18.09.2020

Subject: Lok Sabha Unstarred Question Dy. No. 8486 for 24.09.2020 regarding Health and Safety of labourers – reg.

a) The details of the rules and guidelines at the work places for the health and safety of the labourers; and

All the guidelines as issued from time to time by the Competent Authorities and obligations of the principal employer towards health and safety for contractual workers are followed.

It is further submitted that health and safety facilities like availability of safety gears, face masks, hand gloves & sanitizers etc. for the contractual workers are at par with regular employees of this Institute.

b) The ministry-wise details of the amount spent by the Government to ensure the health care of the labourers?

An annual expenditure of Rs. 8,00,000/- towards reimbursement of ESIC contribution by employer are made against deployment of 220 numbers (subject to variation depending upon requirement of the Institute) contractual workers.

28.01.2021

Subject: Reply to Parliament Question (Lok Sabha) Diary No. 2473 for 05.02.2021 regarding "Herbal Gardens" reply reg.

a) Whether the Central Sector Scheme for Conservation, Development and Sustainable management of Medicinal plants is being implemented in the country;

- The National Medicinal Plants Board under the AYUSH ministry has this mandate.
- The Ministry of Environment, Forest and Climate Change provides assistance for setting up of botanical gardens that includes medicinal Plants.
- The CSIR through its themes and missions (e.g Agri nutri Biotech, Phytopharma) is catering to the above.

b) If so, the details thereof along with the number of herbal gardens functioning in the country including Maharashtra and Tamil Nadu;

- Herbal garden at CSIR-IHBT, Palampur (H.P.) with 86 plant species comprising 24 vatshamak, 31 pitshamak and 31 kaphashamak ayurvedic plants.
- Herbal garden established by CSIR-IHBT at Civil Hospital, Palampur (H.P.) with 24 species of medicinal plants.

Given below are the activities undertaken by the Institute on cultivation, characterization and value addition of herbs, where training is also an important component:

- Heeng (*Ferula asafoetida*) is one of the top condiment and medicinal plant traded in India. India imports about 1540 tonnes of raw asafoetida annually from Afghanistan, Iran and Uzbekistan and spends approximately Rs942 crores per year on import of asafoetida (2019).With the goal to achieve self-sufficiency in asafoetida production through wide spread cultivation in India, CSIR-IHBT introduced Heeng seeds (six accessions) for the first time in the country from Iran through ICAR-NBPGR, New Delhi in October 10, 2018 vide import permit Nos. 318/2018 (July 25, 2018) & 409/2018 (September 12, 2018).The Institute raised the plants of Heeng at Center for High Altitude Biology (CeHAB), Ribling, Lahaul&Spiti, H.P. under the vigil of NBPGR.Dr. Sanjay Kumar, Director, CSIR-IHBT initiated the asafoetida cultivation program by planting asafoetida seedlings at village Kwaring of Lahaul valley (HP) on 15 October 2020.Further, CSIR-IHBT scientists also organized training programs on asafoetida cultivation and laid out asafoetida demonstration plots in villages of Madgran, Beeling and Keylong in Lahaul

valley of Himachal Pradesh in collaboration with officers of State Agriculture Department for establishment of seed production chain and cultivation of asafoetida on commercial scale.Heeng has also been planted at Kataru, Majhakhal, Janjehli and Ghayan in district Mandi; and Mebar, Kothi, Dunni, ReckongPeo and Powari in district Kinnaur. Secretary DSIR &Director General, CSIR, Dr.Shekhar C. Mande planted the first plant of Heeng in Janjehalion 8th Nov, 2020 to mark cultivation of Heeng for the first time in DistrictMandi of Himachal Pradesh.

- Saffron (*Crocus sativus* L.) is the most expensive spice of the world.The annual demand for this spice is 100 tons per year but its average production in India is about 6-7 tons and hence a large amount of the spice is imported.With an objective to extend the saffron cultivation beyond Kashmir, CSIR-IHBT started working on saffron from 2015 onwards to develop disease free corms production technology through tissue culture & identifying the suitable locations in India.CSIR-IHBT standardized agro-technology for the introduction of this crop in non-traditional areas of Himachal Pradesh, Uttarakhand, North East and Leh. CSIR-IHBT identified different locations across the western Himalayas through the MAXENT model having the potential to cultivate saffron. Initial experiments conducted in the non-traditional areas of H.P. and Uttarakhand yielded promising results from some locations of districts Chamba, Kinnaur, Mandi and Kangra in Himachal Pradesh and Bageshwar of Uttarakhand state. Quality of the produce was tested in the laboratory of CSIR-IHBT and it was found to be at par with the quality of Kashmiri saffron and in some aspects *viz*., amount of crocin and picrocrocin it was even better.

- Also, Institute introduced sweetener crop Monk Fruit (*Siraitiagrosvenorii*) for the first time in the country, as potential low-calorie natural sweetener, 300 times sweeter than sucrose.

- Institute has been actively engaged for development of quality standards for important phytomolecules from the Himalayan medicinal plants such as *Cissampelospareira* and *Trillium govanianum*.

- The TKDL programme of CSIR targeted digitizing information on medicinal plants including plants used in Ayurveda.

- Under CSIR Phytopharmaceutical mission, 21 medicinal herbs were targeted to bring more than 300 ha under captive cultivation in a coordinated manner at different CSIR institutes to meet the industrial demand for high quality raw botanical drug. Efforts are also going for revival more than 25 RET (rare, engendered and threatened) high value plants. As stated previously, the institute under this mission is pursuing captive cultivation of selected Himalayan medicinal plants used in Ayurveda (such as *Saussurealappa, Inularacemosa,* RET Himalayan plant species (*Picrorhizakurroa, Podophyllumhexandrum, Trillium*

*govanianum*and*Fritillariaroylei*). Survey, collection and characterization have also been undertaken for these RET medicinal plants species.

- Also, under in-house programmes, CSIR-IHBT has been promoting cultivation and processing of herbals in Himachal Pradesh. The institute has developed agrotechniques and new cultivars of important Himalayan crops such as *Hedychium spicatum* (Him Kachri), *Valerianajatamansi* (Him Bala & Him Surbhit) and *Curcuma aromatica* (Him Haldi). For ex-situ conservation of Himalayan species, the institute has established conservatories and botanical gardens that hold ~200 species. CSIR-IHBT also introduced Russian varieties of Seabuckthorn Altaiskaya and Gnom which are upto five times higher yielding than Indian Seabuckthorn.

- In addition, the institute this year raised about 50,000 seedlings of medicinal plants (*Aconitum heterophyllum, Saussureacostus, Inularacemosa*and*Picrorhizakurroa* at Lahaul for growing there.

- Conservation and sustainable resource generation of high altitude bioresources is being done at CSIR-Centre for High Altitude Biology, Ribling, Keylong, Lauhal & Spiti district. This centre maintains germplasm of *Trillium govanianum, Aconitum heterophyllum, Picrorhizakurrooa, Fritillariaroylei, Dactylorhizahatagirea, Saussureacostus, Inula racemose* etc. Characterization and consolidation of *Hippophae* genetic resources and propagation of elite genotypes for varietal evaluation is being done

- CSIR-IHBT is actively involved in research on population and distribution of medicinal plants, their extraction patterns, indigenous uses, and value chain. The institute is generating chemical and spectral signatures of medicinal plants

- Institute is also generating geo-tagged digital database for herbal plants.

- CSIR-IHBT has successfully completed development of the database on medicinal plants of the Indian Himalayan region. The database has been developed for National Medicinal Plants Board, Ministry of AYUSH, New Delhi in a network mode with Indian Institute of Integrative Medicine, Jammu; North East Institute of Science and Technology, Jorhat; and North Eastern Hill University, Shillong. The institute coordinated the project, which created the database containing information on about 1582 plant species of therapeutic value, including Ayurveda, dwelling in Indian Himalaya.

- For popularizing research on medicinal plants and their current status, CSIR-IHBT is engaged in ex-situ conservation of medicinal plants through setting up of herbal gardens at Palampur and Ribling located in Himachal Pradesh.

During 2020 following training programs has been conducted by CSIR-IHBT Palampur, HP for the farmers, unemployed youth, women and agriculture officers.

Date of training	Title of training	Trainee	Venue of training	Number of trainees
February 5-8, 2020	Training programme on hydroponics and aeroponics cultivation of herbal plants	Horticulture Development Officers, Dept. Horticulture, progressive farmers, unemployed youth, students from HP, UK and Gujra	CSIR-IHBT Palampur, HP	33
February 28, 2020	Awareness cum training program on improved agrotechnologies for cultivation of aromatic plants	Farmers of Baramulla, Jammu and Kashmir conducted at CSIR-IHBT	CSIR-IHBT Palampur, HP	25
February 24-25, 2020	Improved Agro and process technology of Damask rose	Industrialists Nagpur from Maharashtra (Paid training 12000)	CSIR-IHBT Palampur, HP	2
March 17, 2020	Awarness cum training programme on aromatic plants	Farmers of Puth, Garh Mukteshwar, Distt Hapur , UP	Village Puth, Garh Mukteshwar, Distt Hapur , UP	10
July 20-22, 2020	Capacity Building of Agriculture Officers, Department of Agriculture, HP on Production Technology of Saffron and Heeng	Agriculture officers of Departmnet of agriculture, Govt. of HP from six districts of HP	CSIR-IHBT Palampur, HP	12
October 28, 2020	Training on agro and process technology of wild marigold	Schedule caste farmers, women and unemployed youth of	Village Parwai , Chowari block, Chamba HP	30

		aspirational district, Chamba, HP		
November 7, 2020	Training on agro and process technology of wild marigold	Tribal farmers of aspirational district Chamba, HP	Village Talla, Shiunta, Chamba, HP	50
November 8, 2020	Training on cultivation of saffron and Heeng	Farmers, women and unemployed youth	Janjehli, Mandi, HP	50
December 10, 2020	One day training cum exposure visit of farmers from Chowari, Chamba, HP	Schedule caste farmers, unemployed youth of aspirational district, Chamba	CSIR-IHBT Palampur	7
January 22, 2021	One day training programme on Heeng cultivation	Tribal farmers of Lahaul	Keylong, Lahaul & Spiti	34

c) If so, the details thereof including project based support to various government and non-government organizations to develop different types of herbal gardens in Maharashtra;

Does not pertain to CSIR-IHBT, Palampur

d) whether under this scheme financial assistance as subsidy to farmers to promote farming of herbs/medicinal plants has been provided and if so, the quantum of financial assistance provided during each of the last three years; and

Does not pertain to CSIR-IHBT, Palampur

e) the corrective measures taken by the government to further incentivize the program under the scheme?

Does not pertain to us

29.01.2021

Subject: Reply to Loksabha question Dy. No. 2347 regarding "Internal Complaints Committee" – reg.

Sr. No.	Question	Answer
a	Whether all the Central Government Departments and PSUs have constituted Internal Complaints Committee (ICCs) against the backdrop of Sexual Harassment of Women at workplace (Prevention, Prohibition and Redressal) Act notified by Government of India, 2013;	Yes, Internal Complaints Committee has been constituted in this Institute.
b	If so, the details thereof and if not, the reasons therefore;	The Sexual Harassment committee has been constituted vide OM No. 2-2(24)02-Estt. dated 21-08-2018 and renamed as Internal Complaints Committee vide OM of even number dated 06-12-2019.
c	The total number of sexual harassment complaints filed, resolved and pending in the departments of the Central Government before the respective ICCs' since 2013;	1. One complaint received during the year 01-04-2014 to 31-03-2015 and disposed off successfully. 2. One complaint received during the year 01-04-2016 to 31-03-2017 and disposed off successfully.
d	Whether cooperative institutions in Kerala have constituted the ICCs to look into such cases;	Not pertained to this Institute.
e	If so, the details hereof, if not, the reasons therefore; and	Not pertained to this Institute.
f	Whether penalty for non compliance with provisions provided under Section 26 of the said Act have been imposed on employees and if so, the details thereof and if not, the reasons thereof?	Not pertained to this Institute.

09.02.2021

Subject: Demands for Grants (2021-22) of the Department of Scientific and Industrial Research- reg Questionnaire -II

a) Details of the Department's project on cultivation of Asafoetida

A Niche Creating Project entitled, "Introduction, characterization and cultivation of *Ferula assa-foetida* (*Hing*) in cold desert regions of Indian Himalayas" on cultivation of Asafoetida in Himachal Pradesh is being undertaken at CSIR-Institute of Himalayan Bioresource Technology, Palampur.

Financial outlay towards this project

Total budget outlay of the project is Rs. 378.7 Lakhs (Rs. 152.58 Lakhs for 2020-21, Rs. 115.584 Lakhs for 2021-22 and Rs. 110.584 lakhs for 2022-23).

b) Proposed milestones across different phases of this initiative

- Introduction, identification of niche areas and adaptation of Ferula assa-foetida in cold desert regions of Indian Himalayas
- Morphological, chemical and molecular characterization of the germplasm
- Standardization of basic agro-technologies
- In vitro production of oleo-gum-resin using organ culture of Ferula assa-foetida

c) Is Department planning to expand this initiative to other states and other crops?

Yes, CSIR-IHBT is planning to expand cultivation of Hing in cold desert regions of Indian Himalayas such as Lahaul & Spiti, Kinnaur, Chamba and Mandi districts of Himachal Pradesh, Ladakh, parts of Jammu & Kashmir, Uttarakhand, Sikkim and Arunachal Pradesh which are suitable for cultivation of asafoetida. CSIR-IHBT has signed MOU with State Department of Agriculture, Himachal Pradesh on June 6, 2020 for a joint collaboration to promote cultivation of Hing in the State. The target is to cover 300 ha area under cultivation of Hing in Himachal Pradesh during next five years.

Already, correspondence with following organizations is in progress regarding cultivation of Hing:

1. Sher-e-Kashmir University of Agriculture Sciences & Technology (SKUAST-J), Chatha, Jammu, J&K 180 009
2. Administration of Union Territory of Ladakh, Ladakh Autonomous Hill Development Council, Kargil
3. Farmers from Garud, District Bageshwar, Uttarakhand

d) CSIR-IHBT is also promoting cultivation of following commercially important plants:

- Saffron in Himachal Pradesh and Uttarakhand
- Apple in North Eastern States (Manipur, Mizoram and Meghalaya)
- Natural sweeteners (monk fruit in low hill regions of Himachal Pradesh, Uttarakhand, Sikkim and West Bengal; stevia in Punjab, Haryana, Rajasthan, Madhya Pradesh, Chhattisgarh, Maharashtra, Uttar Pradesh, Telangana, Karnataka and Himachal Pradesh)
- Bamboo in Himachal Pradesh
- Floriculture in Himachal Pradesh, Uttarakhand and Punjab
- Medicinal and aromatic plants in Himachal Pradesh, Punjab, Haryana, Uttar Pradesh, Sikkim, Arunachal Pradesh, Manipur, Mizoram, Chhattisgarh, Odisha, Tamil Nadu and the Union Territories of Ladakh and Jammu and Kashmir.

12.03.2021

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. S4277 reg.)

a) The details of steps Government has taken to maintain fragile and vital ecology of the Himalayas; and

The **National Mission for Sustaining the Himalayan Ecosystem (NMSHE)** is being implemented by the Department of Science and Technology, Govt. of India. For this 6 task forces have been set up:

Task force	**Nodal organization/agency**
Natural and geological wealth	Wadia Institute of Himalayan Geology
Water, ice, snow resources Including glaciers	National Institute of Hydrology
Forest resources and plant biodiversity	Govind Ballabh Pant National Institute of Himalayan Environment (GBPNIHE)
Micro flora and fauna and wild life & animal population	Wildlife Institute of India
Traditional Knowledge Systems	Jawaharlal Nehru University
Himalayan Agriculture	Indian Council of Agricultural Research

The CSIR-IHBT is a part of the traditional knowledge systems.

The **National Mission on Himalayan Studies (NMHS)** is being implemented across the Himalayan states. It is being co-ordinated by the Ministry of Environment, Forest and Climate Change through the Govind Ballabh Pant National Institute of Himalayan Environment. *Under this mission, CSIR-IHBT is carrying out studies on conservation and management of Himalayan bioresources, community involvement, and waste management.*

The **Himalayan Alpine Dynamic Research Initiative (HIMADRI)** of the Department of Space, being co-ordinated by the Space Applications Centre, Ahmedabad targets alpine dynamics in fate of climate change in five Himalayan states (Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh). *Under this, CSIR-IHBT is mapping and characterizing alpine regions.*

As a part of its **core activities, CSIR-IHBT** is actively involved in characterizing species, mapping resources, documenting their spatial & temporal patterns vis-à-vis climate change. CSIR-IHBT is also focussing on Indigenous Knowledge Systems prevalent in the Himalaya. All these target maintaining the fragile ecology of Himalaya.

b) Whether any monitoring mechanism has been set up to Strengthen any changes taking place in glaciers by inducting scientists also for consultation, if so, the details thereof and if not, the reasons therefor?

This does not pertain to us. However, a task force **"**Water, ice, snow resources Including glaciers" under the NMSHE (DST) is looking after this.

12.07.2021

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. S301) regarding "Mission Innovation"

e) Whether Government (CSIR) aims to promote Science and Technology with emphasis on emerging areas and their application for the development and support to the weaker sections of the society and if so, the details thereof.

I. To disseminate the technology on bacterial consortia for rapid degradation of organic waste and generation of enriched compost, the project of Rs 4 crore 10 lakhs has been granted by Ministry of Ministry of Micro, Small & Medium Enterprises (MoMSME) under 'SFURTI' scheme at rural areas of HP and Sikkim. Under the project, the financial assistance will help in establishment of a CFC building comprising of a microbial culture room, bioreactor room, compost quality test room, training hall and model 20 concrete compost pits. The CFC will be equipped with all the advanced instruments including bioreactor (500 l), autoclave, laminar air flow, distilled water unit, BOD incubator, automatic kjeldahl apparatus, flame photometer, UV spectrophotometer, pH and conductivity meter, moisture analyzer, hot air oven etc. The scheme will benefit 400 cattle rearers and each of them will get toolkit worth Rs 28,600/-. With the implementation of this cluster apart from controlling the organic waste, the farmers are expected to earn additional Rs 30,000/- per year by selling enriched compost. The Triloki Enriched Composting/ Vermicomposting Cluster, Sirmour District, Himachal Pradesh State has 200 beneficiaries from the weaker section 28 SC, 172 ST. Likewise, in the other cluster at Sikkim, Moonew Tareybhir Enriched Composting /Vermicomposting Cluster, West District, Sikkim State, 122 beneficiaries belong to weaker sections (9 SC, 57 ST, 56 OBC).

II. Two clusters at Gondla and Shansha in Lahaul has been sanctioned by Ministry of Micro, Small & Medium Enterprises (MSME) under 'SFURTI' scheme with CSIR-IHBT as a Technical Agency. The project of Rs 330.59 lakhs has been sanctioned for both the clusters with a Govt. of India grant assistance of Rs 317.48 lakhs. Under the project, the financial assistance will help in establishment of a CFC building, cold storage unit, drying conveyor tunnel, grading and sorting machines, tools for farmers with working capital. The clusters are aiming to benefit 351 farmers all belonging to SC/ST communities. This project will also increase the market window from 35 days to 90 days thereby, increase the margin of the farmers by 35%. Apart from this, there is a provision under soft-interventions for trainings on techniques of cold storage, grading and packaging, marketing, quality control, participation in local

trade fair, buyer-seller meet and launch of website in order to access lager market. The direct impact of this intervention will be an additional increase of Rs 36,000/- per year by selling lilium flowers and bulbs.

III. To disseminate the technology on Vitamin D2 enriched Shiitake mushroom, institute has got the approval from National Small Industries Corporation Ltd. (NSIC) under National SC-ST Hub, Ministry of MSME, New Delhi. Under the programme it is proposed to undertake capacity building programme on Shiitake mushroom production at 15 Himalayan districts dominated with SC/ST populations.

IV. Under CSIR-Aroma Mission, catalysed rural economy through cultivation of aromatic crops and made Himachal Pradesh the top state in the country in the production of wild marigold oil. 6.49 tonnes of high grade tagetes oil was produced during 2019-20 leading to revenue generation of Rs. 5.19 crores and benefitting 861 small farmers.

V. Promoted cultivation of aromatic crops in ten states and two union territories through end-to-end technologies from supply of planting material, trainings on cultivation practices and processing of produce by extraction of essential oils from aromatic crops in the farmers' fields.

VI. Empowered farmers through installation of forty-three field distillation units for extraction of essential oils, which were set up in the farmers' fields leading to empowerment of farmers of Chamba (the aspirational district of H.P.) and other districts of Himachal Pradesh, Jammu & Kashmir, Uttarakhand, Arunachal Pradesh, Manipur, Odisha, Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, Chhattisgarh and Tamil Nadu.

VII. Area covered under cultivation of different aromatic crops was 538.45 ha which was promoted in waste lands, abandoned lands affected by wild animal menace and led to generation of 1,31,000 man-days. As per report of Third Party Assessment by National Productivity Council, New Delhi, cultivation of wild marigold resulted in farmer income of Rs. 94, 000/ha.

VIII. CSIR-Floriculture Mission has been launched at the national level to provide support to farmers growing floriculture crops. Based on Third Party Assessment by National Productivity Council, New Delhi, cultivation of lilium by farmers in Lahaul & Spiti resulted in income enhancement by 5 times compared to traditional crops of peas and potatoes.

IX. Integrating apiculture with floriculture and aromatic crops cultivation and utilizing CSIR improved bee hive for quality and hygienic extraction of honey

X. The institute has introduced low chilling varieties of apple in North-East states, which was recognized by Govt. of Mizoram, North East Council, Shillong, Meghalaya. North East Council, Shillong, Meghalaya sanctioned one project entitled "Capacity building programmes for NERCORMP Communities on cultivation and post-harvest management of low chilling varieties of apple". In this project low chilling varieties of

apple were introduced in Manipur and Meghalaya during 2019-2020 in association with North Eastern Region Community Resource Management Project (NERCORMP). Low chilling varieties viz., Anna, Dosett Golden, Red Fuji, Early Fuji, Sun Fuji and pollinizer variety Scarlett Gala were introduced in Ukhrul district of Manipur and West Khasi Hills district of Meghalaya. Capacity building programmes were conducted to the officials of NERCORMP in CSIR-IHBT and in north east states. 110 farmers were trained under the capacity building programme. About 16 acres of area have been covered in different location till now. During 2020, North East Council funded a project to CSIR-IHBT for bringing 66 acres of area under low chilling varieties in Arunachal Pradesh and Meghalaya. CSIR-IHBT have supplied 25000 low chilling varieties of apple viz., Anna, Dosett Golden, Red Fuji, Early Fuji, Sun Fuji, Pink lady, Granny Smith and Scarlett Gala to NERCORMP, Meghalaya for plantation in farmers' field in North East during January 11, 2021. With a net returns of 3-3.5 lakh /ha apple could be hot substitutes to zhoom cultivation being practiced in north east states of India.

XI. In case of training of students (Summer/ winter training-UG/PG/ Ph.D./ others trainees) at CSIR-IHBT, Palampur, a concession in training charges is being given on case to case basis after receiving request from economically/ socially weaker sections of society having annual income less than one lakh supported with valid income certificate issued by the Revenue Officer not below the rank of Tehsildar. The concessions/ waiver in fee is applicable only for 10 candidates on the basis of first come first serve i.e. from the date of receipt of application in the Institute". (Approved by Management Council of CSIR-IHBT).

15.07.2021

Subject: Reply to Parliament Question (Rajya Sabha Q. No. 19) regarding.

a) The step taken by Government for research and documentation of the medicinal plants which are used by various tribal groups in the country for the treatment of various diseases?

Yes.

- The CSIR-IHBT is documenting the medicinal plants used by the tribal communities of Himachal Pradesh through primary field surveys. It is conducting questionnaire recordings by obtaining Prior Informed Consent.
- Resident communities of Himachal Pradesh such as the Bhangalis, Gaddis, Gujjars, Lahulas and Pangwals have been targeted for the same.
- Additionally, CSIR-IHBT is developing databases on plant resource use such as the TRAMPIS (Traditional Medicinal Plants Information System). This database has information on traditionally used medicinal plants of Himachal Pradesh based on secondary information
- The 'Traditional Knowledge Digital Library', an initiative of CSIR focuses on this aspect. CSIR-IHBT is a party to it.

