.19.50 crore, police officials said. Twelve persons have been arrested in this connection. Motor pumps and pipes used for irrigation have been seized.

On October 19, similar raids in Phiringia police station area had led to destruction of ganja plantations worth Rs.24.31 crore. On October 20, ganja worth around Rs.15 crore was destroyed in Gochhapada area of the district.

Illicit cultivation of marijuana continues in remote areas of Kandhamal district, which is promoted by financiers from outside. There have also been allegations of involvement of some police and excise personnel in the smuggling of marijuana cultivated in Kandhamal to other parts of Odisha and outside the State. On June 1, a police constable and a home guard of Phulbani police station were among three arrested in relation to marijuana smuggling from Kandhamal district. In July 2014, two Assistant Sub-Inspectors of police were suspended in seizure of ganja in Phiringia police station limits.

A police home guard and a former home guard were among those arrested in this case.

**1,000,000 ACRE**

**\$ 20 MILLION**



**& OPPORTUNITIES**



GOVERNMENT OF INDIA  
MINISTRY OF FINANCE  
(Department of Revenue)  
Central Bureau of Narcotics



ORIGINAL  
(IMPORTER TO TRANSMIT TO EXPORTING COUNTRY)

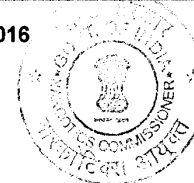
S. NO. : 0001577

Certificate is not valid unless it bears official seal of the Issuing Authority hereon

Import Certificate No. P - IMP-10020/2016

F. No. XVI/4A/198/Tech/Psy/2015

Dated : 8th Jan 2016



**Certificate of Official Approval of Import**  
(The Narcotic Drugs and Psychotropic Substances Rules, 1985)

NARCOTICS COMMISSIONER being the authority empowered to issue Import Certificate under the Narcotic Drugs and Psychotropic Substances Rules, 1985 hereby approves the importation into India of the consignments containing Psychotropic Substances as specified in the Schedule below by :

Importer Shriram Institute For Industrial Research  
(A Unit Of Shriram Scientific And Industrial Research Foundation)  
19, University Road  
Delhi-110007, INDIA

From : Echo Pharmaceuticals BV  
Transistorweg 5A  
Nijmegen-6534 AT, NETHERLANDS

Subject to the condition that the consignment containing such Substances shall be imported before **8th Jul 2016** by  
By Air to New Delhi Custom House, New Delhi in India.

In approving the importation of the consignment containing the said Substances specified, the Narcotics Commissioner is satisfied that it is required solely for medical and scientific purposes.

**Narcotics Commissioner**  
**Central Bureau of Narcotics,**  
**19, The Mall, Morar, Gwalior - 474 006**  
**Madhya Pradesh, INDIA.**  
(Address of the Issuing Authority)

*Margaret*  
Margaret Extros  
Superintendent (Technical)  
Authorised Signatory

Name and Designation of the Authorised Officer

Schedule specifying the Psychotropic Substances contained in the consignment to be imported.

|                                       |                                   |
|---------------------------------------|-----------------------------------|
| 1) delta-9-Tetrahydrocannabinol, 1 ml | delta-9-Tetrahydrocannabinol 1 mg |
| 2) delta-8-Tetrahydrocannabinol, 1 ml | delta-8-Tetrahydrocannabinol 1 mg |