Some relevant publications

1. Uniyal SK, Singh KN, Jamwal P, BrijLal (2006). Traditional use of medicinal plants among the tribal communities of Chhota Bhangal, Western Himalaya. Journal of Ethnobiology and Ethnomedicine 2:14 doi: 10.1186/1746-4269-2-14

2. Uniyal SK, Sharma V, Jamwal P (2011) Folk medicinal practices in Kangra district of Himachal Pradesh, western Himalaya. Human Ecology. 39: 479-488. DOI 10.1007/s10745-011-9396-9.

3. Ahmad M, Alpy, Parkash O, Uniyal SK (2017). Folk utilization of plants in Kugti: An interior village of Chamba (Himachal Pradesh). Journal of Non-Timber Forest Products: 24(1):7-19.

4. Rana D, Bhatt A, Lal B, Parkash O, Kumar A, Uniyal SK (2020). Use of medicinal plants for treating different ailments by the indigenous people of Churah subdivision of district Chamba, Himachal Pradesh, India. Environment, Development and Sustainability https ://doi.org/10.1007/s1066 8-020-00617-0.

5. Rana D, Bhatt D, Lal B, Uniyal SK (2021). Taking a leaf from Jantri for traditional medicament- an ancient manuscript in Tankri. Indian Journal of Traditional Knowledge 20(2): 451-458.

23.07.2021

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. U2129) regarding "Research on algaculture for Bio-Energy"

a) Whether any new technological innovations and initiatives are being taken by Government for the development in the field of algaculture to combat climate change, if so, the details thereof and if not, the reasons therefor;

- In CSIR-IHBT a facility for cultivation of microalgae and germplasm collection centre for fresh water microalgae was established in 2018
- Nine microalgae strains namely, (i) Spirulina platensis, (ii) Chlorella vulgaris, (iii) Chlorella pyrenoidosa, (iv) Chlorella sorokiniana, (v) Scenedesmus obliquus, (vi) Scenedesmus acutus, (vii) Scenedesmus abundans, (viii) Scenedesmus sp., (ix) Monoraphidium sp., are being cultivated for evaluating the nutritional and animal feed applications
- These aforesaid microalgae strains have been cultivated under elevated CO_2 concentrations (range between 0.03% and 3% CO_2 partial pressures) at lab level and reduced carbon sources and waste water obtained from food processing industries to understand bioremediation potential
- Low cost protocols for harvesting and dewatering of microalgae biomass have been standardized at laboratory level
- Research is underway for mass cultivation of these microalgae strains utilizing waste salts generated from beverage industry and their complete chemical characterization for bioenergy and other bio-refinery applications

b) the details of institutions involved in such research work;

CSIR- Institute of Himalayan Bioresource Technology, Palampur (HP)

c) if not, the details of whether Government is considering to formulate any such study; and

Not Applicable

d) whether Government has taken any step to grant incentive for promoting biofuel industries through algaculture, if so, the details thereof and if not, the reasons therefor?

Does not pertain to CSIR-IHBT

26.07.2021

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. S2505) regarding "Research on Ayurvedic Medicines"

a) Whether Government has encouraged the research laboratories to develop Ayurvedic medicines for different diseases in the country;

Yes, CSIR-IHBT Palampur is presently working in close association with Rajiv Gandhi Government Post Graduate Ayurvedic College, Paprola (HP) to validate some molecules to develop Ayurvedic medicine. CSIR-IHBT currently studying important plants like Nirgundi and Hadjod mentioned in Ayurveda to assess and validate their potential in relieving rheumatic complications, improving cartilage health, and respiratory disorders. CSIR-IHBT is also working on anti-malarial aspect and identified lead extract/molecules from traditionally used medicinal plants.

b) If so, the details of ongoing projects in different laboratories and progress made so far in each case; and

The following activities were perceived by the following plants at CSIR-IHBT Palampur:

- Immunomodulation activity on tea based polyherbal formulation is reported at preclinical level and technology transferred to M/s. Vigada Care Pvt. Ltd. Formulation was developed under the regulatory mechanism of FSSAI and product was recently launched under the trade name "IMMUST PRO" (Immunity modulation product) by M/s. Vigada Care Pvt. Ltd. New Delhi.
- Efficacy of medicinal herb *Picrorhiza kurroa* has been tested in Type II diabetes mellitus specifically high fat diet induced preclinical modal of insulin resistance where it has shown remarkable potential to revert the disease phenotype and regulates blood sugar.
- Anti-colitis activity of *Berberis lycium* fruits has demonstrated with good efficacy at preclinical level.
- Our institute is carrying out preclinical efficacy validation and safety of clinically used ayurvedic preparations in collaboration with Ayurvedic college, Paprola, HP. In this context ayurvedic preparations including,

trikatu, triphala, arjuna ksheerpak and phalatrikadi kwath has been validated for their efficacy. Furthermore, safety of Sammerpanag ras has been studied in rats as per standard guidelines. For these activities, the Institute have signed MOU with state Ayurveda department, H.P.

- CSIR-IHBT Palampur already completed some work in this direction by virtue of participation in CSIR Mission on Nutraceuticals and nutritionals. Ongoing CSIR-Immunity mission is targeted towards utilizing herbal formulation for immune modulation and immune boosting.
- Under the project “Exploration of Himalayan Plants for Novel Antimalarial Agents: Characterization of potential molecules (Phase-I&II), one lead extract and two molecules from *Cissampelos pareira* have been identified against Malarial parasite.

c) the steps Indian laboratories are proposing to take to get international recognition of Ayurvedic medicines being developed in India?

CSIR-IHBT is involved in scientific validation of functional foods, nutraceuticals and phytopharmaceuticals in terms of their preclinical validation in *in vitro* and *in vivo* set up. This follows our continuous efforts by complying with national and international regulatory guidelines to get approval for international recognition and marketing.

30.07.2021

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. 2634)

a) whether Government is working towards linking innovative agricultural technologies with farms to benefit small and marginal farmers in Northeast India and if so, the details thereof;

CSIR-IHBT has been striving to disseminate technologies developed by the institute to catalyse the economy of North Eastern states. Details of the initiatives undertaken in the North-Eastern states are given below:

1. Introduction of low chilling varieties of Apple in Mizoram

In 2016, a preliminary study was carried out by CSIR-IHBT, Palampur in the north eastern region by planting low chilling apple varieties viz., Anna, Red Fuji, Early Fuji, Sun Fuji, Red Lum Gala, Gale Gala, and pollinizer variety Scarlett Gala in Champhai district of Mizoram in 5.2 acres. The altitude of locations ranged from 1198–1501 m amsl (above mean sea level). After two years of plantation, the crop reported to produce flowers, fruits in good number and the nutritional analysis of the fruit was also at par with the market apple. Apple samples of Mizoram were analysed for quality parameters and were compared with the apple of Himachal Pradesh whose maturity coincide with these low chilling apple varieties. Glucose, fructose, sucrose and total sugar content were higher in apple fruits cultivated in Mizoram as compared to the apples procured from the market of Palampur, Himachal Pradesh. The preliminary examination also indicates this as potential crop for the region and the farmers of the underdeveloped region of the north eastern states can improve their livelihood through adoption of these low chilling apple varieties.

Additionally, during 2019–2020, low chilling apple varieties were also introduced in Ukhrul district of Manipur and West Khasi Hills district of Meghalaya in association with North Eastern Region Community Resource Management Project (NERCORMP) under the project entitled “Capacity building programmes for NERCORMP communities on cultivation and post-harvest management of low chilling varieties of apple.” In this project the capacity building programmes were conducted for the officials of NERCORMP in CSIR-IHBT and in north east states. The plants which were introduced in January-February 2019 in district Ukhrul, Manipur started bearing fruits and the farmers have harvested fruits this year (2021). So far about 16 acres of area have been covered under low chilling apple cultivation in different locations throughout the north eastern states.

In August 2020, North East Council funded a project to CSIR-IHBT to bring 56 acres of area under low chilling varieties in Arunachal Pradesh and Meghalaya under a consultancy project entitled “Promotion of low chilling apple plantation in North Eastern Region of India.” Under this project about 25000 rooted plants of low chilling varieties of apple were supplied by CSIR-IHBT to the north eastern states. Nine low chilling varieties viz., Anna, Dorsett Golden, Red Fuji, Granny Smith, Pink Lady, Gale Gala, Sun Fuji, Early Fuji, Scarlet Gala were supplied to Arunachal Pradesh and Meghalaya.

Apple plants introduced in different locations of Champhai district during January, 2018

Site no.	Village name	Farmer’s Name	No of plants
01	Mualkawi	Mr. Zairemthanga	25
02	Mualkawi	Mr. Lianthianga	25
03	Mualkawi	Mr. P.C Liantana	25
04	Mualkawi	Mr. Lalthazauva	25
05	Mualkawi	Mr. E. Lalthneawa	25
06	Mualkawi	Mr C Lalchhuanliana	25
07	Mualkawi	Mr Lalpiangmawia	25
08	Mualkawi	Mr. Lalhmangaihtluanga	25
09	Mualkawi	Mr Ramthanga	25
10	Mualkawi	Mr Kaplianhranga	25
11	Mualkawi	Lalrotluanga	25
12	Hnahlan	Mr K. Zoliana	25
13	Hnahlan	Mr Hrangthuami	25
14	Hnahlan	Ms Roseii	25
15	Hnahlan	K. Laltlanzauva	25
16	Hnahlan	Ms K. Lalniliani	25
17	Hnahlan	Dorikhuma	25
18	Talangsam	Mr H. Hmangaiha	30
19	Tlangsam	Mr Vanlalruatkima	30
20	Tlangsam	Mr V L Siama Fanai	30
21	Vengthlang	Mr Valbuanga	30

22	Vengthlang	Mr C Malswma	30
23	Vengthlang	Mr Valbuanga	30
24	Vengthlang	Mr C. Lianzova	20
25	Vengthlang	Mr. K Lalmawia	8
26	New Champhai	Mr Lalrochanga	30
27	Zotlang	Mr Vanlalchhuanga Varte	10
28	Zotlang	Rinthianghlima	25
29	Vengsang	Mr V. Kawlbuaia	25
30	Vengsang	Mr. Lallawmzuala	25
31	Vengsang	Mr Vanlalringheta	30
32	Vengthlang	Mr Vanlawma	20

2. Aromatic plants cultivation and promotion

CSIR-IHBT, Palampur is working on promotion and cultivation of aromatic crops in Northeast India to benefit small and marginal farmers by providing complete agro and process technologies of aromatic crops. Details given in the table below:

Sr. No.	Crop	Region /State	Area covered
1.	Wild marigold	Manipur	32 ha
2.	Damask rose	Dibrugarh, Assam	1 ha
3.	Wild marigold and lemongrass	Mizoram	1 ha
4.	Damask rose	Arunachal Pradesh	2.5 ha
5.	Low chilling apple varieties *viz*., Anna, Red Fuji, Early Fuji, Sun Fuji, Red Lum Gala, Gale Gala, and pollinizer variety Scarlett Gala	Mizoram	25 ha
6.	Low chilling apple varieties	Ukhrul, Manipur and West Khasi Hills, Meghalaya	
7.	Nine low chilling apple varieties *viz*., Anna, Dorsett Golden, Red Fuji, Granny	Arunachal Pradesh and Meghalaya	

	Smith, Pink Lady, Gale Gala, Sun Fuji, Early Fuji, Scarlet Gala		

Distillation units installed in NER

Sr. No.	Beneficiary/Society	Region/ State	Dated
1.	Namponliu Associates	Makhan, Senapati, Manipur	26-04-2018
2.	Manav Jiwan Sudhar Evam Kshamata Nirman Samiti	Daragaon, Soreng, West Sikkim-737 121	27-08-19
3.	Mizoram Rural and Development Society	Zotlang, Aizawl Mizoram-796 009	06-12-19

3. CSIR- IHBT has done following activities in Sikkim:

3.1. Generated livelihood opportunities for the small and marginal farmers by introducing technology to grow exotic high value mushroom- Shiitake within short duration and space and its processing for value addition.

- Technology feature: Shorter production time: 2 months as oppose to 8-12 months, yield 0.5-0.6 kg/ 1 kg dry substrate, 350 mg powder meets 100% RDA
- Three SFURTI clusters on Shiitake mushroom production and processing under the SFURTI scheme of Ministry of micro, small and medium enterprises are under implementation at West and South Sikkim with a total budget of Rs 7.35 crore expecting to impact 750 beneficiaries

3.2. Facilitation of organic farming through composts enriched with indigenous microbes with better agricultural attributes and introduction of advanced Anaerobic Digester to process organic waste (250 kg per day).

- Technology feature: Cold tolerant, efficient hydrolytic bacterial consortia with biofertilizers and PGPRs are developed (both aerobic and anaerobic consortia).
- Anaerobic Digester through DST-WMT scheme has been installed at Gyalshing Municipal Council, West Sikkim to treat 250 kg organic waste per day. Prduscts like Biogas and quality compost will be used for society. MoU signing today

- For generation of livelihood opportunities for marginal farmers one SFURTI cluster on production of enriched compost through MoMSME is getting implemented at West Sikkim with total budget of Rs 2.5 crore impacting 200 beneficiaries.

b) whether Department of Biotechnology has issued special call for Northeast region under the programme which will help in understanding local issues of farmers & provide scientific solutions to them and if so, the details thereof; and

DBT has called for programme like “Development and Utilization of Bioresources of North East Region for Generating Livelihood Security and Entrepreneurship” and CSIR-IHBT in collaboration with counterparts from North East have applied for following projects under the call:

Project number 1: Integrated livelihood generation programme with basic mushroom (Oyster, paddystraw and milky) and advance mushroom (shiitake, Rishi, Wood ear mushroom) clubbed with Vermicompost and Gobar Gas Unit with special emphasis on vitamin D enriched mushroom value added products at Baksa district of Bodoland Territorial Council & Ribhoi District of Meghalaya

Project number 2: Livelihood generation using mass production of bioinoculants and biopesticides targeted towards tea (Camellia sinensis) at Kaziranga district of Assam

The projects are submitted but there has been no response from the funding agency so far.

c) whether under the programme hubs in NER will collaborate with scientific institutions of India and Krishi Vigyan Kendras and if so, the details thereof?

Does not pertain to CSIR-IHBT

30.07.2021

Subject: Reply to Parliament Question (Lok Sabha Q. Diary No. 7531) regarding "Plants on the verge of extinction"

a) whether various species of medicinal and aromatic plants are on the verge of extinction in the country;

Yes, various plant species are threatened with extinction. The below mentioned 22 plant species, many of which are medicinal, have been notified as threatened by the Himachal Pradesh State Biodiversity Board.

Sr. No.	Scientific Name	Family
1	*Aconitum deinorrhizum* Satpf	Ranunculaceae
2	*Aconitum heterophyllum* Wall	Ranunculaceae
3	*Arnebia benthamii* (Wall ex G. Don) I. M. Jonst.	Boraginaceae
4	*Atropa acuminata* Royle ex. Lindle.	Solanaceae
5	*Berberis aristata* DC.	Berberidaceae
6	*Betula alnoides* Buch. -Hem. Ex D. Don	Betulaceae
7	*Dactylorhiza hatagirea* D. Don	Orchidaceae
8	*Eremostachys superba* Royle ex Benth	Lamiaceae
9	*Fritillaria roylei* Hook.	Liliaceae
10	*Gentiana kurroo* Royle	Gentianaceae
11	*Habenaria edgeworthii* Hook. f. ex Collett	Orchidaceae
12	*Jasminum parkeri* Dunn	Oleaceae
13	*Lilium polyphyllum* D. Don	Liliaceae
14	*Malaxis muscifera* (Lindl.) Kuntze	Orchidaceae
15	*Nardostachys grandiflora* DC	Boraginaceae
16	*Paris polyphylla* Sm.	Liliaceae
17	*Sinopodophyllum hexandrum* (Royle) T.S. Ying	Berberidaceae
18	*Skimmia laureola* (DC.) Siebold & Zucc. ex Walp.	Rutaceae
19	*Staphylea emodi* Wall.ex Brandis	Staphyleaceae
20	*Swertia chirayita* (Roxb. ex Fleming) Karsten	Gentianaceae

21	*Taxus contorta* Griff.	Taxaceae
22	*Trillium govanianum* Wall. ex D. Don	Melanthiaceae

- CSIR-IHBT, Palampur is working on tissue culture, cell culture and hydroponic and aeroponic farming for conservation of rare, endangered and threatened medicinal and aromatic plants of Himalayas. CSIR-IHBT is successfully developed in vitro protocols and end-to end solution for reintroduction of plants in their natural habitats for conservation purpose. CSIR-IHBT is working on endangered species e.g. *Valeriana jatamansi*, *Podophyllum hexandrum, Fritillaria roylei*, *Rhodiola imbricate* etc.

b) whether the medicinal plants being grown with the help of fertilizer that are from different types of chemicals greatly affect their quality under the National Medicinal Plant Board; and

Does not pertain to CSIR-IHBT

c) the effective measures taken by the Government to save human life from its impact

Does not pertain to CSIR-IHBT

02.12.2021

Subject: Reply to Parliament Question (Lok Sabha Q. Diary No. 5086) "Research and Documentation of Medicinal Plants" reg.

a) the steps taken by the Government for research and documentation of medicinal plants used by the various tribal groups and villagers for the treatment of various types of diseases in the country along with the details thereof?

The CSIR-IHBT is working on the documentation of medicinal plants used by the various tribal groups and villagers for the treatment of various diseases. It has documented information on plants used by the *Bhangalis*, *Gaddis*, *Gujjars*, *Lahuals*, *Pangwals* of Himachal Pradesh for treating various diseases.

Some papers published on the same

Uniyal SK, Singh KN, Jamwal P, BrijLal (2006). Traditional use of medicinal plants among the tribal communities of Chhota Bhangal, Western Himalaya. Journal of Ethnobiology and Ethnomedicine 2:14 doi: 10.1186/1746-4269-2-14.

Uniyal SK, Sharma V, Jamwal P (2011) Folk medicinal practices in Kangra district of Himachal Pradesh, western Himalaya. Human Ecology. 39: 479-488. DOI 10.1007/s10745-011-9396-9.

Ahmad M, Alpy, Parkash O, Uniyal SK (2017). Folk utilization of plants in Kugti: An interior village of Chamba (Himachal Pradesh). Journal of Non-Timber Forest Products: 24(1):7-19.

Rana D, Bhatt A, Lal B, Parkash O, Kumar A, Uniyal SK (2020). Use of medicinal plants for treating different ailments by the indigenous people of Churah subdivision of district Chamba, Himachal Pradesh, India. Environment, Development and Sustainability https ://doi.org/10.1007/s10668-020-00617 -0

Rana D, Bhatt D, Lal B, Uniyal SK (2021). Taking a leaf from Jantri for traditional medicament- an ancient manuscript in Tankri. Indian Journal of Traditional Knowledge 20(2): 451-458.

07.12.2021

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. U2709) "National Mission for sustaining the Himalayan Ecosysteme" reg.

a) details of programmes formulated by Government under National Mission for Sustaining the Himalayan Ecosystem (NMSHE) during the last three years;

Task force	Nodal organization/agency
Natural and geological wealth	Wadia Institute of Himalayan Geology
Water, ice, snow resources Including glaciers	National Institute of Hydrology
Forest resources and plant biodiversity	Govind Ballabh Pant National Institute of Himalayan Environment (GBPNIHE)
Micro flora and fauna and wild life & animal population	Wildlife Institute of India
Traditional Knowledge Systems	Jawaharlal Nehru University
Himalayan Agriculture	Indian Council of Agricultural Research

CSIR-IHBT is an active member in the activities of NMSHE. It is a key partner of the task force "Traditional Knowledge Systems" and is involved in "Network programme on convergence of traditional knowledge system for integration to sustainable development of western of Indian Himalayan region". Here-in the CSIR-IHBT had a focus on the Chamba region of Himachal Pradesh. It has documented the traditional knowledge systems prevalent in the area and also the climate perception of the local communities.

Some of the publications from the NMSHE project

- Rana D, Bhatt D, Lal B, Uniyal SK (2021). Taking a leaf from Jantri for traditional medicament- an ancient manuscript in Tankri. Indian Journal of Traditional Knowledge 20(2): 451-458.
- Rana D, Bhatt A, Lal B, Parkash O, Kumar A, Uniyal SK (2020). Use of medicinal plants for treating different ailments by the indigenous people of Churah subdivision of district Chamba, Himachal Pradesh, India. Environment, Development and Sustainability https ://doi.org/10.1007/s1066 8-020-00617 -0
- Brij Lal, Dipika Rana and Anupam Bhatt (2019) Natural resource use pattern for self sustenance by the natives of Tissa region of Himachal Pradesh in Western Himalaya, India. In: *Ethnobotany* Vol. 2 (Ed.- Suresh Kumar), Kojo Press, 23 Ansari Road, Daryaganj, New Delhi, pp. 132-152.
- Rana D, A Bhatt and Brij Lal (2020) Studies on lifestyle and livelihood options of the Gujjar Tribe of Tissa Region of District Chamba, Himachal Pradesh in the western Himalaya, In: S. Pant, A. Sharma and V. Sharma

(eds.) – *Ethnobotany and Biodiversity Conservation,* Indus Book Services Pvt. Ltd., 21 Ansari Road, Daryaganj, New Delhi, pp. 1-9.

- Bhatt A, D Rana, SK Uniyal, A Kumar, and Brij Lal (2020) Biodiversity, traditional knowledge and cultural aspects of the native people of Pangi valley, Chamba district, H.P. *Proceedings of International Biodiversity Congress (IBC,* Oct., *2018),* Forest Research Institute, Dehradun, India, Volume IV, pp. 1-6.
- Dipika Rana, Anupam Bhatt and Brij Lal (2019) Ethnobotanical knowledge among the semi-pastoral Gujjar tribe in the high altitude (Adhwari's) of Churah subdivision, district Chamba, Western Himalaya, *Journal of Ethnobiology and Ethnomedicine* 15:10-30, https://doi.org/10.1186/s13002-019-0286-3.

b) whether Government has issued any guideline or directives for states of Himalayan region for sustainable development in the view of climate change; and

Not relevant to CSIR-IHBT.

c) if so, the details thereof?

Not applicable.

13.12.2021

Subject: Reply to Parliament Question (Lok Sabha Q. Diary No. 9638) "Research and Development of Traditional Medicines" reg.

a) whether Government has entered into any agreement with other countries for research and development of traditional medicines,

Yes

b) if so, the details thereof?

S No.	Title for MoU	Party Name	Date of signing	Duration
1	MoU to collaborate in the areas of mutual interest (medicinal plants, bioactive molecules, herbal formulations etc.)	National Research Institute of Chinese Medicine (NRICM), Taiwan, 155-1, Section 2, Linong Street, 11221 Taipei, Taiwan	21.12.2019	5 Years

c) whether Government has any scheme to promote traditional and ethnic pharmaceutics in the country,

Does not pertain to CSIR-IHBT

d) if so, the details thereof? And

Not applicable

e) the details of the locations where ethnic and conventional medicines are available in the country, State-wise including Tamil Nadu?

Does not pertain to CSIR-IHBT

13.12.2021

Subject: Reply to Parliament Question (Lok Sabha Q. Diary No. 9754) "Medicinal Herb "Jufa"" reg.

a) Whether the Government believes that the medicinal herb "Jufa", available in high mountainous regions, can be effective in providing protection against respiratory problems;

As per the literature Jufa, Zuufaa, Zuufaa, Zufah is the common name for Hyssopus officinalis L. (family Lamiaceae) is native to Europe and temperate Asia. In India, it is reported from West Himalayas (Kashmir to Kumaon) at altitude of 2800–4200 (Khare 2007, Samant et al. 2007)* which is used in respiratory problems.

b) if so, the details thereof?

The plant is considered as a stimulant, carminative and expectorant and is used in colds, coughs, and congestion and lung complaints (Chopra et al. 1956)*. Leaves are stimulating stomachic, carminative and colic. It is used in coughs, and congestion and lung complaints (Spice Board of India, http://www.indianspices.com/spice-catalog/hyssop.html).

c) the details of studies, if any, on the broader benefits of medicinal herbs to ensure good lung health for residents of highly polluted cities, conducted in the last three years, year-wise;

Does not pertain to CSIR-IHBT

d) whether the Government is considering to initiate any schemes for promoting the use of such medicinal herbs in the most polluted cities of the country, as a necessary lifestyle change;

Does not pertain to CSIR-IHBT

e) if so, details thereof;

Not applicable

f) whether there are any existing plans or schemes for promoting the use of medicinal herbs for tackling respiratory problems and if so, details thereof?

Not applicable

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*References

Chopkra, R.N., Nayar, S.L., Chopra, I.C. 1956. Glossary of Indian Medicinal Plants. Council of Scientific & Industrial Research, New Delhi.

Khare, C.P. 2007. Indian Medicinal Plants- An Illustrated Dictionary. Springer Science+Business Media, LLC.

Samant, S.S., Pant, S., Singh, M., Lal, M., Singh, A., Sharma, A., Bhandari, S. 2007. Medicinal plants in Himachal Pradesh, north western Himalaya, India. International Journal of Biodiversity Science and Management 3: 234–251

24.01.2022

Subject: Reply to Parliament Question (Lok Sabha Q. Diary No. 674) “Make in India initiatives of CSIR-IHBT” reg.

a) whether it is a fact that CSIR and its laboratories are trying their best in Make in India initiatives; and

CSIR-IHBT is making effort for make in India. Below are the areas in which we are trying for make in India:

a. Hydro and aeroponics: In the area of modern agriculture practises includes hydroponic and aeroponic cultivation. The institute (CSIR-IHBT) has developed cultivation protocol for commercial scale production of high-value flower (Lilium and tulip), spice (oregano, basil and parsley) and commercially important medicinal plants (Picrorhiza kurroa and Valeriana jatamansi). This will create opportunity among farmers, entrepreneurs and youths to sell their product for the income generation and direct benefit to industry and society.

2. Industrial enzymes and useful products: CSIR-IHBT is identifying and characterizing indigenous enzymes for

   i. Superoxide dismutase from high altitude plants having applications in Medical Industry, Cosmetic Industry, Food Industry, and Plant Industry.
   ii. Biodegradable-bioplastic Polyhydroxyalkanoates (PHA) and Violacein pigment from the Himalayan bacteria
   iii. industrial applications such as childhood blood cancer treatment (L-asparaginase),
   iv. Lignocellulolytic enzymes for the bioconversion of biomass to bioethanol industry (Laccase, cellulases).
   v. Reverse transcriptase for biotechnological applications, having high temperature stability and having proof reading activity

3. Indigenous multiplex diagnostics for apple and cherry virus and virus-like pathogens having applications in screening of nursery plants and enhancing the quality and quality of rootstocks to be used for apple and cherry
4. Technology has been transferred to private industries and social bodies for production and commercialization. For example, Shiitake mushroom is an import item, through our initiatives we have developed the technology of captive production of shiitake mushroom and have done value addition by enrichment of Vitamin D2. This technology has been transferred to industry stakeholders for commercialization; and through Ministry of MSME this technology has been also getting utilized to generate rural livelihood. The institute has signed a total of 57 ToTs

agreements. Total MoUs and agreements signed by the institute from June 2015 to January 2022 are 488.

5. CSIR-IHBT is giving effort through in vitro propagation techniques to empower Make in India initiatives in mass scale propagation and establishment of new species in India for uplifting farmers income and livelihood

b) if so, the proposal of the Union Government to use and award the research projects of the CSIR laboratories with the State Governments for technology transfer and applications of the products therefor?

- **Heeng cultivation**: Annual imports of *Heeng* is1540 tonnes with an estimated value of Imports of Rs 942 crore per year. CSIR-IHBT has joined hands with the state government of Himachal Pradesh for asafoetida cultivation for the first time in India to our-self self-sustainable in its production. MoU has already been signed between State Agriculture Department and CSIR-IHBT. Presently we import 1145 tons (worth USD 77m) each year.
- **Introduction of Saffron in Himachal Pradesh:** CSIR-IHBT has joined hands with the state government of Himachal Pradesh for saffron cultivation to make India self-sustainable in its production. MoU has already been signed between State Agriculture Department and CSIR-IHBT. Presently we import 93.5 tons of saffron from Iran each year.
- **Monk fruit cultivation**: CSIR-IHBT for the first time initiated the cultivation of monk fruit through both vegetative methods and *in vitro* methods to make India self-sustainable in natural sweeteners (global market of US$ 379.4 million by 2026). Field trials are currently going on in the Himachal Pradesh for its cultivation in this region. Presently this crop is grown only in China.
- CSIR-IHBT in collaboration with the Department of Industry, Himachal Pradesh under the Himachal Pradesh Chief Minister startup scheme initiated the training of progressive entrepreneurs to **develop and market products from aloe vera, local fruits, cereals & grains, aromatic and medicinal plants**.
- **Hydro and aeroponics**: Efforts are being made in the area of capacity building through CM-start up scheme, institutional facility can be used as incubation centre and skill development program training to farmers, entrepreneurs and young youths. Already tie-up with the state agriculture Dept. of Chamba for setting-up of commercial hydroponic and aeroponic facility, technical support for cultivation of targeted crops and training to entrepreneurs on hydroponic and aeroponic techniques.
- **Initiated organised cultivation of Dalchini (Cinnamon) in H.P**. India Imports: 45,319 tonnes worth Rs. 909 crores. CSIR-IHBT Introduced Dalchini for the First time in Himachal Pradesh and started its organised cultivation at 10 locations in HP. The institute supplied of quality planting material and undertook capacity building of the farmers. Collaborations of CSIR-IHBT in place with State Agriculture Department, Himachal

Pradesh, ICAR-Indian Institute of Spice Research, Calicut, Kerala & Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli (Maharashtra) for technology on its cultivation in North India

- **Introduction of Apples in NE States: s**upplied 40,000 apple plants (low chilling varieties and planted in 150 locations. The institute undertook quality evaluation and capacity building of farmers and officials of the NER.
- **Essential Oil Production**: Under CSIR-Aroma Mission technologies for cultivation of aromatic crops led to production of 27.69 tonnes of essential oil and revenue generation of Rs. 17.05 Cr. **Himachal Pradesh is the highest producer of wild marigold essential oil in the country with annual production potential of 6.5 tonnes**, leading to annual revenue generation of Rs. 5 crores to the farmers
- Under CSIR-**Floriculture Mission technologies** for cultivation of floriculture crops led to production of flowers worth Rs.2.68 crores.
- Keeping in view the rising demand of natural sweeteners, the institute has facilitated an annual production of 4000 tonnes of dry leaves of **stevia,** leading to revenue generation of Rs. 40 Cr. through stevia cultivation technology through industrial partnership.
- **Biofertilizers:** activity on development of Biofertilizer was proceeded with setting up Biofertilizer Unit wherein proposal was submitted to Himachal Pradesh Horticulture Development Project and has been considered for funding under Matching Grant Scheme vide No HPHDP/MGS/II/319.
- **Bamboo incense sticks**: CSIR-IHBT with the help of state government of Himachal Pradesh, has developed technology for production of incense sticks from bamboo to make self-sustainable in its production. Presently we import more than Rs 546 crore of raw agarbatti each year.
- Established collaboration with Khadi Village Industry Commission, GoI and, three Non-government organizations for the production of **Vitamin D2 enriched Shiitake mushroom** at three SFURTI clusters in Sikkim with financial support of Ministry of MSME.
- Established collaboration with Foundation of MSME clusters, New Delhi and two Non-government organizations for the production of **vermicompost, vermiwash and enriched compost** in Sikkim and Himachal Pradesh.
- Transferred the technology of Vitamin D2 enriched Shiitake mushroom to six industry stakeholders for the production of the high value medicinal edible mushrooms.
- Transferred the technology of indigenous Biofertilizer to a Biofertilizer industry at Sikkim for the production of indigenous Biofertilizer.

List of technologies developed from the research projects sanctioned by CSIR

1. Technology for commercial production of iron and zinc enriched Spirulina based food products (energy bars)

2. Technology for commercial production of multigrain high protein mixes
3. Technology for commercial production of protein and fiber enriched energy bars
4. Technology for commercial production of micronutrients fortified ready to cook foods
5. Technology for commercial production of herbal formulations for cartilage health (Oral formulations)
6. Technology for processing **herbal formulation for immunity modulation**

No. of technology partners/beneficiaries – 14 nos.

Commercialization of technologies

Technology	**Technology partners/Licensee**
Technology for commercial production of iron and zinc enriched Spirulina based food products (energy bars)	1. Yujo Agriculture & Aquaculture Farm Society, Meerut, U.P. 2. Daziran Health Products, Coimbatore, Tamil Nadu 3. Lennix Inc., New Delhi
Technology for commercial production of multigrain high protein mixes	1. Unati Co-Operative Marketing cum Processing Society, Talwara, Punjab 2. Lok Seva Trust, Meerut, U.P 3. Lennix Inc., New Delhi
Technology for commercial production of protein and fiber enriched energy bars	1. Lennix Inc., New Delhi 2. SS Vitran Technologies Pvt. Ltd., Haridwar 3. Sirimiri Nutrition Products Pvt Ltd., Bengaluru 4. MAK Biotek, New Delhi 5. Komal Innovations and Wellness Initiatives, Nagrota Bagwan, Kangra 6. Sumati Foods, Baddi, Himachal Pradesh
Technology for commercial production of herbal formulations for cartilage health (Oral formulations)	1. M/s. Carols Formulations, Jalandhar, Punjab
Herbal Formulation for Immunity Modulation	1. M/s. Vigada Care Pvt Ltd, New Delhi

List of outreach programmes and applications of the products thereof

1. POSHAN Abhiyaan – Nutrition supplementation program

Outreach Program – POSHAN Maitree under the auspices of POSHAN Abhiyaan sponsored by Directorate of Women and Child Development, Govt. of Himachal Pradesh, Shimla

Project title - Evaluation of micronutrient fortification and menu diversity on the health indices of anganwadi attending children aged between 3 & 6 years in Panchrukhi Block, Palampur, Distt. Kangra

Project Location – Panchrukhi block, Palampur tehsil, Distt. Kangra

Target beneficiaries

- Severely acute malnourished (SAM)
- Moderately malnourished (MAM)
- Undernourished pregnant and Lactating Women

No. of. Beneficiaries – 100 nos.

Products approved under the POSHAN Abhiyaan program

1. Iron and zinc enriched Spirulina based energy bars
2. Protein and fiber enriched cereal bars
3. Multigrain high protein beverage mix
4. Iron enriched fruit bars

2. **Natural disaster relief activities**

Distribution of CSIR-IHBT technology food products viz., (i) Iron and zinc enriched Spirulina based energy bars, (ii) Protein and fiber enriched cereal bars and (iii) Multigrain high protein beverage mix to

1. Kerala Floods Disaster Relief, 2018
2. Cyclone Fani, Odisha and West Bengal, 2019
3. Cylone Amphan, West Bengal, 2020

S. No	Disaster served	Product	No. of units – servings	Total quantity
1	Kerala Floods Disaster Relief, 2018	Protein and fiber enriched energy bars	100000 units (1 lakh units)	4 metric tonnes
2	Cyclone Fani, Odisha and West Bengal, 2019	Protein and fiber enriched energy bars	100000 units (1 lakh units)	4 metric tonnes
3	Cylone Amphan, West Bengal, 2020	Protein and fiber enriched energy bars	100000 units (1 lakh units)	4 metric tonnes
		Iron and zinc enriched Spirulina energy bar	100000 units (1 lakh units)	2 metric tonnes
		Multigrain high protein premix	100000 units (1 lakh units)	20 metric tonnes
			Total	**34 metric tonnes**

- Collaborations with State Government (Himachal Pradesh)

S. No	Title	Activities
1	MoU with Director of Industries, HP Shimla for "CM Startup Scheme Himachal Pradesh"	51 start-ups under "CM Startup Scheme"
2	Transfer of Technology (ToT): Commissioner Trilokpur Temple Trust, Sirmaur (H.P.) Directorate of Agriculture, Shimla	Herbal incense cones Agro technologies of Heeng & Saffron
3	MoUs : Department of Ayurveda, Govt. of H.P. The Palampur Rotary Eye Foundation, Maranda, Palampur SCVB Government College, Palampur RPGMC Hospital, Tanda, Kangra CSKHPKV, Palampur HIMCOSTE, Shimla (H.P.) H.P Agro Industries	Collaborative research and academic activities
4	Consultancy agreements with Department of Ayurvedic Pharmacy, Joginder Nagar (H.P.)	Establishment of three drying sheds and storage godowns
5	MoU with D.C. office Chamba, H.P. MoU with D.C. Office Lahaul & Spiti, (H.P.)	Crop diversification; apiculture; food processing etc.

- MoUs/ agreements signed under 'MSME SFURTI Scheme'

S. No	Agreement/MoUs	Activities
1	Technology transfer and consultancy agreements for preparation of enriched compost/ vermicomposting in cold hilly region	MTEC cluster, West Sikkim TEC cluster, Sirmaur, (H.P.)
2	Agreement with FMC for cut flower cluster	Gondla Cut Flower cluster, Lahaul Spiti (H.P.) Shansha Cut Flower ClusterLahaul Spiti (H.P.)

3	Technology transfer and consultancy agreements for cultivation of Shiitake mushroom	NCSMC, South Sikkim cluster WSSMC, West Sikkim cluster SSMC Sumbuk, South Sikkim cluster

- **Connect with Other States**

Sr.No.	Description	States Connected
1	MoU's for academic, R&D collaboration and Livelihood promotions	• NERCRMS, Shillong, Meghalaya • HNB Garhwal University, UK • JSS College of Pharmacy, Tamilnadu • DBSSK, Dapoli, Maharashtra • ICAR-IISR, Kozhikode, Kerala • SKUAST, Chatha, Jammu, J&K • NMPB, New Delhi

01.02.2022

Subject: Reply to Rajya Sabha Provisionaly admitted starred/Unstarred Question Diary No. U1169 regarding "Funds for research on new drugs" reg.

a) the percentage hike in allocation of funds to Council of Scientific and Industrial Research (CSIR) under the Union Budget 2022;

Does not pertain to CSIR-IHBT

b) whether the budgetary allocation to CSIR is sufficient to fund the research in new drugs for kala-azar, filaria, leprosy and tuberculosis;

Does not pertain to CSIR-IHBT

c) if so, the details thereof and if not, the manner in which Government proposes to fund and support such research; and

Not applicable

d) the achievements made by CSIR in making affordable drugs for the above said diseases?

CSIR-IHBT is not working on the above mentioned infectious diseases/parasitic activities

04.03.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. S-2399, S803) "Study on herbs and medicinal plants in tribal areas" reg.

a) whether Union Government is planning to conduct any study in tribal areas particularly in Odisha in respect of availability of herbs and medicinal Plants;

- CSIR-IHBT is involved in promoting cultivation of herbs in form of aromatic plants under CSIR-Aroma mission. Planting material of palmarosa, mint and damask rose has been provided to farmers of Odisha through NGO Social Action for People, Rourkela. A multi-purpose distillation unit (worth Rs. 10 Lakhs) for the extraction of essential oil from the aromatic plants has also been provided to empower the farmers to distil their own produce for production of essential oils.
- Similarly, in the area of Bastar in Chhattisgarh, CSIR-IHBT has promoted cultivation of aromatic crops like lemon grass and has setup essential oil distillation unit of 5 quintal capacity.
- Recently a project sanctioned from National Medicinal Plants Board, Ministry of AYUSH, GoI entitled "Production of Quality Planting Materials of Medicinal Plants Including the Rare Endangered Threatened Species for Conservation and Distribution" costing Rs. 75.00 lakhs, which will benefit tribal farmers particular of Himachal Pradesh.

b) if so, the details and the findings thereof, State/UT-wise and if not the reasons therefor;

- In tribal areas particularly in Odisha, quality planting material of damask rose (6300 rooted plants) and mint (1 ton roots/rhizomes) has been supplied to M/s Social Action for People having official address at Sanyasipali, P.O.- Kolabira, P.S.- Kolabira, Dist. Jharsuguda, Odhisa- during March 2 2022.
- Overall, the area under aromatic crops such as wild marigold, chamomile, damask rose, Indian valerian, lavender, rosemary, lemongrass and palmarosa was extended over 1691 ha in which 3121 farmers benefitted leading to production of 27.39 tonnes of essential oil and revenue generation of Rs. 17.05 Cr. So far, under the CSIR Aroma mission 3,97,725 mandays have been generated. To empower the farmers growing aromatic crops, 51 distillation

units for extraction of essential oils were provided to different farmer groups in the farmers' fields by CSIR-IHBT in the states of Himachal Pradesh.

- In western Himalaya, CSIR-IHBT is conducting floristic surveys (primarily in Himachal Pradesh) for collection of plant specimens, identification, inventorization, digitization, and preservation of the specimens in herbarium (PLP).
- The CSIR-IHBT is involved in surveying and mapping the medicinal plant wealth of state of Himachal Pradesh. It has developed a database on medicinal plants of the Indian Himalayan Region in a network mode. Amongst others, this database has information on the name, uses and distribution of medicinal plants (n=1582). Distribution maps of 736 plant species have been prepared based on secondary information. It was financially supported by the National Medicinal Plants Board (NMPB), Ministry of AYUSH
- Also a database “him-Padap-Sankalan” has been created on Flora in Himachal Pradesh with due approval from Botanical Survey of India. It has information on 3200 flowering plant species of HP.

c) the measures taken/proposed to be taken by Government for documentation of these plants and herbs in the country so as to protect them from being patented in other countries; and

- Cultivation of aromatic plants led to enhancement of farmers’ income by two times over traditional crops as per the National Productivity Council report. It also helped in mitigating the human-wildlife conflicts and contributed in rejuvenation of unutilized land area particularly in regions where crops were affected by monkeys, stray cattle or wild animal menace
- In Orissa state, the farmers have formed a society named as SAP (Social Action for People) after collaborating with the institute for the cultivation and area extension of aromatic crops in tribal region of Odisha. As already mentioned, a processing unit for value addition of aromatic plants have already been installed by the institute under CSIR-Aroma mission.
- Ex-situ and in-situ conservation of medicinal Plants of HP are being targeted by the Institute. It is involved in CAMP workshops that target threat assessment of medicinal plants. The Traditional Knowledge Digital Library, an initiative of CSIR focuses on the patent aspect. CSIR-IHBT is a party to it.

d) whether the Government is aware of herbs and plants which are in demand internationally, if so, the details thereof?

- Yes, prioritized medicinal plants are listed by the NMPB. Publications on demand and supply of important medicinal plants are supported by NMPB.
- Aromatic crops, viz., wild marigold, chamomile, damask rose, Indian valerian, lavender, rosemary, lemongrass and palmarosa are in great demand in our country.

04.03.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. U2166) "Tribal Medicine Research" reg.

a) the details of the works done for tribal medicine research in the past three years state-wise;

- Documentation of the indigenous knowledge of the tribal communities residing in Kangra, Chamba, Lahaul & Spiti, Kinnaur (Himachal Pradesh) on the uses of medicinal plants is being carried out. Recently, emphasis on Sowa Rigpa is being placed.
- CSIR-IHBT is involved in promoting cultivation of medicinal and aromatic plants in the tribal region of Lahaul & Spiti in Himachal Pradesh. The plant species involved include *Artemisia maritima*, *Dracocephallum heterophylum*, clary sage, *Inula racemosa*, picrorhiza and *Saussurea lappa.*

b) the details of the funds allocated, released and spent for tribal medicine research in the past three years, statewise;

Not applicable

c) whether there has been any delay in the release of the allocated funds;

Not applicable

d) if so, the reasons therefor;

Not applicable

e) the details of proposed/in progress projects for tribal medicine research, state-wise especially in Maharashtra;

Not applicable

f) whether Government is providing any monetary compensation to the tribes for the traditional knowledge acquired through them; and

Not applicable

g) if so, the details thereof and if not, the reasons therefor?

Not applicable

07.03.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. U1724) "Improvement in efficacy of traditional medicines" reg.

a) whether Government has chalked out any plan to improve the efficacy of traditional medicines in tackling lifestyle diseases;

At IHBT, for improvement in efficacy of traditional medicines, nutraceutical formulations have been developed from herbal (traditional) medicines by using FSSAI and WHO approved supplements as base for product formulations. Efforts are also made towards enrichment of active constituents by following appropriate extraction method. In this way, sensory properties of the traditional medicines are maintained and products are prepared in acceptable and consumer friendly formats (water soluble powder, chewable jellies etc.)

b) If so, the details thereof; and

Mentioned above

c) the steps taken by Government to create awareness about Indian Systems of Medicines as well as showcase various scientific researches being undertaken in the sector?

CSIR-IHBT houses a herbal garden that has more than 100 plant species many of which are used in Indian Systems of Medicine. The institute is further enriching the garden and is also developing QR codes for providing species information.

CSIR-IHBT has developed a database on medicinal plants of the Indian Himalayan Region in a network mode. Amongst others, this database has information on the name, uses and distribution of medicinal plants (n=1582). Distribution maps of 736 plant species have been prepared based on secondary information. It was financially supported by the National Medicinal Plants Board (NMPB), Ministry of AYUSH.

A CSIR-TKDL Point of Presence has recently been established in the premises of CSIR-IHBT. It primarily focusses on digitizing information related to Sowa Rigpa (Tibetan System of Medicine).

08.03.2022

Subject: Reply to Rajya Sabha Question Dy. No. U2286 on "Use of biotechnology in Agriculture" reg.

d) the steps being taken by Government to provide biotechnology trained personnel in various sectors including agriculture;

Biotechnological tools have a great potential for crop improvement in agri- Hort crops. CSIR-IHBT conducting 3-6 months training programs for students of Bachelor and Master degree in the area of biotechnology, tissue culture for mass propagation plants viz., stevia, chrysanthemum, calla lilies and gerbera plants

e) whether Government is working on any scheme to promote the use of biotechnology in the fields of agriculture; and

CSIR-IHBT has undertaken following projects on biotechnology which will have applications in the field of agriculture

External Funded Projects

1. Identification of important transcription factors for modulating plant stress tolerance and secondary metabolism
2. Identification of key genes to enhance photosynthesis and to reduce photorespiration with concomitant increase in Nitrogen Use Efficiency (NUE)
3. Next generation genomics for conservation and improvement of an endangered medicinal herb, *Angelica glauca*
4. Elucidating the role of host transcription factor (s) in disease development by cucumber mosaic virus
5. Comparative structure modelling and simulation approach to improve the bio-physicochemical properties of industrial important enzyme Superoxide dismutase obtained from *Potentilla atrosanguinea*
6. Genetic dissection of micronutrient content and composition in foxtail millet grains for identification of novel genes and their characterization
7. Bio-prospecting and product development from Curcuma longa (turmeric) in Uttarakhand
8. Evaluation of role of endophytes in mogroside production of *Siraitia grosvenorii*
9. Investigation of novel formulation approaches for improving the bioavailability of dietary phytochemicals

10. Evaluation of key regulatory genes ASYMMETRIC LEAVES1 and REVOLUTA to make a pitcher in *Nepenthes khasiana*.

11. Studies to identify host factors that are manipulated by cucumber mosaic virus for disease development and spread
12. Rapid and onsite diagnostic for viruses and viroid infecting apple
13. Development of remunerative organic waste management systems for colder regions of India with the intervention of psychrophilic aerobic and anaerobic microbial consortia
14. Metagenomic exploration for efficient and stable bacterial L-asparaginase and its nano-conjugation for therapeutic application
15. Development of efficient psychrotrophic bacterial formulation for preparation of enriched compost / vermicompost in cold hilly region and production and testing of enriched compost / vermicompost
16. Assessment of Biofertilizer for PGPR attributes
17. Characterization of efficient Nitrogen fixing (NFB), Phosphorous solubilizing (PSB) and Potash mobilizing (KMB) bacteria from organic farmlands of Sikkim (ToT)
18. Elucidating the thermoresponsive pathway underlying the regulation of flowering in saffron (*Crocus sativus*)
19. Deciphering the mechanism of epidermal cell differentiation leading to prickle formation in *Rosa hybrida*
20. Evaluation of thermostable variants of copper, zinc superoxide dismutase in combating oxidative stress in *Arabidopsis thaliana*
21. Next-generation genomics for genetic improvement and conservation of endangered Himalayan medicinal herb, *Saussurea costus*
22. Promotion and post-harvest value addition of four important herbs for improvement of livelihood security in cold desert areas of Himachal Pradesh
23. Exploring stress sensitivity and nutritional quality of underutilized grain amaranth (*Amaranthus* spp.) under climate change
24. Captive Cultivation, Development of Location Specific Agrotechnology, Downstream Processing and Value Addition of Mentha piperita: A Sustainable Option for Livelihood Improvement and Security in the Himalayan Region
25. Role of viral and host factors in circulative transmission of tomato begomoviruses by the whitefly *Bemisia tabaci*

CSIR Funded projects

1. Genetic improvement of high value medicinal plants (NCP)

2. Functional characterization of the host (plant) and vector (whitefly) proteins in systemic immunity and transmission of virus and virus-like pathogens
3. Next generation genomics for genetic improvement of *Stevia rebaudiana* Bert
4. Up-scaled production of disease free corms of saffron (*Crocus sativus*)
5. Biostimulants Network Project titled "Bio-stimulants for stress amelioration, enhanced plant productivity and soil health (FBR)
6. Development of botanical formulation using *Artemisia maritima* extract for the control of aphids in cabbage/cowpea (DBAM)
7. Genome-Editing Network Project entitled "Genome-editing for crop improvement (GE-Crop) (FBR)
8. Characterization of reverse transcriptase (RNA dependent DNA polymerase) activity from greenhouse whitefly *Trialeurodes vaporariorum*
9. Bioprospecting kinetically stable lytic polysaccharide monooxygenase(s) (LPMOs) for accelerated degradation of lignocellulosic biomass
10. Investigating mechanisms underlying transgenerational heat stress adaptation in plants
11. Revealing the Chloroplast Oxi-proteome and Engineering ROS-insensitive Photosynthetic Apparatus
12. What makes 'asafoetida' – understanding the specialized terpenoid metabolic pathway?

f) if so, the details of expenditure incurred by Government for development in organic farming?