# Hemp Gene Bank of Northern India by NBPGR (National Bureau of Plant Genetic Resources)

| S.no | CropName   | Botanicalname   | Accession | CollNo          | ReceiveFrom                              | BioStatus           | Verna_Name | Village      | District   | StateName         |
|------|------------|-----------------|-----------|-----------------|------------------------------------------|---------------------|------------|--------------|------------|-------------------|
| 1    | Hemp Bhang | Cannabis sativa | IC0262282 | /VRS-MA-1169    | VPKAS, Almora Uttarakhand                | OTHERS              | Bhang      | Jyoli        | Almora     | Uttarakhand       |
| 2    | Hemp Bhang | Cannabis sativa | IC0262283 | /VRS-MA-1170    | VPKAS, Almora Uttarakhand                | OTHERS              | Bhang      | Kheniya      | Almora     | Uttarakhand       |
| 3    | Hemp Bhang | Cannabis sativa | IC0262285 | /VRS-MA-1172    | VPKAS, Almora Uttarakhand                | OTHERS              | Bhang      | Kafalkot     | Almora     | Uttarakhand       |
| 4    | Hemp Bhang | Cannabis sativa | IC0262286 | /VRS-MA-1173    | VPKAS, Almora Uttarakhand                | OTHERS              | Bhang      | Dhamus       | Almora     | Uttarakhand       |
| 5    | Hemp Bhang | Cannabis sativa | IC0263455 | /VRB-MA-800     | VPKAS, Almora Uttarakhand                | OTHERS              | Bhang      | Dhasper      | Almora     | Uttarakhand       |
| 6    | Hemp Bhang | Cannabis sativa | IC0263458 | /VRB-MA-803     | VPKAS, Almora Uttarakhand                | OTHERS              | Bhang      | Paten        | Champawat  | Uttar Pradesh     |
| 7    | Hemp Bhang | Cannabis sativa | IC0263462 | /VRB-MA-807     | VPKAS, Almora Uttarakhand                | OTHERS              | Bhang      | Dhyadi       | Almora     | Uttarakhand       |
| 8    | Hemp Bhang | Cannabis sativa | IC0278427 | /RRIta-31       | Unknown                                  | WILD                | -          | -            | -          | Arunachal Pradesh |
| 9    | Hemp Bhang | Cannabis sativa | IC0281885 | /VR-MA-1500     | VPKAS, Almora Uttarakhand                | IMPROVED CULTIVAR   | Bhang      | Choura       | Almora     | Uttarakhand       |
| 10   | Hemp Bhang | Cannabis sativa | IC0322080 | /VKS/SCC-5/48   | NBPGR, New delhi                         | OTHERS              | Ganja      | Sarma        | Lakhisarai | Bihar             |
| 11   | Hemp Bhang | Cannabis sativa | IC0322081 | /VKS/SCC-5/49   | NBPGR, New delhi                         | OTHERS              | Ganja      | Sarma        | Lakhisarai | Bihar             |
| 12   | Hemp Bhang | Cannabis sativa | IC0326906 | /SKY-934        | NBPGR R/S, Shimla                        | OTHERS              | Bhag       | Phagni       | Sirmour    | Himachal Pradesh  |
| 13   | Hemp Bhang | Cannabis sativa | IC0381084 | /SKY/BJ/RC-1111 | NBPGR R/S, Shimla                        | WILD                | Bhang      | Bishtho      | Chamba     | Himachal Pradesh  |
| 14   | Hemp Bhang | Cannabis sativa | IC0381161 | /SKY/BJ/RC-1188 | NBPGR R/S, Shimla                        | WILD                | Bhang      | Dharwas      | Chamba     | Himachal Pradesh  |
| 15   | Hemp Bhang | Cannabis sativa | IC0381186 | /SKY/BJ/RC-1213 | NBPGR R/S, Shimla                        | WILD                | Bhang      | Punto Killad | Chamba     | Himachal Pradesh  |
| 16   | Hemp Bhang | Cannabis sativa | IC0398664 | /AKP-12/63      | T.M.Bhagalpur University Bhagalpur Bihar | WILD                | Bhang      | Salampur     | Siwan      | Bihar             |
| 17   | Hemp Bhang | Cannabis sativa | IC0469772 | /DARL/PK-2230   | DRDO Pithoragarh Uttarakhand             | Traditional variety | Bhang      | Polop        | Champawat  | Uttarakhand       |
| 18   | Hemp Bhang | Cannabis sativa | IC0469806 | /DARL/PK-2264   | DRDO Pithoragarh Uttarakhand             | Traditional variety | Bhang      | Nakusala     | Champawat  | Uttarakhand       |
| 19   | Hemp Bhang | Cannabis sativa | IC0604544 |                 | VPKAS, Almora Uttarakhand                | OTHERS              |            |              |            | Unknown           |
| 20   | Hemp Bhang | Cannabis sativa | IC0604545 |                 | VPKAS, Almora Uttarakhand                | OTHERS              |            |              |            | Unknown           |