The outcomes of the following projects have potential towards organic farming

Title of the project	Total Cost (Rs in lakhs)
Triloki Enriched Composting / Vermicomposting Cluster (under KVIC)	13.09
Moonew Tareybhir Enriched Composting / Vermicomposting Cluster (under KVIC)	13.09
Development of efficient psychrotrophic bacterial formulation for preparation of enriched compost / vermicompost in cold hilly region and production and testing of enriched compost / vermicompost	5.00
Development of efficient psychrotrophic bacterial formulation for preparation of enriched compost / vermicompost in cold hilly	5.00

region and production and testing of enriched compost / vermicompost	
Assessment of Biofertilizer for PGPR attributes	0.99
Characterization of efficient Nitrogen fixing (NFB), Phosphorous solubilizing (PSB) and Potash mobilizing (KMB) bacteria from organic farmlands of Sikkim (ToT)	5.00
Functional characterization of the host (plant) and vector (whitefly) proteins in systemic immunity and transmission of virus and virus-like pathogens	217.09
Up-scaled production of disease free corms of saffron (Crocus sativus)	45.27
Development of botanical formulation using Artemisia maritima extract for the control of aphids in cabbage/cowpea (DBAM)	50.00
Total	**354.53**

17.03.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. S5399) “Pearl cultivation in Himachal Pradesh” reg.

a) whether the Institute of Himalayan Bioresource Technology (IHBT) has gained success in the cultivation of freshwater pearls;

CSIR-IHBT, Palampur (HP) has initiated research and development activity on cultivation of freshwater pearls

b) If so, the details thereof and plans it has to transfer the technology to the interested persons for the cultivation of pearls;

After achieving successful results which are expected in a year’s time, the institute would work out cost-benefit analysis and accordingly would proceed for transfer of technology with the interested parties

c) whether Government has any proposal to extend financial help to the persons desirous of pearl cultivation at individual or co-operative levels; and

Not applicable to CSIR-IHBT

d) if so, the details thereof and also whether this technology is proposed to be introduced in other States as well depending upon weather conditions?

Mentioned in part (b)

17.03.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. No 168 (Dy. No. 9595)) "Scientific validation and strong documentation of AYUSH Drugs" reg.

a) whether the Government has undertaken steps to initiate more clinical trials to fill up the gap due to lack of evidence based medicines;

Yes (CSIR IHBT Palampur has initiated process for Human intervention studies for in-house herbal formulations)

b) if so, the details thereof;

To fill gap due to lack of evidence based traditional medicines, CSIR-IHBT has developed in-house herbal formulations for different clinical disorders related to skeletal, neurological and cardiovascular systems. Clinical trials (Human intervention studies) of these formulations will be under taken in CSIR Immunity mission.

In addition, CSIR-IHBT, Palampur has undertaken pre-clinical trials for Rajiv Gandhi Government Post Graduate Ayurvedic College, Paprola (District Kangra, H.P.) of some of the Ayurveda drugs viz., Phalatrikadi Kashaya, Sameer Panag Ras and Shila Sindoor, Arjuna Ksheerapaka and Trikatu

c) whether the Government has undertaken steps towards scientific validation and strong documentation of AYUSH drugs; and

CSIR-IHBT, Palampur is presently not working on any drugs developed by Ministry of AYUSH

d) if so, the details thereof?
Not applicable

17.03.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. No 207 Dy. No. S2138) "Reserach on herbal medicines like Bahera" reg.

a) whether Government proposes to undertake research on various herbal medicines like Bahera which keeps stomach to brain healthy;

Yes.

b) if so, the number of herbal medicines on which new researches have been done so far; and

Following herbal plants are being scientifically validated for different nutraceutical leads at CSIR-IHBT, Palampur:

1. *Punica granatum*
2. *Mucuna pruriens*,
3. *Withania somnifera*
4. *Bacopa monnieri*
5. *Vitex negundo* (Nirgundi)
6. *Cissus quadrangularis* (Hadjod)

c) the details thereof?

The herbal plants showing leads on nutraceutical properties to combat health related disorders have been mentioned in part (b)

17.03.2022

Subject: Reply to Parliament Question (Lok Sabha Q. No 3226) “One Health for All” reg.

a) whether the Government has taken initiative to evaluate the concept of one health for all living organisms including the invisible biota in soil that sustain our agricultural systems; and

1. CSIR-IHBT has undertaken evaluation of soil microbiota from both Eastern and Western Himalayas to help sustain the agroecosystem of high altitude regions.
2. The institute has developed indigenous bacterial formulation for rapid degradation stabilization of human waste (night soil) in cold regions like Lauhal in H.P.
3. Institute is working on biostimulant for stress amelioration enhanced plant productivity and soil health

b) If so, the details thereof;

1. From Western Himalaya, soil microbiota of Lahaul valley (Distt Lahaul & Spiti, HP), Nahan (Distt Sirmour, HP), and Palampur (Distt Kangra, HP) have been explored and from Eastern Himalaya soil microbiota of East Rathong glacier (Sikkim) and Sombaria of West Sikkim have been isolated. The efficient hydrolytic and plant growth-promoting bacteria have been used for the preparation of bacterial formulation of efficient degradation of organic waste. The microbial formulation for stabilization of cattle waste with green biomass has been upscaled and two SFURTI clusters have been established for livelihood generation of 400 people. The enriched compost prepared using the indigenous bacterial formulation has been used for sustaining the agroecosystem of the region. Work is under progress for development of crop specific microbial bio fertilizer.
2. Additionally, indigenous bacterial formulation for the stabilization of human waste (night soil) in Lahaul region has been conducted and the prepared compost is being used in the agriculture farmlands. The salient features of the product are: Ready to use formulation, contains cold tolerant hydrolytic bacteria, and effective carrier material: reduced foul odour during composting process. Work is under progress for development of crop specific microbial biofertilizer.
3. We are also working in the CSIR projects on "Biostimulant for stress amelioration enhanced plant productivity and soil health", where we are working to 'identify and characterize the indigenous, culturable, invisible rhizobacteria (biota) from native soil and find out its potential for plant growth promotion'. It is likely that some of these rhizobacteria with efficient plant growth promoting traits could be used as biostimulants/biofertilizer for safe sustainable agriculture.

21.03.2022

Subject: Reply to Parliament Question (Lok Sabha Q. Dy. No 12139) "Identification of Medicinal Plants and Rare Species of Herbs" reg.

a) whether the Government has conducted any survey to identify medicinal plants and rare species of herbs in the country and if so, the details thereof along with the list of plants identified, State /UT-wise including Bihar:

Based on the need of the country, CSIR-IHBT, Palampur has undertaken cultivation, characterization and value addition of the following precious medicinal herbs with aim to achieve self-sufficiency:

- Heeng (*Ferula asafoetida*) is one of the top condiment and medicinal plant traded in India. India imports about 1540 tonnes of raw asafoetida annually from Afghanistan, Iran and Uzbekistan worth Rs 942 crores per year (2019). CSIR-IHBT introduced Heeng seeds (six accessions) for the first time in the country from Iran through ICAR-NBPGR, New Delhi, raised nursery plants and started its cultivation 169 locations in different districts of Himachal Prades, planting a total of 21,250 heeng plants. Initial trials have also been stared in J&K, Ladakh and Uttrakhand with planting of 100 seedlings in each of the location.

- Saffron (*Crocus sativus*) is the most expensive spice of the world. The annual demand for this spice is 100 tons per year but its average production in India is about 6-7 tons and hence a large amount of the spice is imported. With an objective to extend the saffron cultivation beyond Kashmir, CSIR-IHBT developed disease free corms production technology through tissue culture and identifying the suitable locations across the western Himalayas through the MAXENT model having the potential to cultivate saffron. Initial experiments conducted in the non-traditional areas of H.P. and Uttarakhand yielded promising results from some locations of districts Chamba, Kinnaur, Mandi and Kangra in Himachal Pradesh and Bageshwar of Uttarakhand state. Quality of the produce was found to be at par with the quality of Kashmiri saffron.

- India imports 45,319 tonnes of Dalchini (*Cinnamomum verum*) worth Rs. 909 crores. CSIR-IHBT introduced Dalchini for the first time in Himachal Pradesh and started its organized cultivation at 10 locations in the state. The activity is being persuade in collaboration with State Agriculture Deptt, HP and other organizations.

- In the western Himalaya, CSIR-IHBT is conducting floristic surveys (primarily in Himachal Pradesh) for collection of plant specimens, identification, inventorization, digitization, and preservation of the specimens in herbarium (PLP). CSIR-IHBT has created a database "himFlorIS" on distribution and status of flowering plant resources in western

Himalaya, depicting the information generated from the field surveys (ground truthing) as well as published literature. It was created under the aegis of National Bioreource Development Board, DBT, New Delhi. It has information on medicinal and rare plants.

- CSIR-IHBT co-ordinated creation of database containing information on about 1582 medicinal plants of the Himalayan region. The database has been developed for National Medicinal Plants Board, Ministry of AYUSH, New Delhi in a network mode with Indian Institute of Integrative Medicine, Jammu; North East Institute of Science and Technology, Jorhat; and North Eastern Hill University, Shillong.
- The institute conducted Rapid Vulnerability Assessment of 15 high value medicinal plants and their habitat characterization.
- Ruthless extraction of medicinal plants has resulted in their sharply declined status in the wild. In this direction, CSIR-IHBT has put efforts on promotion of cultivation of medicinal plants and conversion of their status from rare and threatened to the non-threatened. About 1.4 lacs plants of *Valeriana*, *Inula* and *Podophyllum* have been rehabilitated in natural habitat in forest. These efforts lay basis of linking the activity with the recently approved *Van Samridhi Jan Samridhi Yojana* of the state government.
- In addition to extension cultivation of the sweetener crop Stevia in the country, the institute also introduced another sweetener crop Monk Fruit (*Siraitia grosvenorii*) for the first time in the country, as potential low-calorie natural sweetener, 300 times sweeter than sucrose.
- Institute has been actively engaged for development of quality standards for important phytomolecules from the Himalayan medicinal plants such as *Cissampelos pareira* and *Trillium govanianum*.
- Conservation and sustainable resource generation of high altitude bioresources is being done at CSIR-IHBT Centre for High Altitude Biology, Ribling, Keylong, Lauhal & Spiti district. This centre maintains germplasm of *Trillium govanianum, Aconitum heterophyllum, Picrorhiza kurrooa, Fritillaria roylei, Dactylorhiza hatagirea, Saussurea costus, Inula racemose* etc. Characterization and consolidation of *Hippophae* genetic resources and propagation of elite genotypes for varietal evaluation is being done there.
- CSIR-IHBT is actively involved in research on population and distribution of medicinal plants, their extraction patterns, indigenous uses, and value chain. The institute is generating chemical and spectral signatures of medicinal plants
- Institute is also generating geo-tagged digital database for herbal plants
- CSIR-IHBT, Palampur is working on tissue culture, cell culture and hydroponic and aeroponic farming for conservation of the herbs.

b) whether the Government has assessed the various uses of these plants and if so, the details thereof with special reference to those in Bihar,

The following activities were perceived by the following plants on human at CSIR-IHBT, Palampur (HP):

28.03.2022

Subject: Reply to Parliament Question (Lok Sabha Q. No 4860) “Herbal Heritage Trees” reg.

a) whether the Government has any statistics on the number of herbal heritage trees available across the country;

This information as such is not available with the institute.

However, CSIR-IHBT Palampur has following herbal heritage plants in its campus:

1. Aonla: 40-50 plants
2. Pepal: 2 No.

In addition, it pertinent to mention here that *Ginkgo biloba* L. is a valuable plant for mankind since more than 5000 years and is considered as a "living fossil" of Jurassic period. CSIR-IHBT has developed protocol for generation of planting material of this plant and raised 30,000 saplings also planted six-acre area of this species in its research farms, and promoted plantation in Himachal Pradesh. During last 5 years, 3,756 plants were distributed.

b) if so, the details thereof, State/area-wise;

As above

c) the details of top 20 trees with herbal presence, State-wise; and

Currently, CSIR-IHBT, Palampur has conserved 46 tree species in the Botanical Garden of which top 20 trees having valued medicinal/ herbal importance are provided below-

1. *Bombax ceiba* L.
2. *Cedrus deodara* (Roxb. ex D.Don) G.Don
3. *Cinnamomum camphora* (L.) J.Presl
4. *Cordia dichotoma* G.Forst.
5. *Ehretia acuminata* R.Br.
6. *Elaeocarpus sphaericus* (Gaertn.) K.Schum.
7. *Ficus palmata* Forssk.
8. *Ginkgo biloba* L.
9. *Mallotus philippensis* (Lam.) Müll.Arg.
10. *Mangifera indica* L.
11. *Melia azedarach* L.
12. *Phoenix sylvestris* (L.) Roxb.

13. *Phyllanthus emblica* L.
14. *Prunus persica* (L.) Batsch
15. *Putranjiva roxburghii* Wall.
16. *Saraca asoca* (Roxb.) Willd.
17. *Syzygium cumini* (L.) Skeels
18. *Terminalia arjuna* (Roxb. ex DC.) Wight & Arn.
19. *Terminalia chebula* Retz.
20. *Vernicia fordii* (Hemsl.) Airy Shaw

It is also mentioned that CSIR-IHBT has created a database (himFloRIS) on distribution and status of 1141 flowering plants of Himachal Pradesh including important tree species of herbal importance based on field surveys and published literature.

d) the details of funds provided and utilized along with the number of herbal saplings planted as on date, for maintaining clean and healthy environment?

Recently NMPB has sanctioned a project entitled “Establishment of Institutional herbal garden at CSIR-IHBT Palampur” vide file no. HG/HP-01//2021-22 NMPB (GAP 0281; Total sanctioned amount Rupees 27 Lakhs for 5 years of which first year grant of Rs. 15 lakhs have been released), under which 125 herbal plants has proposed for conservation along with 37 trees with medicinal importance. The planting beds are under preparation and plants will be planted between May to August, 2022.

28.03.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Dy. No U4492) “Giloy induced liver toxicity” reg.

a) whether it is a fact that Giloy induced liver toxicity has resulted in liver damage in a few patients:

The Institute is not working on 'Giloy induced Liver toxicity'.

b) if so, the details thereof;

Not applicable

c) whether the specific dose of Giloy intake has been published and communicated to all the stakeholders;

Not applicable

d) if so, the details thereof; and

Not applicable

e) any action taken against those who have falsely linked the medicine to liver damage if Giloy is safe?

Not applicable

29.03.2022

Subject: Reply to Parliament Question (Lok Sabha Q. No. 437) "Research on Ayurvedic Medicines" reg.

a) Whether Government has been encouraging research to develop Ayurvedic medicines for different diseases in the country;

Yes, CSIR-IHBT Palampur is presently working in close association with Rajiv Gandhi Government Post Graduate Ayurvedic College, Paprola (HP) to validate some molecules to develop Ayurvedic medicine. CSIR-IHBT currently studying important plants like Nirgundi and Hadjod mentioned in Ayurveda to assess and validate their potential in relieving rheumatic complications, improving cartilage health, and respiratory disorders. CSIR-IHBT is also working on anti-malarial aspect and identified lead extract/molecules from traditionally used medicinal plants.

b) If so, the details of ongoing projects in different laboratories, State/UT-wise including Chhattisgarh along with the progress made so far in each case; and

The following activities were perceived by the following plants at CSIR-IHBT Palampur:

- Immunomodulation activity on tea based polyherbal formulation is reported at preclinical level and technology transferred to M/s. Vigada Care Pvt. Ltd. Formulation was developed under the regulatory mechanism of FSSAI and product was recently launched under the trade name "IMMUST PRO" (Immunity modulation product) by M/s. Vigada Care Pvt. Ltd. New Delhi.
- Efficacy of medicinal herb *Picrorhiza kurroa* has been tested in Type II diabetes mellitus specifically high fat diet induced preclinical modal of insulin resistance where it has shown remarkable potential to revert the disease phenotype and regulates blood sugar.
- Anti-colitis activity of *Berberis lycium* fruits has demonstrated with good efficacy at preclinical level.
- Our institute is carrying out preclinical efficacy validation and safety of clinically used ayurvedic preparations in collaboration with Ayurvedic

college, Paprola, HP. In this context ayurvedic preparations including, trikatu, triphala, arjuna ksheerpak and phalatrikadi kwath has been validated for their efficacy. Furthermore, safety of Sammerpanag ras has been studied in rats as per standard guidelines. For these activities, the Institute have signed MOU with state Ayurveda department, H.P.

- CSIR-IHBT Palampur already completed some work in this direction by virtue of participation in CSIR Mission on Nutraceuticals and nutritionals. Ongoing CSIR-Immunity mission is targeted towards utilizing herbal formulation for immune modulation and immune boosting.
- Under the project “Exploration of Himalayan Plants for Novel Antimalarial Agents: Characterization of potential molecules (Phase-I&II), one lead extract and two molecules from *Cissampelos pareira* have been identified against Malarial parasite.

c) the steps taken by the Government to get international recognition for Ayurvedic medicines which are being developed in the country?

CSIR-IHBT is involved in scientific validation of functional foods, nutraceuticals and phytopharmaceuticals in terms of their preclinical validation in *in vitro* and *in vivo* set up. This follows our continuous efforts by complying with national and international regulatory guidelines to get approval for international recognition and marketing.

01.04.2022

Subject: Reply to Parliament Question (Lok Sabha) Q. Dy. No 18922 “Clinical Trials of Ayurvedic Drugs” reg.

a) whether the Government domestically and globally proposes to analyse the medical scheme to be supported by clinical tests and trials to establish domestically and globally the efficacy of 57 ayurvedic dravyas and 600 Indian medicinal plants referred in official grantha for side effect free treatments;

Does not pertain to CSIR-IHBT

b) if not, the reasons therefor; and

Not applicable

c) whether some of these remedies have been prescribed according to the said Granthe texts and scientific studies and proved to be very effective like Arjuna bark powder and Arogyavardhini for bad cholesterol and Chyawanprash for cough and cold?

Not applicable

2022-2023

PQ/IHBT/2022/22
14.07.2022

Subject: Lok Sabha admitted Starred Question No. 22 regarding "R&D on Food Processing Industries" reg.

c) whether inadequate Research and Development (R&D) activities are adversely affecting the food processing sector in the country;

No, a lot of emphasize has been given in food processing, value addition and postharvest infrastructure development. There are mission and schemes that are being funded in this sector:

- National Nutrition Mission (NNM) to tackle the problems of malnutrition
- MoFPI- Krishi Sampda Yojna
- Government allotted Rupees one lakh crore under Agriculture Infrastructure Fund for post-harvest management and nurturing farm assets for next 10 years
- Scheme for agro-marine processing and development of agro-processing clusters
- Strengthening MSMEs and focus on make in India products

d) if so, the details thereof including reasons along with the corrective steps taken by the Government in this regard;

Not applicable

e) whether the Government is providing any investment-linked incentives for in-house R&D expenditure incurred by companies and if so, the details thereof;

Does not pertains to CSIR-IHBT, Palampur

f) the details of indigenously developed technologies which have been utilized gainfully for enhancing production and improving quality of food products during the last three years and the current years?

List of technologies developed at CSIR-IHBT				
Sl No	**CSIR Lab**	**Name/title of Technology**	**Year of Development**	**Status in last three years and current year**
1.	CSIR-IHBT	Technology for Tea Wines & RTD Tea	2015-16	Technology transferred in 2019-20 and 2022-23
2.	CSIR-IHBT	Technology for manufacturing/ processing of Multigrain Protein powder as per technical KNOW-HOW of CSIR-IHBT.	2017-18	Technology transferred in 2019-20, 2020-21 and 2022-23
3.	CSIR-IHBT	Technology for Manufacture Granola bars - (millet and cereals based) products	2017-18	Technology transferred in 2019-20, 2020-21 2021-22 and 2022-23
4.	CSIR-IHBT	Technology for production of natural colours and herbal lipsticks from different natural sources	2017-18	Technology transferred in 2019-20
5.	CSIR-IHBT	Technology for manufacturing/ processing of Spirulina Peanut Bar PRODUCTS	2017-18	Technology transferred in 2020-21 and 2021-22
6.	CSIR-IHBT	Technology for Tea Vinegar	2019-20	Technology transferred in 2020-21
7.	CSIR-IHBT	Technology for Ready to eat (RTE) Free from additives & Chemical preservatives	2016-17	Technology transferred in 2020-21
8.	CSIR-IHBT	Technology for rice puffed bars	2017-18	Technology transferred in 2020-21
9.	CSIR-IHBT	Technology to take the lab scale technology on cultivation of Shiitake mushroom to its implementation at large scale	2017-18	Technology transferred in 2020-21 and 2021-22

10.	CSIR-IHBT	Technology agreement for herbal Formulation for Immunity Modulation	2020-21	Technology transferred in 2020-21 and 2021-22
11.	CSIR-IHBT	Technology for ready to reconstitute oral formulations utilizing microalgae	2020-21	Technology transferred in 2021-22
12.	CSIR-IHBT	Lab scale technology for Technology/ process for ready to eat instant seera in the convenience package	2021-22	Technology transferred in 2021-22
13.	CSIR-IHBT	Technology for manufacturing/ processing of (i) chikki and bars - (immunity extract based) PRODUCTS, and (ii) immunity based beverage mixes products/ variants	2020-21	Technology transferred in 2022-23

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PQ/IHBT/2022/2816
29.07.2022

Details of Young scientists (Upto Principal Scientists) working at CSIR Laboratories/ Institutions including CSIR Hqrs. during the last three years and the current year (Till Date)

Lab./Instt.	2019	2020	2021	2022 (Till Date)
Name of the Laboratory: CSIR-Institute of Himalayan Bioresource Technology, Palampur (H.P.)	37	45	47	45

Sr.CoA/CoA/AO
(Signature of Authorised Signatory)

PQ/IHBT/2022/3272
20.07.2022

Subject: Reply to Parliament Question (Lok Sabha Q. Dy. No 3272) reg.

a) whether the Government has undertaken any study/survey to identify and map the indigenous medicinal/aromatic plants and herbs across the country;

Based on the need of the country, CSIR-IHBT, Palampur has undertaken cultivation, characterization and value addition of the following precious medicinal herbs with aim to achieve self-sufficiency:

- Heeng (*Ferula asafoetida*) is one of the top condiment and medicinal plant traded in India. India imports about 1540 tonnes of raw asafoetida annually from Afghanistan, Iran and Uzbekistan worth Rs 942 crores per year (2019). CSIR-IHBT introduced Heeng seeds (66 accessions from Iran & Afghanistan) for the first time in the country from Iran through ICAR-NBPGR, New Delhi, raised nursery plants and started its cultivation 258 locations in different districts of Himachal Pradesh, planting a total of 32,733 Heeng plants. Initial trials have also been stared in J&K, Ladakh and Uttrakhand with planting of 100 seedlings in each of the location.
- Saffron (*Crocus sativus*) is the most expensive spice of the world. The annual demand for this spice is 100 tons per year but its average production in India is about 6-7 tons and hence a large amount of the spice is imported. With an objective to extend the saffron cultivation beyond Kashmir, CSIR-IHBT developed disease free corms production technology through tissue culture and identifying the suitable locations across the western Himalayas through the MAXENT model having the potential to cultivate saffron. Initial experiments conducted in the non-traditional areas of H.P. and Uttarakhand yielded promising results from some locations of districts Chamba, Kinnaur, Mandi and Kangra in Himachal Pradesh and Bageshwar of Uttarakhand state. Quality of the produce was found to be at par with the quality of Kashmiri saffron.
- India imports 45,319 tonnes of Dalchini (*Cinnamomum verum*) worth Rs. 909 crores. CSIR-IHBT introduced Dalchini for the first time in Himachal Pradesh and started its organized cultivation at 12 locations in the state. The activity is being persuade in collaboration with State Agriculture Deptt, HP and other organizations.
- In the western Himalaya, CSIR-IHBT is conducting floristic surveys (primarily in Himachal Pradesh) for collection of plant specimens, identification, inventorization, digitization, and preservation of the specimens in herbarium (PLP). CSIR-IHBT has created a database “himFlorIS” on distribution and status of flowering plant resources in western Himalaya, depicting the information generated from the field surveys (ground truthing) as well as published literature. It was created under the aegis of National Bioreource Development Board, DBT, New Delhi. It has information on medicinal and rare plants.

- CSIR-IHBT co-ordinated creation of database containing information on about 1582 medicinal plants of the Himalayan region. The database has been developed for National Medicinal Plants Board, Ministry of AYUSH, New Delhi in a network mode with Indian Institute of Integrative Medicine, Jammu; North East Institute of Science and Technology, Jorhat; and North Eastern Hill University, Shillong.
- The institute conducted Rapid Vulnerability Assessment of 15 high value medicinal plants and their habitat characterization.
- Ruthless extraction of medicinal plants has resulted in their sharply declined status in the wild. In this direction, CSIR-IHBT has put efforts on promotion of cultivation of medicinal plants and conversion of their status from rare and threatened to the non-threatened. About 1.4 lacs plants of *Valeriana*, *Inula* and *Podophyllum* have been rehabilitated in natural habitat in forest. These efforts lay basis of linking the activity with the recently approved *Van Samridhi Jan Samridhi Yojana* of the state government.
- In addition to extension cultivation of the sweetener crop Stevia in the country, the institute also introduced another sweetener crop Monk Fruit (*Siraitia grosvenorii*) for the first time in the country, as potential low-calorie natural sweetener, 300 times sweeter than sucrose.
- Institute has been actively engaged for development of quality standards for important phytomolecules from the Himalayan medicinal plants such as *Cissampelos pareira* and *Trillium govanianum*.
- Conservation and sustainable resource generation of high altitude bioresources is being done at CSIR-IHBT Centre for High Altitude Biology, Ribling, Keylong, Lauhal & Spiti district. This centre maintains germplasm of *Trillium govanianum, Aconitum heterophyllum, Picrorhiza kurrooa, Fritillaria roylei, Dactylorhiza hatagirea, Saussurea costus, Inula racemose* etc. Characterization and consolidation of *Hippophae* genetic resources and propagation of elite genotypes for varietal evaluation is being done there.
- CSIR-IHBT is actively involved in research on population and distribution of medicinal plants, their extraction patterns, indigenous uses, and value chain. The institute is generating chemical and spectral signatures of medicinal plants
- Institute is also generating geo-tagged digital database for herbal plants
- CSIR-IHBT, Palampur is working on tissue culture, cell culture and hydroponic and aeroponic farming for conservation of the herbs.

b) if so, the details thereof;

As above

c) whether the step taken/ proposed to be taken by the Government for the conservation, cultivation and commercial exploitation of indigenous medicinal/ aromatic plants along with funds earmarked, allocated and utilized for the propose during the last three years and the current year, State/UT-wise;

Given below is the detail of the list of last three years and ongoing research projects in CSIR-IHBT, Palampur related to the promotion of cultivation and utilisation of medicinal and aromatic plants

S. No.	Title of the project	Funding agency	Sanctioned amount (Rs in lakhs)	Duration
1.	CSIR Aroma Mission (Phase-II)	CSIR	1361.09	2020-23
2.	Up-scaled production of disease free corms of saffron (*Crocus sativus*)	CSIR	45.270	2020-22
3.	Genetic improvement of high value medicinal plants	CSIR	373.650	2020-23
4.	Development of botanical formulation using *Artemisia maritima* extract for the control of aphids in cabbage/cowpea (DBAM)	CSIR	50.000	2020-22
5.	Exploration of Himalayan Plants for Novel Antimalarial Agents: Charaterization of potential molecules (Phase-II)	CSIR	194.600	2020-23
6.	Next generation genomics for genetic improvement of *Stevia rebaudiana* Bert	CSIR	376.560	2020-23
7.	Development of bare-root seedling simulations system and automatic seedling transplanted for stevia	CSIR	26.440	2020-22
8.	Introduction, Charaterization and cultivation of *Ferula assa-foetida* (Heeng) in cold desert regions of Indian	CSIR	378.752	2020-23
9.	Conservation of threatened plant species of India	CSIR	299.72	2020-23
10.	Digitization of Indian System of Medicine – Siddha and Sowa Rigpa	CSIR	319.62	2021-25
11.	Production of Heeng in Himachal Pradesh - A new approach (RNS)	Directorate of Agriculture, H.P.	450.34	2020-25
12.	Technical and hand holding support by CSIR-IHBT Palampur for saffron production	Directorate of Agriculture, H.P.	498.071	2020-23
13.	Introduction of Monk Fruit cultivation: A new initiative in Himachal Pradesh	HIMCOSTE, H.P.	5.700	2021-23
14.	Bio-prospecting and product development from *Curcuma longa* (turmeric) in Uttarakhand	UCOST, Uttarakhand	2.000	2021-22
15.	Development of Geo-tagged digital database and spectral library of medicinal plants in	NMPB, Ministry of AYUSH, GoI	36.771	2018-21

	protected cultivation in the foothills of western Himalaya			
16.	Production of Quality Planting Materials of Medicinal Plants Including the Rare Endangered Threatened Species for Conservation And Distribution	NMPB, Ministry of AYUSH, GoI	75.000	2021-24
17.	Development of Probiotics for Plant Tissue Culture Boosting the performance of micro propagated plant materials by supplementing plant associated useful endophytes	NMPB, Ministry of AYUSH, GoI	49.80	2021-24
18.	Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur	NMPB, Ministry of AYUSH, GoI	27.000	2021-26
19.	Bringing back the real green: eradicating invasive species and restoring ecosystem through community participation	NMHS GBPNIHESD, Almora	46.08	2018-21
20.	Bringing back the real green: eradicating invasive species and restoring ecosystem through community participation	NMHS GBPNIHESD, Almora	46.08	2018-21
21.	In vitro adventitious root cultures of *Picrorhiza kurroa* as an alternative source of nutraceutical ingredients	SERB	26.31	2018-21
22.	In vitro adventitious root cultures of *Picrorhiza kurroa* as an alternative source of nutraceutical ingredients	SERB	26.31	2018-21
23.	Next generation genomics for conservation and improvement of an endangered medicinal herb, *Angelica glauca*	SERB	20.256	2021-23
24.	Next-generation genomics for genetic improvement and conservation of endangered Himalayan medicinal herb, *Saussurea costus*	SERB	20.256	2021-23
25.	Population studies and establishment of field conservatories of threatened medicinal species *Eremurus himalaicus* Baker and *Polygonatum cirrhifolium* (Wall.) Royle in the cold desert, Himachal Pradesh	SERB	37.489	2022-25
26.	Captive cultivation, development of location specific agrotechnology, downstream	DBT	84.16	2022-25

	processing and value addition of *Mentha piperita*: a sustainable option for livelihood improvement and security in the Himalayan Region			
27.	Inter-Institutional Programme Support on the Development and Sustainable Utilization of Bioresource of Mizoram Sub-Project 2: Captive production of shittake and oyster mushroom and their processing for Vitamin D2 enrichment Sub-Project 3: Introduction of low chilling varieties of apple (*Malus domestica* L.) in Mizoram to improve the livelihood of tribal farmers Sub-Project 4: Livelihood generation through cultivation and value addition of aromatic plants in Mizoram	DBT	141.154	2022-25
28.	Breaking the barrier of saffron cultivation through technological interventions for enhancing production and livelihood of farmers in Kashmir and non-traditional Areas	DBT	118.0984	2022-25
29.	Establishing efficient platform for genetic engineering in Indian Tea	DBT	25.0352	2022-24
30.	Germplasm characterization, genomics analysis and gene discovery for yield, metabolite and stress tolerance in Tea	DBT	38.0712	2022-24
31.	Value addition and product diversification in tea	DBT (NER-BPMC)	91.812	2022-25

d) the details of the proposals received from the States/UTs for the aforesaid purpose along with the action taken/ proposed to be taken by the Government thereon, State/UT-wise;

- The institute is working on development of nutraceutical formulations based on the selected medicinal plants to combat diseases like cartilage health, age-linked neurodegeneration, cardio protective etc.
- The institute is actively working on conservation and awareness creation on medicinal plants and setting up of herbal gardens.

e) whether the Government has any proposal to set up research institutes to conduct research/ study on the medicinal and aromatic use of indigenous herbs and plant; and

Does not pertain to CSIR-IHBT, Palampur

f) if so, the details thereof, State/UT-wise?

NA

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PQ/IHBT/2022/5450
21.07.2022

Subject: Reply to Parliament Question (Lok Sabha Q. Dy. No 5450) "Medicinal Plants" reg.

a) the details of efforts being made by the Government to conserve the natural and wild medicinal plants and herbs;

- The institute with National Medicinal Plants Board (NMPB), Ministry of AYUSH, New Delhi, funded project on "Development of Geo-tagged digital database and spectral library of medicinal plants in protected cultivation in the foothills of western Himalaya" using GIS approach has prepared a total of 47 geo-referenced maps depicting location and area of medicinal plants in cultivations in Himachal Pradesh and Uttarakhand. CSIR-IHBT co-ordinated creation of database containing information on about 1582 medicinal plants of the Himalayan region. The database has been developed for NMPB, in a network mode with CSIR-Indian Institute of Integrative Medicine, Jammu; North East Institute of Science and Technology, Jorhat; and North Eastern Hill University, Shillong.
- The institute signed an MoU with NMPB on 4th October, 2021 for extending joint collaborative efforts to promote the production of quality planting material (QPM) of medicinal plants and herbs. Consequence upon this agreement, NMPB has sanctioned a project to the CSIR-IHBT on "Nursery Management". The main objectives of this project are to generate large scale QPM, promotion, conservation and cultivation of the appropriate medicinal plants in different agro-climatic zones, including the Rare Endangered Threatened (RET) species and those growing in high-altitude regions. During the project period (three years) about 13.00 lakh quality planting materials for 8 medicinal plants (*Valeriana jatamansi, Picrorhiza kurroa, Bacopa monnieri, Aloe vera*, *Stevia rebaudiana, Cinnamomum verum, Siraitia grosvenorii, Hippophae rhamnoides*) will be generated, and about 1533 kg quality seeds/rhizomes for 3 medicinal plants will be generated. The distribution of QPM to the farmers/growers has also been initiated free of cost.
- Again with funding from NMPB, the institute in in the process of developing probiotics for plant tissue culture boosting and improving performance of micro propagated plant materials by supplementing plant associated useful endophytes for large-scale cultivation of plants. In this activity, the institute has developed tissue culture protocol and modern agriculture practices including hydroponic and aeroponic cultivation for higher plant productivity for commercialization utilization and benefits to industry and society.

- CSIR-IHBT under an in-house project using Hyperspectral remote sensing generated data for non-invasive and onsite identification of the age group of an endangered medicinal plant species *Valeriana jatamansi*, which is otherwise harvested unscientifically before its maturity.
- The institute is currently working on preparing a DNA barcode of some targeted medicinal/aromatic species.
- CSIR-IHBT is conducting floristic surveys (primarily in Himachal Pradesh) to generate information on floral resources of Himachal Pradesh that includes medicinal and aromatic plants. The institute has created a database "*himFlorIS*" on distribution and status of flowering plant resources in western Himalaya, depicting the information generated from the field surveys (ground truthing) as well as published literature. It was created under the aegis of National Bioreource Development Board, DBT, New Delhi. It has information on medicinal and rare plants.
- The institute has conducted Rapid Vulnerability Assessment of 15 high value medicinal plants and their habitat characterization.
- CSIR-IHBT has carried out survey and mapping of wild populations of medicinal plants like *Dactylorhiza hatagirea* (Vern. Salem Panja) in the Himalaya. The niche areas of these plants like *Dactylorhiza hatagirea* and *Sinpodophyllum hexandrum* were elucidated using Ecological Niche Modelling. Further we have also assessed 25 populations of *D. hatagirea* for its community structure, population density and the factors influencing its distribution).

b) whether it is proposed to set up Medicinal Plants Conservation Centres at district level, in future, including Uttar Pradesh and Madhya Pradesh, if so, the details thereof;

- CSIR-IHBT is setting up of an herbal garden at Palampur, District Kangra, Himachal Pradesh through a project "Establishment of Institutional Herbal Garden, at CSIR-IHBT, Palampur" funded by under which 125 herbal/medicinal plants are proposed for conservation.
- The CSIR-IHBT Herbal Garden so far has 86 plant species comprising 24 vatshamak, 31 pitshamak and 31 kaphashamak ayurvedic plants. The institute has also set up a garden at Civil Hospital, Palampur (H.P.) with 24 species of medicinal plants.
- CSIR-IHBT has established Field Gene Bank and field nurseries at its centre in Lahaul and Spiti District (Centre for High Altitude Biology, CeHAB) for conservation of the targeted plants.

c) the kind of special efforts being made by the Government for promoting natural medicine system and farming of medicinal plants and herbs; and

- The institute with CSIR funding is optimizing aeroponic and hydroponic cultivation systems for cultivation and commercial exploitation of medicinal/aromatic plants such as *Picrorhiza kurroa*, *Valeriana jatamansi*, *Petroselinum crispum,* and

Ocimum basilicum. Also in the institute, the project is going on medicinal plants such as *Rhodiola imbricata* and *Fritillaria roylei*.

- CSIR-IHBT has optimized in vitro and seed germination protocols for 04 targeted species (*Dactylorhiza hatagirea, Aconitum heterophyllum, Nardostachys jatamansi, Rhododendron anthopogon*) for their conservation. The institute has collection of 40 species with multiple accessions of wild medicinal/aromatic plants.
- The institute is providing awareness/training on tissue culture of high altitude medicinal and economically important herbs to various students and to stake holders as start-up tissue culture of various high altitude medicinal and economically important plants.
- Efforts are being made in the area of capacity building where institutional facility is made available for incubation and skill development programs and trainings to the farmers, entrepreneurs and youths.

d) if so, the details thereof?

In addition to the above, CSIR-IHBT, Palampur based on the need of the country, has undertaken cultivation, characterization and value addition of the following precious medicinal herbs with aim to achieve self-sufficiency:

- Heeng (*Ferula asafoetida*) is one of the top condiment and medicinal plant traded in India. India imports about 1540 tonnes of raw asafoetida annually from Afghanistan, Iran and Uzbekistan worth Rs 942 crores per year (2019). CSIR-IHBT introduced Heeng seeds (66 accessions from Iran & Afghanistan) for the first time in the country from Iran through ICAR-NBPGR, New Delhi, raised nursery plants and started its cultivation 258 locations in different districts of Himachal Pradesh, planting a total of 32,733 Heeng plants. Initial trials have also been stared in J&K, Ladakh and Uttrakhand with planting of 100 seedlings in each of the location.
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- India imports 45,319 tonnes of Dalchini (*Cinnamomum verum*) worth Rs. 909 crores. CSIR-IHBT introduced Dalchini for the first time in Himachal Pradesh and started its organized cultivation at 12 locations in the state. The activity is being persuade in collaboration with State Agriculture Deptt, HP and other organizations.

- Ruthless extraction of medicinal plants has resulted in their sharply declined status in the wild. In this direction, CSIR-IHBT has put efforts on promotion of cultivation of medicinal plants and conversion of their status from rare and threatened to the non-threatened. About 1.4 lacs plants of *Valeriana*, *Inula* and *Podophyllum* have been rehabilitated in natural habitat in forest. These efforts lay basis of linking the activity with the recently approved *Van Samridhi Jan Samridhi Yojana* of the state government.

- In addition to extension cultivation of the sweetener crop Stevia in the country, the institute also introduced another sweetener crop Monk Fruit (*Siraitia grosvenorii*) for the first time in the country, as potential low-calorie natural sweetener, 300 times sweeter than sucrose.

- Institute has been actively engaged for development of quality standards for important phytomolecules from the Himalayan medicinal plants such as *Cissampelos pareira* and *Trillium govanianum*.

- Conservation and sustainable resource generation of high altitude bioresources is being done at CSIR-IHBT Centre for High Altitude Biology, Ribling, Keylong, Lauhal & Spiti district. This centre maintains germplasm of *Trillium govanianum, Aconitum heterophyllum, Picrorhiza kurrooa, Fritillaria roylei, Dactylorhiza hatagirea, Saussurea costus, Inula racemose* etc. Characterization and consolidation of *Hippophae* genetic resources and propagation of elite genotypes for varietal evaluation is being done there.

- CSIR-IHBT is actively involved in research on population and distribution of medicinal plants, their extraction patterns, indigenous uses, and value chain. The institute is generating chemical and spectral signatures of medicinal plants

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Lok Sabha Unstarred Question Dy no. 8740 (Information to be provided as on date)

Name of the Lab/ Institute: CSIR-Institute of Himalayan Bioresource Technology, Palampur

No. of Scientist Post Sanctioned in the Lab	No. of Scientist Working in the Lab	No. of Scientist post lying vacant
75	54	21*

*** 10 posts of Scientist are advertised vide Advt. No. 02/2020 of this Institute and recruitment is under process.**

Authenticated by AO/CoA/Sr.CoA

Signature and Seal

PQ/IHBT/2022/8589
29.07.2022

Subject: Reply to Parliament Question (Lok Sabha Q. Dy. No 8589) "Research in Medicinal Plants" reg.

a) whether less research has been done in the field of medicinal plants in the country to harness its huge potential along with its utility and development;

Not agreed. CSIR-IHBT is actively involved in research and development activities with the financial support from CSIR, NMPB, DST, DBT and other funding agencies. Details of the project being run in the institute in the last three years is given in Annexure – I.

b) if so, the details thereof;

As mentioned above, our institute, CSIR-IHBT has been actively involved in R&D activities with the support from our parent organization (CSIR) and other funding agencies, and details of the activities is mentioned hereunder in different heads:

I. Development of evidence-based nutraceuticals from medicinal and aromatic plants

Several projects are underway that focus on developing evidence-based nutraceuticals from medicinal and aromatic plants under CSIR-Mission on “Immuno Modulatory Function of Nutritionals and Nutraceuticals for Health and Wellness” involving over 10 CSIR labs across India. Earlier also, a mission on Nutraceuticals and Nutritionals was completed that too focused on promoting the use of medicinal and aromatic plants.
The following nutraceutical products using medicinal plants are in different stages of development:

- Cardio-protective nutraceuticals (capsule and tablets) from pomegranate peel developed - Human Intervention Studies are in progress.
- A combination extract of Withania, Bacopa and Mucuna showed neuroprotection in both C. elegans and zebrafish model - Human Intervention Studies are in progress.
- Nutraceutical formulation based on Withania leaf and tea theanine enriched extract to potentiate sleep properties developed - Human Intervention Studies are in progress.
- Nutraceutical formulation from combination extracts of Vitex and Cissus for boosting cartilage health developed. - Human Intervention Studies are in progress.
- Nutraceutical formulation of Vitamin D2 rich Shiitake mushroom - Human Intervention Studies are in progress.
- *Ginkgo biloba* L. in suppression of epilepsy using experimental animal models was validated.
- The nutraceutical potential of active constituents of *Vitex negundo* (Vitexin and Agnuside) and *Adhatoda vasica* (Adhatodine) is validated against respiratory diseases.
- *Picrorhiza kurroa* and its active constituents as antidiabetic by insulin resistance and glucose uptake by adipocytes and skeletal muscle cells. Picrorhiza kurroa extract was

also found effective against non-alcoholic fatty liver disease (NAFLD) by lowering the fat accumulation and modulating the expression of various genes involved in the pathogenesis of NAFLD. In collaboration with CDRI the product is approved by DCGI for clinical trials.

- Use of *Berberis lycium* and its active constituents for immunomodulatory activities with specific emphasis on ulcerative colitis and rheumatoid arthritis.
- *Swertia purpurascens* was found to improve the liver injury markers and reduced oxidative stress and hepatocyte injury. The extract showed a therapeutic effect against hepatic fibrosis by inhibiting TGFβ/SMAD/NFκB signalling in rats.
- *Tinospora cordifolia* extract was evaluated for the diabetic kidney disease in rats.
- An ayurvedic medicine, *Phalatrikadi kwath* was found efficacious against NAFLD in rat models.
- The scientific validation of Ayurveda formulations Arjuna ksheerapaka and Trikatu were also performed.

II Conservation of medicinal plants and herbs;

- The institute with National Medicinal Plants Board (NMPB), Ministry of AYUSH, New Delhi, funded project on "Development of Geo-tagged digital database and spectral library of medicinal plants in protected cultivation in the foothills of western Himalaya" using GIS approach has prepared a total of 47 geo-referenced maps depicting location and area of medicinal plants in cultivations in Himachal Pradesh and Uttarakhand. CSIR-IHBT co-ordinated creation of database containing information on about 1582 medicinal plants of the Himalayan region. The database has been developed for NMPB, in a network mode with CSIR-Indian Institute of Integrative Medicine, Jammu; North East Institute of Science and Technology, Jorhat; and North Eastern Hill University, Shillong.
- The institute signed an MoU with NMPB on 4th October, 2021 for extending joint collaborative efforts to promote the production of quality planting material (QPM) of medicinal plants and herbs. Consequence upon this agreement, NMPB has sanctioned a project to the CSIR-IHBT on "Nursery Management". The main objectives of this project are to generate large scale QPM, promotion, conservation and cultivation of the appropriate medicinal plants in different agro-climatic zones, including the Rare Endangered Threatened (RET) species and those growing in high-altitude regions. During the project period (three years) about 13.00 lakh quality planting materials for 8 medicinal plants (*Valeriana jatamansi, Picrorhiza kurroa, Bacopa monnieri, Aloe vera*, *Stevia rebaudiana, Cinnamomum verum, Siraitia grosvenorii, Hippophae rhamnoides*) will be generated, and about 1533 kg quality seeds/rhizomes for 3 medicinal plants will be generated. The distribution of QPM to the farmers/growers has also been initiated free of cost.
- Again with funding from NMPB, the institute in in the process of developing probiotics for plant tissue culture boosting and improving performance of micro propagated plant materials by supplementing plant associated useful endophytes for large-scale cultivation of plants. In this activity, the institute has developed tissue culture protocol and modern agriculture practices including hydroponic and aeroponic cultivation for higher plant productivity for commercialization utilization and benefits to industry and society.
- CSIR-IHBT under an in-house project using Hyperspectral remote sensing generated data for non-invasive and onsite identification of the age group of an endangered

medicinal plant species *Valeriana jatamansi*, which is otherwise harvested unscientifically before its maturity.

- The institute is currently working on preparing a DNA barcode of some targeted medicinal/aromatic species.
- CSIR-IHBT is conducting floristic surveys (primarily in Himachal Pradesh) to generate information on floral resources of Himachal Pradesh that includes medicinal and aromatic plants. The institute has created a database "*himFlorIS*" on distribution and status of flowering plant resources in western Himalaya, depicting the information generated from the field surveys (ground truthing) as well as published literature. It was created under the aegis of National Bioreource Development Board, DBT, New Delhi. It has information on medicinal and rare plants.
- The institute has conducted Rapid Vulnerability Assessment of 15 high value medicinal plants and their habitat characterization.
- CSIR-IHBT has carried out survey and mapping of wild populations of medicinal plants like *Dactylorhiza hatagirea* (Vern. Salem Panja) in the Himalaya. The niche areas of these plants like *Dactylorhiza hatagirea* and *Sinpodophyllum hexandrum* were elucidated using Ecological Niche Modelling. Further we have also assessed 25 populations of *D. hatagirea* for its community structure, population density and the factors influencing its distribution).

III Setting up herbal gardens and Field gene banks

- CSIR-IHBT is setting up of an herbal garden at Palampur, District Kangra, Himachal Pradesh through a project "Establishment of Institutional Herbal Garden, at CSIR-IHBT, Palampur" funded by under which 125 herbal/medicinal plants are proposed for conservation.
- The CSIR-IHBT Herbal Garden so far has 86 plant species comprising 24 vatshamak, 31 pitshamak and 31 kaphashamak ayurvedic plants. The institute has also set up a garden at Civil Hospital, Palampur (H.P.) with 24 species of medicinal plants.
- CSIR-IHBT has established Field Gene Bank and field nurseries at its centre in Lahaul and Spiti District (Centre for High Altitude Biology, CeHAB) for conservation of the targeted plants.