# HEMP CERTIFICATION PROGRAMME

## Work involved

### 1.Characterization of Plant material- one sample

THC, THCA, CBD, CBDA,CBGA and CBN content by HPLC

THC (D8 & D9) and CBD individual content by HPLC

Heavy metals (Lead, Arsenic, mercury, cadmium, copper, Methyl mercury and zinc)

#### Residual pesticide

##### Organochlorine Pesticide group

Aldrin, Dieldrin, Chlordane, alpha Endosulfan, beta Endosulfan, Endosulfan sulphate, Lindane (HCH-gamma), Heptachlor, Heptachlor epoxide, Methoxychlor, o,p-DDT, p,p-DDT.

##### Organophosphorous Pesticide group

Diazinon, Fenthion, Malathion, Parathion, methyl, Phosalone.

##### Organosulphur Pesticide group

Carbendazine, Benomyl, Carbofuran.

#### Microbial analysis

∑ Total bacterial count,

∑ Yeast & moulds

∑ Pathogens (Ecoli, salmonella, P. aeruginosa, S. Aureus)

### 2.Characterization of hemp oil-one sample

THC, THCA, CBD, CBDA,CBGA and CBN content by HPLC

THC (D8 & D9) and CBD individual content by HPLC Heavy metals (Lead, Arsenic, mercury, cadmium, copper , Methyl mercury and zinc)

#### Residual pesticide

##### Organochlorine Pesticide group

Aldrin, Dieldrin, Chlordane, alpha Endosulfan, beta Endosulfan, Endosulfan sulphate, Lindane (HCH-gamma), Heptachlor, Heptachlor epoxide, Methoxychlor, o,p-DDT, p,p-DDT.

##### Organophosphorous Pesticide group

Diazinon, Fenthion, Malathion, Parathion, methyl, Phosalone.

##### Organosulphur Pesticide group

Carbendazine, Benomyl, Carbofuran.

#### Microbial analysis

∑ Total bacterial count,

∑ Yeast & moulds

∑ Ecoli

### 3.Shelf life study of hemp oil (4 months accelerated study for 1 year shelf life)-one sample

Sensory evaluation

Microbiological

Chemical Properties

Heavy Metals

#### Pesticides , Organochlorine Pesticide group

Aldrin, Dieldrin, Chlordane, alpha Endosulfan, beta Endosulfan, Endosulfan sulphate, Lindane (HCH-gamma), Heptachlor, Heptachlor epoxide ,Methoxychlor, o,p-DDT, p,p-DDT.

#### Organophosphorous Pesticide group

Diazinon,Fenthion, Malathion, Parathion, methyl, Phosalone.

#### Organosulphur Pesticide group

Carbendazine, Benomyl, Carbofuran



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# ABOUT US



Shriram Institute for Industrial Research (or SRI) is one of the most respected institutions of its kind in India, engaged in a wide range of R&D, analytical and related activities, covering material sciences, life sciences and bio sciences. Over the last six decades of its existence, SRI has built a formidable reputation for quality and reliability, and is a well known name across industries.



Material Research      Materials Characterized  
Trouble-shooting      Consultancy  
R&D Contract Research      Rubber & Plastics  
Major Thrust Areas      Textiles & Paper      Surface Coatings  
Core Competency      Compositional Analysis  
Multi-layer Films      Chemical Analysis

**MSD**  
Material Science Division



## **ACCREDITATIONS**

**ISO/IEC 17025**

**NABET/QCI**



## **CERTIFICATIONS**

**ISO : 9001**

**ISO : 13485**

**ISO : 11137**

**ISO : 14001**

**OHSAS : 18001**

# RESEARCH AREAS OF INTEREST (FOR SPONSORSHIP)

## 1. Ethanol production from ihemp hurd

iHemp is at least four times richer in biomass/cellulose potential than its nearest rivals: cornstalks, sugarcane, kenaf, trees, etc. iHemp produces the most biomass of any crop, which is why it is the natural choice for an energy crop. iHemp converts the sun's energy into cellulose faster than any other plant, through photosynthesis. iHemp can produce 10 tons of biomass per acre every four months.