IV Adoption of advanced technologies for cultivation and capacity building

- The institute with CSIR funding is optimizing aeroponic and hydroponic cultivation systems for cultivation and commercial exploitation of medicinal/aromatic plants such as *Picrorhiza kurroa*, *Valeriana jatamansi*, *Petroselinum crispum,* and *Ocimum basilicum*. Also in the institute, the project is going on medicinal plants such as *Rhodiola imbricata* and *Fritillaria roylei*.
- CSIR-IHBT has optimized in vitro and seed germination protocols for 04 targeted species (*Dactylorhiza hatagirea, Aconitum heterophyllum, Nardostachys jatamansi, Rhododendron anthopogon*) for their conservation. The institute has collection of 40 species with multiple accessions of wild medicinal/aromatic plants.
- The institute is providing awareness/training on tissue culture of high altitude medicinal and economically important herbs to various students and to stake holders as start-up tissue culture of various high altitude medicinal and economically important plants.

- Efforts are being made in the area of capacity building where institutional facility is made available for incubation and skill development programs and trainings to the farmers, entrepreneurs and youths.

V. Introduction/Promotion of high value crops

CSIR-IHBT, Palampur based on the need of the country, has undertaken cultivation, characterization and value addition of the following precious medicinal herbs with aim to achieve self-sufficiency:

- Heeng (*Ferula asafoetida*) is one of the top condiment and medicinal plant traded in India. India imports about 1540 tonnes of raw asafoetida annually from Afghanistan, Iran and Uzbekistan worth Rs 942 crores per year (2019). CSIR-IHBT introduced Heeng seeds (66 accessions from Iran & Afghanistan) for the first time in the country from Iran through ICAR-NBPGR, New Delhi, raised nursery plants and started its cultivation 258 locations in different districts of Himachal Pradesh, planting a total of 32,733 Heeng plants. Initial trials have also been stared in J&K, Ladakh and Uttrakhand with planting of 100 seedlings in each of the location.

- Saffron (*Crocus sativus*) is the most expensive spice of the world. The annual demand for this spice is 100 tons per year but its average production in India is about 6-7 tons and hence a large amount of the spice is imported. With an objective to extend the saffron cultivation beyond Kashmir, CSIR-IHBT developed disease free corms production technology through tissue culture and identifying the suitable locations across the western Himalayas through the MAXENT model having the potential to cultivate saffron. Initial experiments conducted in the non-traditional areas of H.P. and Uttarakhand yielded promising results from some locations of districts Chamba, Kinnaur, Mandi and Kangra in Himachal Pradesh and Bageshwar of Uttarakhand state. Quality of the produce was found to be at par with the quality of Kashmiri saffron.

- India imports 45,319 tonnes of Dalchini (*Cinnamomum verum*) worth Rs. 909 crores. CSIR-IHBT introduced Dalchini for the first time in Himachal Pradesh and started its organized cultivation at 12 locations in the state. The activity is being persuade in collaboration with State Agriculture Deptt, HP and other organizations.

- Ruthless extraction of medicinal plants has resulted in their sharply declined status in the wild. In this direction, CSIR-IHBT has put efforts on promotion of cultivation of medicinal plants and conversion of their status from rare and threatened to the non-threatened. About 1.4 lacs plants of *Valeriana*, *Inula* and *Podophyllum* have been rehabilitated in natural habitat in forest. These efforts lay basis of linking the activity with the recently approved *Van Samridhi Jan Samridhi Yojana* of the state government.

- In addition to extension cultivation of the sweetener crop Stevia in the country, the institute also introduced another sweetener crop Monk Fruit (*Siraitia grosvenorii*) for the first time in the country, as potential low-calorie natural sweetener, 300 times sweeter than sucrose.

- Institute has been actively engaged for development of quality standards for important phytomolecules from the Himalayan medicinal plants such as *Cissampelos pareira* and *Trillium govanianum*.

- Conservation and sustainable resource generation of high altitude bioresources is being done at CSIR-IHBT Centre for High Altitude Biology, Ribling, Keylong, Lauhal & Spiti district. This centre maintains germplasm of *Trillium govanianum, Aconitum*

heterophyllum, Picrorhiza kurrooa, Fritillaria roylei, Dactylorhiza hatagirea, Saussurea costus, Inula racemose etc. Characterization and consolidation of *Hippophae* genetic resources and propagation of elite genotypes for varietal evaluation is being done there.

- CSIR-IHBT is actively involved in research on population and distribution of medicinal plants, their extraction patterns, indigenous uses, and value chain. The institute is generating chemical and spectral signatures of medicinal plants

c) whether the Government proposes to start an internship for research on medicinal plants and to promote the sector; and

NA

d) if so, the details thereof?

NA

ANNEXURE-I

Given below is the detail of the list of ongoing research projects in CSIR-IHBT, Palampur on medicinal and aromatic plants

S. No.	Title of the project	Funding agency	Sanctioned amount (Rs in lakhs)	Duration
1.	CSIR Aroma Mission (Phase-II)	CSIR	1361.09	2020-23
2.	Up-scaled production of disease free corms of saffron (*Crocus sativus*)	CSIR	45.270	2020-22
3.	Genetic improvement of high value medicinal plants	CSIR	373.650	2020-23
4.	Development of botanical formulation using *Artemisia maritima* extract for the control of aphids in cabbage/cowpea (DBAM)	CSIR	50.000	2020-22
5.	Exploration of Himalayan Plants for Novel Antimalarial Agents: Charaterization of potential molecules (Phase-II)	CSIR	194.600	2020-23
6.	Next generation genomics for genetic improvement of *Stevia rebaudiana* Bert	CSIR	376.560	2020-23
7.	Development of bare-root seedling simulations system and automatic seedling transplanted for stevia	CSIR	26.440	2020-22
8.	Introduction, Charaterization and cultivation of *Ferula assa-foetida* (Heeng) in cold desert regions of Indian	CSIR	378.752	2020-23
9.	Conservation of threatened plant species of India	CSIR	299.72	2020-23
10.	Digitization of Indian System of Medicine – Siddha and Sowa Rigpa	CSIR	319.62	2021-25
11.	Production of Heeng in Himachal Pradesh - A new approach (RNS)	Directorate of Agriculture, H.P.	450.34	2020-25
12.	Technical and hand holding support by CSIR-IHBT Palampur for saffron production	Directorate of Agriculture, H.P.	498.071	2020-23

13.	Introduction of Monk Fruit cultivation: A new initiative in Himachal Pradesh	HIMCOSTE, H.P.	5.700	2021-23
14.	Bio-prospecting and product development from *Curcuma longa* (turmeric) in Uttarakhand	UCOST, Uttarakhand	2.000	2021-22
15.	Development of Geo-tagged digital database and spectral library of medicinal plants in protected cultivation in the foothills of western Himalaya	NMPB, Ministry of AYUSH, GoI	36.771	2018-21
16.	Production of Quality Planting Materials of Medicinal Plants Including the Rare Endangered Threatened Species for Conservation And Distribution	NMPB, Ministry of AYUSH, GoI	75.000	2021-24
17.	Development of Probiotics for Plant Tissue Culture Boosting the performance of micro propagated plant materials by supplementing plant associated useful endophytes	NMPB, Ministry of AYUSH, GoI	49.80	2021-24
18.	Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur	NMPB, Ministry of AYUSH, GoI	27.000	2021-26
19.	Bringing back the real green: eradicating invasive species and restoring ecosystem through community participation	NMHS GBPNIHESD, Almora	46.08	2018-21
20.	Bringing back the real green: eradicating invasive species and restoring ecosystem through community participation	NMHS GBPNIHESD, Almora	46.08	2018-21
21.	In vitro adventitious root cultures of *Picrorhiza kurroa* as an alternative source of nutraceutical ingredients	SERB	26.31	2018-21
22.	In vitro adventitious root cultures of *Picrorhiza kurroa* as an alternative source of nutraceutical ingredients	SERB	26.31	2018-21
23.	Next generation genomics for conservation and improvement of an endangered medicinal herb, *Angelica glauca*	SERB	20.256	2021-23
24.	Next-generation genomics for genetic improvement and conservation of endangered Himalayan medicinal herb, *Saussurea costus*	SERB	20.256	2021-23

25.	Population studies and establishment of field conservatories of threatened medicinal species *Eremurus himalaicus* Baker and *Polygonatum cirrhifolium* (Wall.) Royle in the cold desert, Himachal Pradesh	SERB	37.489	2022-25
26.	Captive cultivation, development of location specific agrotechnology, downstream processing and value addition of *Mentha piperita*: a sustainable option for livelihood improvement and security in the Himalayan Region	DBT	84.16	2022-25
27.	Inter-Institutional Programme Support on the Development and Sustainable Utilization of Bioresource of Mizoram Sub-Project 2: Captive production of shittake and oyster mushroom and their processing for Vitamin D2 enrichment Sub-Project 3: Introduction of low chilling varieties of apple (*Malus domestica* L.) in Mizoram to improve the livelihood of tribal farmers Sub-Project 4: Livelihood generation through cultivation and value addition of aromatic plants in Mizoram	DBT	141.154	2022-25
28.	Breaking the barrier of saffron cultivation through technological interventions for enhancing production and livelihood of farmers in Kashmir and non-traditional Areas	DBT	118.0984	2022-25
29.	Establishing efficient platform for genetic engineering in Indian Tea	DBT	25.0352	2022-24
30.	Germplasm characterization, genomics analysis and gene discovery for yield, metabolite and stress tolerance in Tea	DBT	38.0712	2022-24
31.	Value addition and product diversification in tea	DBT (NER-BPMC)	91.812	2022-25

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Annexure-I

CSIR-INSTITUTE OF HIMALAYAN BIORESOURCE TECHNOLOGY
PALAMPUR (H.P.)-176 061

Proforma for furnishing information on provisionally admitted Question for the Rajya Sabha Starred/ Unstarred Diary No. S3321 to be put down for 04-08-2022 regarding expenditure on Government Officers visits abroad.

Name of Ministry	Name of Department	Officers sent abroad during last five years (FY: 2017-18) for				
DSIR	CSIR-IHBT, Palampur	Training	Workshops	Conference	Studies	Other meeting
Number of Officers		02	01	01	NIL	01
Expenditure (in Rs.)		NIL	NIL	Rs.19,900/-	NIL	Rs.1,53,796/-

Name of Ministry	Name of Department	Officers sent abroad during last five years (FY: 2018-19) for				
DSIR	CSIR-IHBT, Palampur	Training	Workshops	Conference	Studies	Other meeting
Number of Officers		01	NIL	01	NIL	02
Expenditure (in Rs.)		NIL	NIL	NIL	NIL	Rs.1,29,000/-

Name of Ministry	Name of Department	Officers sent abroad during last five years (FY: 2019-20) for				
DSIR	CSIR-IHBT, Palampur	Training	Workshops	Conference	Studies	Other meeting
Number of Officers		01	NIL	01	NIL	07
Expenditure (in Rs.)		Rs.4,60,000/-	NIL	Rs.1,06,233/-	NIL	NIL

Name of Ministry	Name of Department	Officers sent abroad during last five years (FY: 2020-21) for				
DSIR	CSIR-IHBT, Palampur	Training	Workshops	Conference	Studies	Other meeting
Number of Officers		-NIL-				
Expenditure (in Rs.)						

Name of Ministry	Name of Department	Officers sent abroad during last five years (FY : 2021-22) for				
DSIR	CSIR-IHBT, Palampur	Training	Workshops	Conference	Studies	Other meeting
Number of Officers		-NIL-				
Expenditure (in Rs.)						

(B.P. Saw)
Administrative Officer
Authenticated by AO/CoA/Sr.CoA
Signature and Seal

PQ/IHBT/2022/U316
14.07.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. U316) "Tribal Medicine Research" reg.

a) the details of the works done for Tribal Medicine Research and the funds provided in the past three years, State-wise;

- Documentation of the indigenous knowledge of the tribal communities residing in Kangra, Chamba, Lahaul & Spiti, Kinnaur (Himachal Pradesh) on the uses of medicinal plants is being carried out. Recently, emphasis on Sowa Rigpa is being placed.
- CSIR-IHBT is involved in promoting cultivation of medicinal and aromatic plants in the tribal region of Lahaul & Spiti in Himachal Pradesh. The plant species involved include *Artemisia maritima*, *Dracocephallum heterophylum*, clary sage, *Inula racemosa*, picrorhiza and *Saussurea lappa.*

b) whether there has been any delay in releases of the allocated funds; if so, the reasons therefor;

Not applicable

c) the details proposed in progress projects for Tribal Medicine Research; and

Not applicable

d) whether Government is providing any *monetary compensation* to the tribes for the traditional knowledge acquired through them, if so, the details thereof, and if not, the reasons therefor?

Not applicable

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PQ/IHBT/2022/U1359
19.07.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Diary No. U1359) reg.

a) whether Government has establishment any research centres to promote research and development on medicinal plants, if so, the details thereof;

CSIR-Institute of Himalayan Bioresource Technology, Palampur (Himachal Pradesh), established in the year 1983-84, has a mandate to carry out basic as well as translation research around Himalayan plants including plants of industrial and commercial importance such as medicinal, aromatic, floriculture, spice, sweetener plants etc for developing diversified technologies (agro-technology, bio-technology, chemical technology, dietetics & nutrition technology, and environmental technology) through multifaceted state-of-the-art facilities.

Its current focus areas in the medicinal plants include:

1. Selection and development of improved varieties
2. Standardization of agro-technological practices for improvement in productivity and quality of the crop.
3. Characterization of plants using modern tools such as genomic, proteomic, metabolomics and molecular and chemical tools
4. Mass propagation of plants, particularly threatened medicinal plants using tissue culture techniques
5. Short cycle production of plants using new generation farming systems like hydroponics and aeroponics
6. Delivery of characterized planting material to the end users and rehabilitation of the plants at its natural sites.
7. Development of gene banks of the medicinal plants

8. Development of sustainable alternative system of secondary metabolites products of the desired medicinal plants to prevent their felling from natural sites.
9. Predictions of climate change impacts on the medicinal plants using FACE & FATI facilities.

The Institute visualises the following prioritized areas for future:

1. Development of agri-entrepreneurship model of commercially important plant species including medicinal plants for production of quality and quantity of planting material
2. Developing techniques for precision farming and developing phytofactories for production of secondary metabolites for commercial scale productivity
3. Developing Next generation remote sensing such as hyperspectral remote sensing for medicinal, aromatic and commercial plants (e.g. Saussurea costus, Stevia rebaudiana, Valeriana jatamansi, Tegetes minuta, Pichrorhiza kurooa, etc.)
4. Identify and validate traditional knowledge and practices in the Himalayan region for nutritionals and medicinal product development.
5. Investigating phenotypic plasticity and photoprotection in the plants growing in Himalayas
6. Developing Genome, Proteome and Metabolome atlas of plants in Himalayas:
7. Utilization of deciphered molecular mechanisms for enhanced plant productivity
8. Developing systems for plant cell and tissue culture for plant growing in Himalayas
9. Revisiting environment-regulated developmental features in plants growing in Himalayas
10. Investigating plant-microbe interactions

The institute has an extension centre **"Centre for High Altitude Biology"** located in cold desert region at Ribling, in district Lahaul &Spiti (H.P.) with following objectives:

- Mapping, conservation and bioprospecting of genetic resources of high altitudes (including medicinal plants)

- Study and predict the effects of climate change and understanding adaptation strategies of high altitude plants
- Ex situ conservation of native, endemic and threatened plants including establishment of conservatories
- To develop strategies for conserving and promoting high altitude bio-resource.
- Societal upliftment through extension of technologies and skill development programmes

b) whether government proposes to establish any such research centres in Andhra Pradesh, if so, the details thereof; and

Not applicable

c) whether there are any ongoing research project pertaining to medicinal plants being carried out in Andhra Pradesh and if so, the details thereof?

Not applicable

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PROVISIONALY ADMITTED QUESTION FOR THE RAJYA SABHA

Starred /Unstarred Diary No.-- U1828
The Question Will be put down for -- 28/07/2022
Answer on the Ministry Department -- Science and Technology(S&T)

Active women scientists in the country

Requested Information

Name of the Laboratory : CSIR-IHBT, Palampur (H.P.)- 176 061			
S. No.	**31st December 20--**	**Number of Active Women Scientist**	**Total Number of Scientist**
1.	**2017**	**04**	**45**
2.	**2018**	**04**	**42**
3.	**2019**	**07**	**53**
4.	**2020**	**06**	**56**
5.	**2021**	**06**	**55**
6.	**2022 (As on 19.07.2022)**	**06**	**54**

(B.P. Saw)
Administrative Officer
(Signature of Authorised Signatory)

PQ/IHBT/2022/U2315
22.07.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Dy. No U2315) "Development of AYUSH entrepreneurship" reg.

a) whether any scheme for the development of AYUSH entrepreneurship is being chalked out to promote AYUSH sector in the country, State/UT-wise particularly in Punjab;

Our Institute CSIR-IHBT Palampur is involved in value addition to medicinal plants & developing technology for nutraceutical products and transferring such technologies to the end users.

b) if so, the details thereof;

Not Applicable

c) whether any proposal has been formulated to include youth and scientists in nation building opportunities in various sectors like research, innovation, management, medical, higher education etc.; and

Does not pertain to CSIR-IHBT

d) if so, the details thereof?

Not Applicable

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PQ/IHBT/2022/U2643
25.07.2022

Subject: Reply to Parliament Question (Rajya Sabha Q. Dy. No U2643) "Development of startups in the field of science and technology" reg.

a) details of development of startups in the field of the science and technology by Government;

So far, institute has facilitated setting up of 50 start-ups. The details are given below:

S. No	Name of Incubatees	Idea of Start-up and Start date	Mentor
1	**Sahil Dutta** Pine Villa, Below HIMUDA Colony, Sector – 6, Distt. Kangra. Dharamshala, Cont. No. 7831012202 Email: sahildatta91@gmail.com	Mango Panna Juice, Apple Juice and Amla honey juice formulations **25th September, 2017**	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No.: 9736440442
2	**Paritosh Bhardwaj** V.P.O. Kand Gwal Tikker, Tehsil Palampur, Distt. Kangra. Cont. No. 9459252890 Email: paritosh7_88@yahoo.co.in	Ready to serve healthy beverages such as medicated and ice Kangra tea development **25th September, 2017**	Name: Dr. Ashu Gulati Email: ashugulati@ihbt.res.in Ph. No.: 9805464220
3	**Rakesh Kumar** Village Dhanyater, P.O. Chauntra, Tehsil Jogindernagar, Distt. Mandi. Cont. No. 9857999888 Email: premgroup2011@gmail.com	Herbal green tea, black tea and blends of different tea products **25th September, 2017**	Name: Dr. Ashu Gulati Email: ashugulati@ihbt.res.in Ph. No.: 9805464220
4	**Aman Patial** #60/4, Bhojpur Sundernagar, (H.P.) Cont. No. 9816484577 Email: amanpatial16@gmail.com	Honey vinegar from waste honey **25th September, 2017**	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No.: 9736440442
5	**Akash Patial** #60/4, Bhojpur Sundernagar, (H.P.) Cont. No. 9816860577 Email: patial.akash5@gmail.com	Fruit Burfi from different seasonal fruits such as guava, mango, apple and amla etc. **25th September, 2017**	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No.: 9736440442
6	**Chandan Sood** Phase – 7, Mohali,	Agro-technology e-market platform	Name: Dr. Sanatsujat Singh

	Cont. No. 7045018453 Email: appleway.herb@gmail.com	**13th February, 2018**	Email: sanatsujat@ihbt.res.in Ph. No.: 9418709582
7	**Sandeep Kumar** V.P.O. Trilokpur, Tehsil Jawali, Distt. Kangra. Cont. No. 9805620466 Email: sandeephimachli@gmail.com	Potato seed production through Plant Tissue Culture and aeroponic facility **13th February, 2018**	Name: Amita bhattacharya Email: amitabhatta@ihbt.res.in Ph. No.: 8894131531
8	**Shivanshu Mehta** Palampur, Cont. No. 9418010613 Email: shivmehta501@gmail.com	Floriculture establishment **06th April , 2018**	Name: Dr. Bhavya Bhargav Email: bhavya@ihbt.res.in Ph. No.: 9418373301
9	**Paritosh Sharma** Bundla, Palampur, Cont. No. 9816623345 Email: paritoshsharmaneugal@gmail.com	Turmeric based essential oil and other products **06th April , 2018**	Name: Dr. Vijay Kant Agnihotri Email: vijai@ihbt.res.in Ph. No.: 9625415100
10	**Sunil Kumar** Vill. Bhadrin, P.O. Galore, Tehsil Galore, Distt. Hamirpur. H.P. Cont. No. 7009454779 Email: rudraherbsindia@gmail.com	Aloe vera processing, retail, marketing services along with farming services in Hamirpur, Himachal Pradesh. **21st February, 2019**	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No.: 9736440442
11	**Swati Sharma** M-150, Jal Vayu Vihar, Sector- 25, Noida- 201301 Cont. No. 9560035488 Email: swati.singhal1817@gmail.com	A complete detox drink which rejuvenates from within and nourishes you. Essential nutrients and provide immunity against several diseases. **21st February 2019**	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No.: 9736440442
12	**Vipin Kumar** Vill Bharmat, P.O. Banuri, Teh Palampur, Distt. Kangra. H.P- 176061 Cont. No. 9816949833 Email: vpnbiotech@gmail.com	Tea is a major produce of palampur which never got the respect in market that it should so tea vinegar is a product which can turn the tables for Kangra tea. **5th march 2019**	Name: Mr. Jai Prakash Dwivedi Email: jpdwivedi@ihbt.res.in Ph. No.: 8894582222
13	**Sandeep Kumar** Palampur, Cont. No. 8580753926 Email: sandeep.malhotra171992@gmail.com	Development of package for pollution awaited plants for different location like house, hospital offices etc. **5th march 2019**	Name: Dr. Bhavya Bhargav Email: bhavya@ihbt.res.in Ph. No.: 9418373301

14	**Udhey Singh** H. No. 41, V.P.O. Dehan Khas, Tehsil Palampur, District Kangra. H.P. Cont. No. 9857836950 Email: udheysingh101@gmail.com	Development of stevia coffee formulation **25th April 2019**	Name: Dr. Vidyashankar Srivatsan Email: vshankar@ihbt.res.in
15	**Sudarshna** V.P.O. Rait, Tehsil Shahpur, Distt Kangra. H.P. Cont. No. 8894124194 Email: sudershnakumari24194@gmail.com	Development of products made from waste pine needles like mats, boxes, baskets, trays etc. **21st may 2019**	Name: Dr. Pamita Bhandari Email: pamita@ihbt.res.in
16	**Vipin Kumar** Vill. Magroo Suryala, P.O. Aloh, Teh. Rakkar, Distt. Kangra. H.P. 177034 Cont. No. 9418273550	Value addition of herbal produce **26th Aug 2019**	Name: Mr. Jai Prakash Dwivedi Email: jpdwivedi@ihbt.res.in Ph. No.: 8894582222
17	**Ankita Rana** V.P.O. Ghati Bilwan, Jaswan Kotla, Kangra. H.P. 176-501 Cont. No. 9816103320 Email: thakurrarito@gmail.com	Organic Ayurvedic products **26th Aug 2019**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
18	**Reena Chandel** Village- Gagal, P.O. Bharmoti, Tehsil- Nadaun, Distt. Hamirpur. (H.P.) Cont. No. 8679223613 Email: newaajivikashggagal@gmail.com	Fruits and vegetables products **26th Aug 2019**	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No. 9736440442
19	**Mona Singh** Near depot above Monal Hostel, Village Bharmat, Palampur, Distt. Kangra. Himachal Pradesh. 176061 Cont. No. 8988232510 Email: roushan2u@gmail.com	Development of cookies for postpartum **28th Aug 2019**	Name: Dr. Vidyashankar Srivatsan Email: vshankar@ihbt.res.in
20	**Satish Kumar** Village Ghurkari, Tika Sunehar, Tehsil Kangra, Distt. Kangra. Himachal Pradesh-176001 Cont. No. 9805565394 Email: satishhoneybeefarm@gmail.com	Himachal honey processing **7th Oct 2019**	Name: Dr. S.G. Eswara Reddy Email: ereddy@ihbt.res.in Ph. No. 9418020738
21	**Amshu CR** C/O Sharma House 3334, Near Manali Public School, Aleu Village,	Sea buckthorn Juices, Shots, Powder and Infusions as product	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No.: 9736440442

	Cont. No. 8219667968 Email- thapasufoods@gmail.com	**17th Jan 2020**	Name: Mr. Jai Prakash Dwivedi Email: jpdwivedi@ihbt.res.in Ph. No.: 8894582222
22	**Sandeep Bhatia** V.P.O. Nadaun, Ward No. 06, Tehsil Nadaun, Distt. Hamirpur. State Himachal Pradesh. Cont. No. 9882198421 Email: sandeepbhatiya1986@gmail.com	Development of vedic, traditional and holistic based products from low urine, dung and medicinal plants **21st Jan 2020**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
23	**Subodh Kumar** Vill & P.O. Saloh, Teh. Palampur, Distt. Kangra. Himachal Predesh. 176102 Cont. No. 9805691903 Email: subodhthakur77@yahoo.com	Nursery raising of aromatic crops **13th Feb 2020**	Name: Dr. Rakesh Kumar Rana Email: rakeshkumar@ihbt.res.in Ph. No. 9418067763
24	**Rajveer** Village Jandera, P.O. Rajpur, Teh. Palampur, Distt. Kangra. (H.P.) 176061 Cont. No. 8894961559 Email: rajveermandyal44@gmail.com	Development of bio-fertilizers **13th Feb 2020**	Name: Dr. Aparna Maitra Pati Email: aparna@ihbt.res.in Ph. No. 9816024955
25	**Rahul Sharma** Village Chakrog, P.O. Drubbal, Tehsil Jogindernagar, Distt. Mandi. H.P. Cont. No. 8146910465 Email: rs616299@gmail.com	Waste to energy **9th June 2020**	Name: Dr. Rakshak Kumar Email: rakshak@ihbt.res.in Cont. No. 01894 233339
26	**Bharat Mohan** V.P.O. Baggi-175027, Mandi. H.P. Cont.No.8628812334 Email: bharat@himoil.com	Cedar wood hydrosol as floor disinfecttant **11th June 2020**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
27	**Rajan Minhas** V.P.O. Maranda, Teh. Palampur, Distt. Kangra. H.P. 176102 Cont. No. 9951519508 Email: thefragrance@outlook.in	Aromatherapy candles **18th June 2020**	Name: Dr. Robin Joshi Email: robinsjoishi@ihbt.res.in Ph. No. 8263058482
28	**Roushan Kumar** S/O Sh. Binod Kumar, Near the depot, Above Monal hostel, Village Bharmat, District- Kangra. (H.P.), Pin-176061 Cont. No. 8894852536 Email: roushan1951990@yahoo.com	Bioreactor based nutraceutical development **25th June 2020**	Name: Dr. Shashi Bhushan Email: sbhushan@ihbt.res.in Ph. No. 9418715867

29	**Sunil Kumar** S/O Sh. Om Prakash Village Upper Majhtly, P.O. Pathiar, Teh and Distt. Kangra. (H.P.), Pin 176047 Cont. No. 9882213996 Email: Sunil_GIS@outlook.com	Geo-spatial solutions for resource mapping **3rd July 2020**	Name: Dr. Amit Kumar Email: amitkr@ihbt.res.in Ph. No. 9418039091
30	**Kanishk Kaushal** S/O Sh. Satish Kumar, House No. 11, Ward No. 2, Nagrota Bagwan, Tehsil- Nagrota Bagwan, Distric- Kangra. (H.P.), Pin- 176047 Cont. No. 8894447008 Email: knshk89@gmail.com	Aeroponics cultivation of high value plants **7th July 2020**	Name: Dr. Ashish Wargat Email: ashishwarghat@ihbt.res.in Ph. No. 9816146345, 9463378921
31	**Jagdeep Singh** V.P.O. Averi, 78 mil Tehsil - Baijnath, Distt. - Kangra. H.P. 176081 Cont. No. 8263898939 Email: jagdeep.ihbt@gmail.com	Organic dustbin **11th Aug 2020**	Name: Dr. Rakshak Kumar Email: rakshak@ihbt.res.in Cont. No. 01894 233339
32	**Kushal Kumar** Ward No. 11, Rania, Distt. Sirsa. Haryana, Pin-125076 Cont. No. 9315377848 Email: soni.kaushal911@gmail.com	Natural perfumes and air fresheners **3rd Sep 2020**	Name: Dr. Robin Joshi Email: robinsjoishi@ihbt.res.in Ph. No. 8263058482
33	**Rajneesh Kumar** V.P.O. Bani, Tehsil Barsar, Distt. Hamirpur. (H.P.) Cont. No. 9418028551 Email: reeswa2004@gmail.com	Products from pine needles **7th Sep 2020**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
34	**Anup Sood** Kaser Bag Colony, Krishana Niketan, Palampur-176061, Kangra. H.P. Cont. No. 7018261700 Email: absspalampur@gmail.com	Products from natural clay, cow dung and aromatic plants **10th Sep 2020**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
35	**Ishan Kashyap** Bhagwan street, Mandi. Cont. No. 9418978981 Email: drishankashyap@gmail.com	Petsby **15th Sep 2020**	Dr. Vikram Patial Email: vikrampatial@ihbt.res.in Ph. No. 9418663900
36	**Surinder Mohan** V.P.O. Baggi-175027, Mandi. H.P. Cont. No. 7018561716 Email: sur000ender@gmail.com	Natural Herbal Extracts with 100% pure constituents **26th Sep 2020**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
37	**Amarjeet** AMARJEET, V.P.O. KEYLONG, TEHSIL LAHAUL, DISTT. LAHAUL & SPITI. H.P.-175132	Ready-to-eat products from buckwheat **11th Dec 2020**	Name: Dr. Mahesh Gupta Email: mgupta@ihbt.res.in Ph. No.: 9736440442

	Cont. No. 9418490092 Email: amrjt77@gmail.com		
38	**Ashveen Khatri** S/O Sh. Oman Singh, CSIR-IHBT apartments, Post Box No. 6, Palampur, (H.P.)-176061 Cont. No. 7018279622 Email: ashveenkhatri16@gmail.com	Enrichment of Oyster mushroom with vitamin D using photo-conversion experiments. Preparation of high vit D vegetarian formulations. Zero waste protocol for conversion of agro-waste. **03rd Mar 2021**	Name: Dr. Rakshak Kumar Email: rakshak@ihbt.res.in Cont. No. 01894 233339
39	**Sanjeev Katoch** Vill. Ram Chowk Ghuggar, (Behind I.V.R.I Colony), Teh & P.O. Palampur, Dsitt. Kangra. (H.P.-176061) Cont. No. 9805440173 Email: katoch_sanjeev@yahoo.com	Local Bio-Resources based value added products 1. Value addition in Phenyl with natural ingredients 2. Mosquito repellent from natural resources 3. Natural Aroma based candles. **03rd Mar 2021**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
40	**Sanjeev Thakur** Village Bisht Behar, P.O. Kais, Teh. & Distt. Kullu. Himachal Pradesh. 175101. Cont. No. 7009881104 Email: thakursanjeev480@gmail.com	Cultivation of High Value Flower Crop (Lilium and Tulip) using Hydroponic System. **08th Mar 2021**	Name: Dr. Ashish Wargat Email: ashishwarghat@ihbt.res.in Ph. No. 9816146345, 9463378921
41	**Ajay Kumar** S/O Sardar Singh, V.P.O. Trehal, Tehsil Baijnath, District Kangra. Himachal Pradesh- Pin Code 176063 Cont. No. 9418338797 Email: ajaykapoor0903@gmail.com	Biomass utilization to fine chemicals synthesis like 5-hydroxymethylfurfural (5-HMF), furfural which are building blocks for perfumery, flavoring, resin, bio-fuel and polymer industry **9th Mar 2021**	Name: Dr. Pralay Das Email: pdas@ihbt.res.in Ph. No. 9418038123
42	**Reena Thakur** V.P.O. Averi, Distt. Mandi. Himachal Pradesh- 176081 Cont. No. 9873741403 Email: thakur.rinu@gmail.com	Nursery raising of aromatic plants and processing of Himalaya's- Essential oils & Perfumes **18th Mar 2021**	Name: Dr. Rakesh Kumar Rana Email: rakeshkumar@ihbt.res.in Ph. No. 9418067763
43	**Ankit Shandil** Village Jahri, Post Office-Naswal Tehsil- Ghumarwin, District Bilaspur. Himachal Pradesh. 174021 Cont. No. 9816757642	Establish plant tissue culture lab for production of diseases free, elite planting material (blueberry, apple and	Name: Dr. Rohit Joshi Email: rohitjoshi@ihbt.res.in

	Email: shandilankit999@gmail.com	saffron) at minimum cost. **1st Apr 2021**	
44	**Tanmay Sharma** C/O Sh. Devi Sharma, V.P.O. Khaira, Tehsil Palampur, District Kangra. (H.P.) 176 086 Cont. No. 8091746060 Email: tanmaysharma1@gmail.com	Establishment of facility for organic incense sticks with/without bamboo sticks **19th Jul 2021**	Name: Dr. Robin Joshi Email: robinsjoishi@ihbt.res.in Ph. No. 8263058482
45	**Nitika Bhandari** C/O Khadi Gramoudhyog Sansthan, Nagrota Bagwan, Distt. Kangra. (H.P.) Cont. No. 9805347466 Email: aasrafoundation111@gmail.com	Establishment of facility for various types of value added products from *Tinospora cordifolia* (Giloe) **19th Jul 2021**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184
46	**Ajay Kumar Thakur** C/O Shri Sarbjeet Singh, V.P.O. Biara, Tehsil Palampur, District Kangra. (H.P.) 176 063 Cont. No. 7833865239 Email: aj9805705679@gmail.com	Availing incubation facility for development of pine charcoal from pine needle (*Pinus roxburghii*) and its essential oil for Mosquito /Insect repellant formulation **26th Jul 2021**	Name: Dr. K. K. Singh Email: kksingh@ihbt.res.in Ph. No. 9418325636
47	**Rohit Kalia** Plot No. 28, Phase 2, Industrial Area, Nagri, Palampur, Distt. Kangra. H.P. Cont. No. 9780599369 Email: mishra.eshika26@gmail.com	Develop packaging material utilising available agricultural wastes and Mushroom Mycelium **26th Jul 2021**	Name: Dr. Rakshak Kumar Email: rakshak@ihbt.res.in Cont. No. 01894 233339
48	**Aditi Sharma** Amravati Niwas, Tika Aima, Ghuggar, Near SSB Chowk, Palampur, Distt. Kangra. H.P. Cont. No. 9988053161 Email: aditi.sharma203@gmail.com	We are determined to use the plant's healing properties to promote good health and lifestyle without any physical contact with skin **22nd Nov 2021**	Name: Dr. Dinesh Kumar Email: dineshkumar@ihbt.res.in Ph. No. 9459344184 Name: Dr. Robin Joshi Email: robinsjoishi@ihbt.res.in Ph. No. 8263058482
49	**Abhishek Gautam** Block No- 18, Flat No- 4, Phase -3, New Shimla, Shimla. 171009 Cont. No. 9871860115/8968884790 Email: abhishekgaumzi99@gmail.com	Project in concentrated on growing different types of mushrooms used for medicinal and nutritional values, **15th Nov 2021**	Name: Dr. Rakshak Kumar Email: rakshak@ihbt.res.in Cont. No. 01894 233339
50	**Akash Deep Rehan** Ward No- 5, Near Yamini Hotel, Palampur, -176061 Cont. No. 7651093555	Plants are high in market demand and used in pharma comp Growth period can be	Name: Dr. Ashish Wargat Email: ashishwarghat@ihbt.res.in

	Email: akkashrehan@gmail.com	shorten by soilless farming result in continuous cash flow Herbs are expensive that can make hi tech farming to profit **18th Nov 2021**	Ph. No. 9816146345, 9463378921

b) details of the status at which such startups are at present; and

Start-ups having serial numbers 1 to 36 have completed their projects as prototype development and directly linked with Director of Industry, Govt of Himachal Pradesh for further financial assistance and further monitoring their future planning for marketing and launch.

c) total funds spent/invested in startup development in this regard over the last five years?

CSIR institutions involved	**Schemes operated/ Incubation centers operated**	**Annual financial allocation**	**Source of funding**
CSIR-Institute of Himalayan Bioresource Technology (CSIR-IHBT), Palampur	Department of Industry, Himachal Pradesh signed a MoU on **23rd February, 2017** for implementation of Himachal Pradesh state chief minister start-up incubation scheme at CSIR-IHBT, Palampur. Under this scheme, incubates shown interest to establish new start-up/enterprise in the state will be inducting.	Rs.30 Lakhs for first two years for facility creation and after that Rs10.00 lakhs as recurring grant for running the startup scheme	Department of Industry, Himachal Pradesh

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Lok Sabha unstarred Question No. 4372
Subject: Information regarding number of minority candidates recruited by Central Government in the year 2021-2022-reg.

	Group A		Group B		Group C		Total A+B+C	
CSIR Lab/Instt.	**Total no. of vacancies during the period**	**minorities selected during the period**	**Total no. of vacancies during the period**	**minorities selected during the period**	**Total no. of vacancies during the period**	**minorities selected during the period**	**Total no. of vacancies during the period**	**minorities selected during the period**
CSIR-IHBT, Palampur (HP)	20	NIL	19	NIL	35	NIL	74	NIL
Total	**20**	**NIL**	**19**	**NIL**	**35**	**NIL**	**74**	**NIL**

Administrative Officer

PQ/IHBT/2022/4085
08.08.2022

Subject: Reply to Parliament Question (Lok Sabha Q. No 4085) "Research Center of AYUSH" reg.

a) the details of the research work being carried out on various aspect of medicinal plants and the institutes involved in the said research, State-wise;

CSIR-Institute of Himalayan Bioresource Technology, Palampur (Himachal Pradesh), established in the year 1983-84, has a mandate to carry out basic as well as translation research around Himalayan plants including plants of industrial and commercial importance such as medicinal, aromatic, floriculture, spice, sweetener plants etc for developing diversified technologies (agro-technology, bio-technology, chemical technology, dietetics & nutrition technology, and environmental technology) through multifaceted state-of-the-art facilities.

Its current focus areas in the medicinal plants include:

1. Selection and development of improved varieties
2. Standardization of agro-technological practices for improvement in productivity and quality of the crop.
3. Characterization of plants using modern tools such as genomic, proteomic, metabolomics and molecular and chemical tools
4. Mass propagation of plants, particularly threatened medicinal plants using tissue culture techniques
5. Short cycle production of plants using new generation farming systems like hydroponics and aeroponics
6. Delivery of characterized planting material to the end users and rehabilitation of the plants at its natural sites.
7. Development of gene banks of the medicinal plants
8. Development of sustainable alternative system of secondary metabolites products of the desired medicinal plants to prevent their felling from natural sites.
9. Predictions of climate change impacts on the medicinal plants using FACE & FATI facilities.

The Institute visualises the following prioritized areas for future:

1. Development of agri-entrepreneurship model of commercially important plant species including medicinal plants for production of quality and quantity of planting material
2. Developing techniques for precision farming and developing phytofactories for production of secondary metabolites for commercial scale productivity
3. Developing Next generation remote sensing such as hyperspectral remote sensing for medicinal, aromatic and commercial plants (e.g. Saussurea costus,

Stevia rebaudiana, Valeriana jatamansi, Tegetes minuta, Pichrorhiza kurooa, etc.)

4. Identify and validate traditional knowledge and practices in the Himalayan region for nutritionals and medicinal product development.
5. Investigating phenotypic plasticity and photoprotection in the plants growing in Himalayas
6. Developing Genome, Proteome and Metabolome atlas of plants in Himalayas:
7. Utilization of deciphered molecular mechanisms for enhanced plant productivity
8. Developing systems for plant cell and tissue culture for plant growing in Himalayas
9. Revisiting environment-regulated developmental features in plants growing in Himalayas
10. Investigating plant-microbe interactions

The institute has an extension centre **"Centre for High Altitude Biology"** located in cold desert region at Ribling, in district Lahaul &Spiti (H.P.) with following objectives:

- Mapping, conservation and bioprospecting of genetic resources of high altitudes (including medicinal plants)
- Study and predict the effects of climate change and understanding adaptation strategies of high altitude plants
- Ex situ conservation of native, endemic and threatened plants including establishment of conservatories
- To develop strategies for conserving and promoting high altitude bio-resource.
- Societal upliftment through extension of technologies and skill development programmes

b) whether any research center has been established/made operational in Chhattisgarh, if so, the details thereof;

Not applicable

c) if not, whether the Government proposes to establish any research center; and

Not applicable

d) the step taken by the Government to promote and publicize the use of AYUSH systems of medicine?

Does not pertain to CSIR-IHBT, Palampur

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CSIR-IHBT, Palampur

Details of the tangible and intangible products derived out of Internationally filed Patents during the last five years

01/Apr/2017 and 21/Oct/2022

S.No	NFNO (CSIR IPU Ref. No.)	Country	Title	Inventors	Prov. Filing Date	Comp. Filing Date	Application No.	Status	Grant Date	Patent No.	Tangible	Intangible
1.	0057NF2011	MX	A METHOD FOR ENHANCING STATUS OF CARBON, NITROGEN, BIOMASS AND YIELD OF PLANTS	ANISH KAACHRA, SURENDER KUMAR VATS, PARAMVIR SINGH AHUJA, SANJAY KUMAR	---	18/Oct/2013	MX/a/2013/012185	LP/As per Competent Com	19/Apr/2017	346985	-	Yes (Yet, Technology not commercialized, hence no product derived)
		NZ				18/Oct/2013	716717	IF	04/Jul/2017	716717		
		PH				21/Oct/2013	1/2013/502175	IF	29/Aug/2017	1/2013/502175		
		US				19/Oct/2013	14/112681	IF	20/Oct/2020	10808259		
2.	0135NF2011	JP	AN ECONOMICAL PROCESS FOR PURIFICATION OF BIO AMINO ACIDS	HARSH PRATAP SINGH, AJAY RANA	---	07/Aug/2014	2014-556200	LP/As per Competent Com	04/Aug/2017	6186379	-	Yes (Yet, Technology not commercialized, hence no product derived)
3.	0035NF2008	GB	A METHOD FOR CLONING FUNCTIONAL GENE OF COPPER/ZINC SUPEROXIDE DISMUTASES USING	BHARDWAJ PARDEEP KUMAR, KUMAR ARUN, KISHORE AMIT, GHAWANA SANJAY, RANI ARTI, SINGH KASHMIR, SINGH	---	11/Oct/2010	09727645.5	LP/As per Competent Com	08/Nov/2017	2268661	-	Yes (Yet, Technology not commercialized, hence no product derived)

S.No	NFNO (CSIR IPU Ref. No.)	Country	Title	Inventors	Prov. Filing Date	Comp. Filing Date	Application No.	Status	Grant Date	Patent No.	Tangible	Intangible
		EP	OLIGONUCLEOTIDE PRIMERS	HARSHARAN, SINGH RAVI SHANKAR, KUMAR HITESH, SOOD PAYAL, DUTT SOM, KUMAR SANJAY, AHUJA PARAMVIR SINGH	---	11/Oct/2010	09727645.5	RO/EP/NP/IF	08/Nov/2017	2268661		
4.	0467NF2003	VN	A FIELD CONVENIENT JACKETED LEAF INACTIVATOR FOR GREEN TEA PROCESSING	GARIKAPATI DYVA KIRAN BABU, RAVINDRANATH SRIGIRIPURAM DESIKACHAR	---	30/Oct/2006	1-2006-01794	LP/As per Competent Com	25/Dec/2017	18153	-	Yes (Yet, Technology not commercialized, hence no product derived)
5.	0013NF2012	US	A BIOREACTOR VESSEL FOR LARGE SCALE GROWING OF PLANTS UNDER ASEPTIC CONDITIONS	RAJESH THAKUR, ANIL SOOD, PARAMVIR SINGH AHUJA	---	19/Jan/2015	14/415711	IF	23/Jan/2018	9872448	Yes (Yet, Technology not commercialized, hence no product derived)	
6.	0055NF2011	FR	PROCESS FOR THE MODIFICATION OF CURCUMA AROMATICA ESSENTIAL OIL	VIJAI KANT AGNIHOTRI, BIKRAM SINGH, GARIKAPATI DYVA KIRAN BABU, GOPI CHAND, RAKESH DEOSHARAN SINGH, PARAMVIR SINGH AHUJA	---	14/Aug/2013	12713320.5	IF/EP DESIG.	03/Oct/2018	2690969	-	Yes (Yet, Technology not commercialized, hence no product derived)
		DE			---	14/Aug/2013	12713320.5	IF/EP DESIG.	03/Oct/2018	2690969		
		EP			---	14/Aug/2013	12713320.5	RO/EP/NP/IF	03/Oct/2018	2690969		
		BR			---	16/Sep/2013	11 2013 023705-8	IF	28/Jan/2020	BR 112013023705-8		

S.No	NFNO (CSIR IPU Ref. No.)	Country	Title	Inventors	Prov. Filing Date	Comp. Filing Date	Application No.	Status	Grant Date	Patent No.	Tangible	Intangible
7.	0167NF2004	US	A PROCESS FOR THE DEVELOPMENT OF HIGHLY EFFICIENT SOLID STATE MATRIX FOR IMMOBILIZING TEA POLYPHENOL OXIDASE ENZYME FOR CONTINUOUS BATCH PRODUCTION AND TOTAL CONVERSION OF TEA SUBSTRATES TO THEAFLAVINS	HARSH PRATAP SINGH, KAPIL SHARMA	---	24/Jul/2009	12/225793	IF	20/Nov/2018	10131727	-	Yes (Yet, Technology not commercialized, hence no product derived)
8.	0190NF2012	JP	A NEW ENERGY EFFICIENT PROCESS FOR MANUFACTURING OF HIGH QUALITY GREEN TEA WITH ENHANCED FLAVOR	AJAY RANA, HARSH PRATAP SINGH, ASHU GULATI	---	09/Aug/2016	2016-568163	IF	02/Aug/2019	6564791	Yes (Yet, Technology not commercialized, hence no product derived)	-
		CN			---	09/Aug/2016	201580007819.3	IF	10/Aug/2021	CN 105979787 B		
9.	0196NF2015	US	A NANOBIOCOMPOSITE FOR WOUND HEALING AND A PROCESS FOR THE	SUDESH KUMAR YADAV, RUBBEL SINGLA, AVNESH KUMARI	---	12/Jul/2018	16/069672	IF	01/Oct/2019	10426809	Yes (Yet, Technology not commercialized, hence	
		FR			---	02/Aug/2018	17715287.3	IF/EP DESIG.	11/Mar/2020	3402462		
		EP			---	02/Aug/2018	17715287.3	RO/EP/NP/IF	11/Mar/2020	3402462		
		IT			---	02/Aug/2018	17715287.3	IF/EP DESIG.	11/Mar/2020	3402462		

S.No	NFNO (CSIR IPU Ref. No.)	Country	Title	Inventors	Prov. Filing Date	Comp. Filing Date	Application No.	Status	Grant Date	Patent No.	Tangible	Intangible
		JP	PREPARATION THEREOF		---	11/Jul/2018	2018-555317	IF	10/Jun/2021	6895991	no product derived)	

PQ/IHBT/2022/S812
01.12.2022

Subject: Reply to Parliament Question (Rajya Sabha Dy. No. S812) "Government's support for research on climatic changes" reg.

a) whether the Ministry has initiated any steps to focus on research, pertaining to climatic changes and its effects on mankind;

Yes

b) the details of schemes being implemented for promoting climate changes research in the country thereof;

- **Project title**: Understanding the nature of alpine timberlines of Himalaya: integrating ecological and scenario studies for assessing the impact of climate change.
  Project duration*:* April 2018 to December 2021
  Funded by: National Mission on Himalayan Studies (NMHS) and State Centre for Climate Change, HIMCOSTE, Shimla.
  Objectives:(i) to map timberline zone in Himachal Pradesh region of western Himalaya (ii) to study plant populations, community structure and functional ecology in the LTER sites (iii) to study effect of changing snow-cover extent on species diversity and recruitment patterns (iv) to study phenology of key species, net primary productivity, nutrient dynamics and ecophysiology in the LTER sites (v) to undertake predictive modelling for projecting future changes in vegetation (vi) to integrate with modelled projections, the scenario studies by involving local stakeholders for understanding the future of their landscape.

- **Project title**: Characterizing Patterns and Processes of Alpine Ecosystem in Indian Himalaya with Special Emphasis to Himachal Pradesh
  Project duration*:* April 2019 to March 2022
  Funded by: Space Applications Centre, ISRO, Ahmedabad
  Objectives:(i) understanding the alpine ecotone structure and function through space based and in-situ observation in Himachal Pradesh (ii) monitoring biodiversity as per HIMADRI protocol, and (c) assessment of nutrient dynamics, physiognomy and physiology in ecotonal zone across elevational gradients around alpine treeline.