The cellulose can be converted to fermentable glucose, which holds the greatest promise for production and feedstock, because it could produce 100 gallons/tons. Their high value fibre can be extracted as first step. Then the remaining core material (mostly hurd) can be converted to alcohol.

## 2. iHemp fibre composite for green brake linings

Brake linings are currently made from asbestos in phenolic resin. "Since asbestos was banned, no fibre has completely replaced it," Aramids are now commonly employed, but also metallic and mineral fibres. But as the cost of aramid fibre is high, any alternative low-cost fibre that can perform some of the work of such an expensive material in composite structures would be significant. "iHemp goes some way to meet the requirements in respect of a stable coefficient of friction and resistance to friction heat. It has adequate compression and shear strength.

Cashew nut shell liquid (CNSL) a renewable phenolic source is the viscous, dark brown substance found in cashew nut shell. It is a sustainable and naturally occurring source of phenolic compounds that can be used to produce thermally stable phenolic resins suitable for use as green brake pads with ihemp fibre as reinforcement.

### 3. Phyto-remediation by iHemp plant

Phyto-remediation is the direct use of green plants and their associated microorganisms to stabilize or reduce contamination in soils, sludges, sediments, surface water, or ground water. iHemp plant has been found to be effective in decontaminating soil from heavy metal contamination.

### 4. Cellophane and rayon

Cellophane and rayon are both classified as regenerated cellulose fibres, as they are structurally identical to cellulose. They are produced similarly: cellulose is dissolved in alkali solution and extruded through a slit into a bath of sulphuric acid to make cellophane film, or through a spinneret to make rayon fibre.

### 5. Nanocellulose

Cellulose can be used to make a vast range of plastics and related substances. Much of the difference in physical properties is attributable to the length of the polymer chains and the extent of crystallisation. Cellulose is extracted from ihemp and other fibre crops in various ways. The raw pulp can be hydrolysed (separated into its component parts through addition of water) at 50- 90°C; it can also be soaked in a weak acid solution to separate the crystalline sections from the amorphous sections, to produce nanocrystalline cellulose.

It can be further subjected to heat and pressure to produce an intriguing form known as nanocellulose—a “pseudo-plastic” that appears gel-like and viscous in normal conditions, but becomes more liquid when shaken or subjected to stress. Nanocellulose has a range of potential applications, as a composite plastic reinforcing material, as a super-absorbent to clean up oil spills or make hygiene products, and even as a low-calorie stabiliser in food technology.

## PROPOSED RESEARCH HEMP PROJECTS

# LIST OF OTHER RESEARCH AND TRIALS BY IIHA IN INDIA

1. CBD and THC based medicines clinical trials in collaboration with (HCG Cancer Hospitals and AMRO)
2. Improvising Non- woody Paper pulping with Hemp ( In Collaboration with NEPA Mills and CPRRI)
3. Bio-Plastic thin film for packaging with SRI
4. Hemp Cottonization by Dr. Ghosh (IIHA R&D Director and SRI)
5. Indian Army Uniforms for DRDO (Indian Army)

# Land Of Opportunities



-INDIA

## And Investments

 the indian journey

# POPULATION

1,328,446,591 (1.32 BILLION) AS OF MAY 28, 2016

INDIA IS PREDICTED TO HAVE MORE THAN 1.53 BILLION  
PEOPLE BY THE END OF 2030.

**10% OF INDIAN POPULATION**

**1.32 MILLION TONS OF HEMP OIL EVERY MONTH**

**10 MILLION TONS OF HEMP SEEDS**

**30 MILLION TONS OF HEMP FIBRE FOR CLOTHING**

## FDI – FOREIGN DIRECT INVESTMENT

- ▶ Hemp Contract farming
- ▶ Processing Plant (Food & Fibre)
- ▶ Medicinal Research (CBD and THC)





# THANK YOU

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