- **Project title**: Modelling forest phenological parameters from time series remote sensing data
  Project duration*:* April 2021 to March 2024
  Funded by: Space Applications Centre, ISRO, Ahmedabad
  Objectives: Installation of phenomet station (time lapse camera with meteorological data loggers) in Chirpine (*Pinus roxburghi*i) forest in the Himachal Pradesh to understand its phenology most dominant predictors for leaf senescence and leaf initiation among air temperature, soil temperature, soil moisture, humidity and photoperiod in various forest ecosystems in India.

c) the details of the funds sanctioned, released, and utilized in this regard during the last five years, year-wise;

- **Project title**: Understanding the nature of alpine timberlines of Himalaya: integrating ecological and scenario studies for assessing the impact of climate change
  Funded by: National Mission on Himalayan Studies (NMHS) and State Centre for Climate Change, HIMCOSTE, Shimla

Year	Funds sanctioned	Funds released	Funds utilized
2018-19	10.42 lakhs	10.42 lakhs	6.93 lakhs
2019-20	9.72 lakhs	9.72 lakhs	7.49 lakhs
2020-21	7.80 lakhs	7.80 lakhs	9.72 lakhs
2021-22	Nil	Nil	4.02 lakhs

- **Project title**: Characterizing Patterns and Processes of Alpine Ecosystem in Indian Himalaya with Special Emphasis to Himachal Pradesh
  Funded by: Space Applications Centre, ISRO, Ahmedabad

Year	Funds sanctioned	Funds released	Funds utilized
2019-20	8.40 lakhs	8.40 lakhs	7.75 lakhs
2020-21	8.40 lakhs	8.00 lakhs	8.03 lakhs
2021-22	8.86 lakhs	8.15 lakhs	8.16 lakhs

- **Project title**: Modelling forest phenological parameters from time series remote sensing data.
  Funded by: Space Applications Centre, ISRO, Ahmedabad

Year	Funds sanctioned	Funds released	Funds utilized
2021-22	12.94 lakhs	12.94 lakhs	1.69 lakhs

d) whether Government has any plans to support and encourage startups engaged in research on Climatic Changes; and

Not applicable

e) if so, the details of such programs, funds sanctioned, funds utilized and the entities supported during the last three years, year-wise, State-wise?

Not applicable

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Information required for Starred/Unstarred Rajyasabha Question: Dy No. U643

"Hefty GST Levied on Technical Tools"

Data with respect to Equipment used for Scientific Research

(From withdrawal of GST (i.e. 18th July 2022) to till date of information)

Sl No	Name of Equipment	Basic Cost	GST Rate	GST amount	Total Cost

PQ/IHBT/2022/U743
28.11.2022

Subject: Reply to Parliament Question (Rajya Sabha Dy. No. U743) "Biotech-KISAN programme" reg.

a) the details of the Biotech-Kisan Programme that has been launched to empower farmers through technological solutions;

b) the support provided under the same;

c) the intended benefits of the same; and

d) the the details of other such measures being taken to provide for direct linkage between science laboratories and farms in the country?

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PQ/IHBT/2023/288
31.01.2023

Subject: Reply to Parliament Question (Lok Sabha Q. No 288) "Medicinal Plants and Rare Species" reg.

a) Whether the Government has conducted any survey to identify medicinal plants and rare species of herbs, State-wise including Andhra Pradesh;

The **s**urvey work on the identification of threatened plants has been done in the Lahaul & Spiti district of Himachal Pradesh. Attempts have been made to identify threatened species with sites specific to Lahaul valley, Himachal Pradesh State. In the case of a site-specific study, the occurrence of 110 threatened species (including 20 critically endangered, 30 endangered, and 60 vulnerable) indicated high value for the conservation of these species. However, comparative studies of the species recorded a total of 39 species under threat categories (06 critically endangered, 16 endangered, and 17 as vulnerable) with Himachal Pradesh state. Similarly, ten species of the studied area were recorded under threat status in the Global level concern. It means, priority for the conservation of the area is needed (Singh et al. 2022).

Reference: Singh Ashok, Samant, S.S., Manohar, L., Sharma, P. 2022. Conservation prioritization criteria to identify rarity of the plant species, habitats, and communities in the Lahaul valley, trans north-western Himalaya, India. *Arid Ecosystems.* 12, 251–271.

b) if so, the details thereof and if not, the reasons therefor;

Nil

c) whether the Government has implemented any scheme to provide financial assistance for cultivation of medicinal plants and rare species of herbs;

Yes, received the sponsored grant for three years project from **National Mission on Himalayan Studies, New Delhi (NMHS-PMU GBPNIHE scheme).**
The sponsored project titled "*Ex-situ conservation and development of gene bank of commercially important threatened medicinal plants in the high-altitude areas, Himachal Pradesh*" was funded by NMHS-PMU GBPNIHE, funded to CSIR-IHBT Palampur (HP). The ecological survey and *ex-situ* conservation studies were conducted for the target rare species *Arnebia euchroma, Angelica glauca, Carum carvi.*

d) if so, the details thereof including the funds sanctioned and released, State-wise so far; and

Given below is the detail of the list of ongoing research projects related to the promotion of cultivation and utilisation of medicinal and aromatic plants

S. No.	Title of the project	Funding agency	Sanctioned amount (Rs in lakhs)	Duration
1.	In vitro adventitious root cultures of *Picrorhiza kurroa* as an alternative source of nutraceutical ingredients	SERB	26.31	2018-21
2.	Bringing back the real green: eradicating invasive species and restoring ecosystem through community participation	NMHS GBPNIHESD, Almora	46.08	2018-21
3.	Development of Geo-tagged digital database and spectral library of medicinal plants in protected cultivation in the foothills of western Himalaya	NMPB	36.771	2018-21
4.	CSIR Aroma Mission (Phase-II)	CSIR	1361.09	2020-23
5.	In vitro adventitious root cultures of Picrorhiza kurroa as an alternative source of nutraceutical ingredients	SERB	26.31	2018-21
6.	Bringing back the real green: eradicating invasive species and restoring ecosystem through community participation	NMHS GBPNIHESD, Almora	46.08	2018-21
7.	Captive Cultivation, Development of Location Specific Agrotechnology, Downstream Processing and Value Addition of Mentha piperita: A Sustainable Option for Livelihood Improvement and Security in the Himalayan Region	DBT	84.16	2022-25
8.	Production of Quality Planting Materials of Medicinal Plants Including the Rare Endangered Threatened Species for Conservation And Distribution	National Medicinal Plants Board, Ministry of AYUSH, GoI	75.000	2021-24

9.	Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur	National Medicinal Plants Board	27.000	2021-26
10.	Up-scaled production of disease free corms of saffron (*Crocus sativus*)	CSIR	45.270	2020-22
11.	Genetic improvement of high value medicinal plants	CSIR	373.650	2020-23
12.	Development of botanical formulation using *Artemisia maritima* extract for the control of aphids in cabbage/cowpea (DBAM)	CSIR	50.000	2020-22
13.	Exploration of Himalayan Plants for Novel Antimalarial Agents: Charaterization of potential molecules (Phase-II)	CSIR	194.600	2020-23
14.	Next generation genomics for genetic improvement of *Stevia rebaudiana* Bert	CSIR	376.560	2020-23
15.	Development of bare-root seedling simulations system and automatic seedling transplanted for stevia	CSIR	26.440	2020-22
16.	Introduction, Charaterization and cultivation of Ferula assa-foetida (Heeng) in cold desert regions of Indian	CSIR	378.752	2020-23
17.	Conservation of threatened plant species of India	CSIR	299.72	2020-23
18.	Digitization of Indian System of Medicine – Siddha and Sowa Rigpa	CSIR	319.62	2021-25
19.	Introduction of Monk Fruit cultivation: A new initiative in Himachal Pradesh	HIMCOSTE, H.P.	5.700	2021-23
20.	Production of Heeng in Himachal Pradesh - A new approach (RNS)	Directorate of Agriculture, HP	450.34	2020-25
21.	Technical and hand holding support by CSIR-IHBT Palampur for saffron production	Directorate of Agriculture, HP	498.071	2020-23
22.	Development of Probiotics for Plant Tissue Culture Boosting the performance of micro propagated plant materials by supplementing plant associated useful endophytes	National Medicinal Plants Board (NMPB)	49.80	2021-24

23.	Next generation genomics for conservation and improvement of an endangered medicinal herb, *Angelica glauca*	SERB	20.256	2021-23
24.	Next-generation genomics for genetic improvement and conservation of endangered Himalayan medicinal herb, *Saussurea costus*	SERB	20.256	2021-23
25.	Bio-prospecting and product development from *Curcuma longa* (turmeric) in Uttarakhand	Uttarakhand State Council for Science and Technology	2.000	2021-22

e) if not, the reasons therefor?

Nil

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PQ/IHBT/2023/S1377
30.01.2023

Subject: Reply to Parliament Question (Rajya Sabha Q. Dy. No S1377) "Promotion of Production and processing of medicinal plants" reg.

a) the details of the steps taken by Government to train farmers about Good Agricultural Practices (GAP) and Good Field Collection Practices (GFCP) for Medicinal Plants in various states of the country to promote the production and processing of herbs/medicinal plants; and herbs/medicinal plants; and

To train farmers about Good Agricultural Practices (GAP) and Good Field Collection Practices (GFCP) for Medicinal Plants, following projects are implemented by the institute:

I. CSIR-Aroma Mission second phase (HCP0007)
II. Technical and hand holding support by CSIR-IHBT Palampur for saffron Production (SSP0126)
III. Inter-Institutional Programme Support on the development and sustainable utilization of bioresources of Mizoram Sub Project 4: Livelihood generation through cultivation and value addition of aromatic plants in Mizoram (GAP0305).
IV. Breaking the Barrier of Saffron Cultivation through Technological Interventions for Enhancing Production and Livelihood of Farmers in Kashmir and Non-traditional Areas (GAP0307)
V. Cultivation and processing of aromatic crops for socio-economic development in rural areas of Himachal Pradesh (GAP0226)

b) if so, the achievements made by Govt. in this field

During the last one year, 176 farmers have been trained for Good Agricultural Practices (GAP) on *Stevia rebaudiana* and *Valeriana jatamansi* under different central and state government funded projects.

During 2020-2022 following training programs has been conducted by CSIR-IHBT Palampur, HP for the farmers, unemployed youth, women and agriculture officers.

Date	**Title of training program**	**Participants from**	**Number of trainees**
July 20-22, 2020	Capacity Building of Agriculture Officers, Department of Agriculture, HP on Production Technology of Saffron and Heeng	Agriculture department officials from six districts of HP	12

Date	Title of training program	Participants from	Number of trainees
October 28, 2020	Training on agro and process technology of wild marigold	Village Parwai , Chowari block, Chamba HP	30
Nov., 7, 2020	Training on agro and process technology of wild marigold	Village Talla, Shiunta, Chamba	50
Nov., 8, 2020	Training on cultivation of saffron and heeng	Janjehli, Mandi, HP	50
Dec 10, 2020	One day training cum exposure visit of farmers from Chowari, Chamba, HP	Chowari, Chamba, HP	7
December 23, 2020	One day training programme on agrotechnologies of aromatic plants to the farmers of district Mandi, HP	Dharampur and ladhbhadol, Mandi	15
January 18, 2021	One day training programme on agrotechnologies of aromatic plants to the farmers of district Mandi, HP	Kotli, Mandi	20
January 28, 2021	One day training cum exposure of medicinal and aromatic plants by the farmers of J&K	Jammu & Kashmir	20
February 23, 2021	One day workshop on Agriculture Diversification Through CSIR-IHBT Technologies	Block Samiti Hall, Chamba, HP	90
March 1, 2021	Crop diversification in HP through cultivation of aromatic and floriculture crops	Kangra HP	126
March 23, 2021	Training cum awareness program on agro and process technology of aromatic plants	Namhol, Bilaspur, HP	31
March 24,2021	Training cum awareness program Agro and process technology of aromatic plants	Gumna, Chirgaon, Rohru, Shimla, HP	43
March 25, 2021	Training cum awareness program aromatic plants for health benefit and livelihood generation to senior citizens and farmers of Ghumarwin	Ghumarwin, Bilaspur, HP	25
April 6, 2021	Training cum awareness program Agro and process technology of aromatic	Chamba, HP	18

Date	Title of training program	Participants from	Number of trainees
	plants farmers of Chamba district		
April 11-15, 2021	Skill development program on improved agro and process technologies of damask rose	Punjab	3
April 10, 2021	Awareness program on agro and process technologies of aromatic crops	Farmers of Samthang, Malbasey, GPU West Sikkim, Sikkim	30 farmers
April 13, 2021	Digital mode awareness program on agro and process technologies of aromatic crops was conducted on April 13, 2021 or the farmers associated with Mani Trust, Kalimpong, West Bengal.	Farmers of Kalimpong, West Bengal.	50 farmers (20 offline 30 online)
April 13, 2021	One day awareness cum training program was organized on agro and process technologies of aromatic crops for farmers of Jharkhand and Orissa states on April 13, 2021 at CSIR-IHBT, Palampur.	Orissa & Jharkhand	6 farmers (3 M 3 F)
April 19, 2021	One day awareness cum training program was organized on cultivation of medicinal and aromatic plants to representative farmers of Bhuja Rishi Kisan Vikas Committee, VPO Shilhibagi, Tehsil Thunag, District Mandi	Thunag, District Mandi, HP	5 (4 M 1 F)
May 5, 2021	Webinar on Potential of Floriculture and Aromatic Plants in Ladakh	Ladakh (Virtual mode)	Farmers of Leh Ladakh 30
June 18, 2021	Training program on cultivation of saffron in non traditional areas	Agriculture officers of HP (Virtual mode)	15 Agriculture officers (11 M 4 F)
June 19, 2021	Virtual training program on agro and process technologies of wild marigold	Mandi, HP (Virtual mode)	30 Farmers of Mandi district associated with EWOK (25 M 5 F)

Date	Title of training program	Participants from	Number of trainees
July 23, 2021	Cultivation techniques of saffron in non traditional areas	Village Baga Srahan, Tehsil Nirmand, Kullu, HP	30 farmers agricultural officials
July 25, 2021	Cultivation techiques of saffron in non traditional areas	Village Kupa, Tehsil, Sangla, Kinnaur, HP	25
July 26, 2021	Cultivation techniques of saffron in non traditional areas	Reckong Peo, Kinnaur, HP	21
August 8, 2021	One day training on cultivation and processing of aromatic plants for farmers of Leh	Leh	60
August 24, 2021	One day training on cultivation and processing of aromatic plants cum exposure visit of farmers from Leh	Ladakh	16 (12+4)
September 1, 2021	Off campus training on cultivation and processing of lemon grass plants cum exposure visit of farmers	Lagh Baliyana village, Dehra, Kangra, HP	19
September 20-24 2021	Capacity building program of agriculture officers of production technology of saffron and heeng	Agriculture officers from HP	12 (11 M 1 F)
September 22, 2021	Virtual training for farmers and agriculture officers on Production technology of saffron in non traditional areas	Farmers of HP (Virtual mode)	21 (16 M 5 F)
November 14, 2021	One day workshop on medicinal and aromatic plants at village Chauki Maniar, Una, HP	Chauki, Maniar, Una, HP	150
November 18, 2021	One day awareness cum training program for the representatives for 50 cooperative societies, BDC members, panchayat Pradhan and farmers of Palampur tehsil, distt. Kangra, HP	Palampur tehsil, distt. Kangra, HP	80
December 3, 2021	One day awareness cum training program for the tribal farmers residing in lower areas of Kangra	Sukeri, Rakh, Palampur	28
December 6, 2021	One day awareness cum training program on cultivation of medicinal and	Palampur tehsil, distt. Kangra, HP	142

Date	Title of training program	Participants from	Number of trainees
	aromatic plants for the cooperative societies of Kangra district		
January 4, 2022	One day awareness cum training program on cultivation of medicinal and aromatic plants farmers of Fatehgarh Sahib, Pb	Fatehgarh Sahib, Punjab	11
February 22, 2022	One day training program on improved cultivation of saffron for the tribal farmers	Holi, Chamba	48
February 23, 2022	One day training program on improved cultivation of saffron for the farmers and agricultural officers	Chamba, HP	23
February 24, 2022	One day awareness cum training program for the farmers of Bhatiyat, Chamba	Chowari, Chamba	60
March 21, 2022	Revival of lavender cultivation in Salooni, Chamba	Salooni Chamba	150
March 23-24, 2022	Capacity building program on agro and process technologies of MAPs for the farmers of Tehsil Thunag, Distt. Mandi (HP)	Tehsil Thunag, Distt. Mandi (HP)	26
April, 6, 2022	Improved cultivation of aromatic crops for crop diversification and doubling the farmers income.	Soreng, Sikkim	24
April, 7, 2022	Improved cultivation of aromatic crops for crop diversification and doubling the farmers income.	Peshok, Dong Busty Darjeeling, WB	36
April, 7, 2022	Improved cultivation of aromatic crops for crop diversification and doubling the farmers income.	4th Mile, Tipper Ding, Kalimpong Block-1 WB	38
April, 8, 2022	Improved cultivation of aromatic crops for crop diversification and doubling the farmers income.	Village Gitbeong, Kalimpong WB	45
April, 8, 2022	Improved cultivation of aromatic crops for crop diversification and doubling the farmers income.	Village, Gorubthan, Kalimpong, WB	24
May 9-10,2022	Two days' workshop for the officers of Horticulture Department, Govt. of HP on	Kangra, HP	13

Date	Title of training program	Participants from	Number of trainees
	Cultivation processing marketing of aromatic and floriculture crops		
May 12 2022	Cultivation technology of saffron in Non traditional areas	Badgran Tehsil Multhan, Kangra, HP	61
June 30, 2022	E Chaupal: Cultivation of aromatic crops: an alternative of doubling farmers income suffering from wild animals	Village Kutahchi, Tehsil balh, Distt. mandi	52
July 5, 2022	Improved cultivation and processing technologies of medicinal and aromatic plants	Kangra, HP	50
July 13, 2022	One day workshop on “Smart Farming”	Dharamshala, Kangra, HP	51
July 23, 2022	One day workshop on “Smart Farming”	Vill. Dhwali, Dharampur, Distt. Mandi, (H.P)	90
August, 5, 2022	Cultivation technology of saffron in Non traditional areas	Gondhla, Tehsil Lahaul, Distt. L & S, HP	55
September 6-10, 2022	Capacity Building of Agriculture Officers, Department of Agriculture, HP on Production Technology of Saffron and Heeng	CSIR-IHBT	13
September19, 2022	Heeng, Kesar, Pushap ropan evam compost booster vitran program for the farmers of Tandi panchayat, L&S	At CeHAB, Ribling, Keylong Lahaul & Spiti	100
September 28, 2022	Cultivation technology of saffron in non traditional areas of western Himalayas	Nalhota, tehsil Multhan Distt Kangra HP	24

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Annexure-I

Details of Young Scientists (up to Principal Scientists) working at CSIR Laboratories/Institutes including CSIR Hqrs.		
Name of the Lab/Instt.	**2022**	**2023 (Till date)**
CSIR-IHBT, Palampur	Dr. Pralay Das, Pri. Sct.	Dr. Pralay Das, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Vijai Kant Agnihotri, Pri. Sct.	Dr. Vijai Kant Agnihotri, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Ravi Shankar, Pri. Sct.	Dr. Ravi Shankar, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Probir Kr. Pal, Pri. Sct.	Dr. Probir Kr. Pal, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Gireesh Nadda, Pri. Sct.	Dr. Gireesh Nadda, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Dharam Singh, Pri. Sct.	Dr. Dharam Singh, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Mahesh Gupta, Pri. Sct.	Dr. Mahesh Gupta, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Rituraj Purohit, Pri. Sct.	Dr. Rituraj Purohit, Pri. Sct.
CSIR-IHBT, Palampur	Er. Mohit Sharma, Pri. Sct.	Er. Mohit Sharma, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Amit Chawla, Pri. Sct.	Dr. Amit Chawla, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Ashok Kumar, Pri. Sct.	Dr. Ashok Kumar, Pri. Sct.
CSIR-IHBT, Palampur	Dr. S.G.E. Reddy, Pri. Sct.	Dr. S.G.E. Reddy, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Yogerndra Shantaram Padwad Pri. Sct.	Dr. Yogerndra Shantaram Padwad, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Dinesh Kumar, Pri. Sct.	Dr. Dinesh Kumar, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Damanpreet Singh, Pri. Sct.	Dr. Damanpreet Singh, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Upendra Sharma, Pri. Sct.	Dr. Upendra Sharma, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Pamita Bhandari, Pri. Sct.	Dr. Pamita Bhandari, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Amitabha Acharya, Pri. Sct.	Dr. Amitabha Acharya, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Vikram Patial, Pri. Sct.	Dr. Vikram Patial, Pri. Sct.
CSIR-IHBT, Palampur	Dr. Vishal Acharya, Sr. Sct.	Dr. Vishal Acharya, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Ashok Singh, Sr. Sct.	Dr. Ashok Singh, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Bhavya Bhargava, Sr. Sct.	Dr. Bhavya Bhargava, Sr. Sct.

CSIR-IHBT, Palampur	Dr. Kunal Singh, Sr. Sct.	Dr. Kunal Singh, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Sukhjinder Singh, Sr. Sct.	Dr. Sukhjinder Singh, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Jeremy Dkhar, Sr. Sct.	Dr. Jeremy Dkhar, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Rohit Joshi, Sr. Sct.	Dr. Rohit Joshi, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Shiv Shankar Pandey, Sr. Sct.	Dr. Shiv Shankar Pandey, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Ashish Rambhau Warghat, Sr. Sct.	Dr. Ashish Rambhau Warghat, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Rajiv Kumar, Sr. Sct.	Dr. Rajiv Kumar, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Narendra Vijay Tirpude, Sr. Sct.	Dr. Narendra Vijay Tirpude, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Arun Kumar, Sr. Sct.	Dr. Arun Kumar, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Vivek Dogra, Sr. Sct.	Dr. Vivek Dogra, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Gaurav Zinta, Sr. Sct.	Dr. Gaurav Zinta, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Rajesh Kumar Singh, Sr. Sct.	Dr. Rajesh Kumar Singh, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Rakshak Kumar, Sr. Sct.	Dr. Rakshak Kumar, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Vidyashankar Srivatsan, Sr. Sct.	Dr. Vidyashankar Srivatsan, Sr. Sct.
CSIR-IHBT, Palampur	Dr. Ankit Saneja, Scientist	Dr. Ankit Saneja, Scientist
CSIR-IHBT, Palampur	Dr. Poonam Kumari, Scientist	Dr. Poonam Kumari, Scientist
CSIR-IHBT, Palampur	Dr. Vandana Jaiswal, Scientist	Dr. Vandana Jaiswal, Scientist
CSIR-IHBT, Palampur	Er. Amit Kumari, Scientist	Er. Amit Kumari, Scientist
CSIR-IHBT, Palampur	Dr. Satbeer Singh, Scientist	Dr. Satbeer Singh, Scientist
CSIR-IHBT, Palampur	Dr. Ramesh, Scientist	Dr. Ramesh, Scientist
CSIR-IHBT, Palampur	Dr. Vikas Kumar, Scientist	Dr. Vikas Kumar, Scientist
CSIR-IHBT, Palampur	Dr. Sarita Devi, Scientist	Dr. Sarita Devi, Scientist
Total	**44**	**44**

Section Officer (G.)
CSIR-IHBT, Palampur (H.P.)

PQ/IHBT/2023/U1152
02.02.2023

Subject: Reply to Parliament Question (Rajya Sabha Q. Dy. No U1152) "Socially useful technologies and products developed by CSIR" reg.

Lab Name: CSIR-IHBT, Palampur

Sl. No.	whether it is fact that the CSIR has developed a no. of socially useful technologies and products	Details of such products Developed in past five years	What extant they have been able to ameliorate the lot of the common man of India	Efforts made to popularize the same amongst the common People	Whether CSIR has any dedicated agency for the popularization of products developed it	Deployment details	Area covered under cultivation and other benefits in terms of revenue generation etc
1	Yes	Herbal Incense Cones from flowers	Agreement signed (for transfer of technology) with Deputy Commissioner-cum-Commissioner, Trilokpur Temple Trust, Dist. Sirmour (H.P.) and Jagriti NGO, Baijnath (Transfer of technology with no license fee, only on royalty model)	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR-IHBT showcases its products at national/international level exhibitions for popularization. Trilokpur Temple Trust and President Jagriti NGOare popularizing the products	Agreement signed (for transfer of technology) with Deputy Commissioner-cum-Commissioner, Trilokpur Temple Trust, Dist. Sirmour (H.P.). And Jagriti NGO Baijnath H.P.	Employment to more than 50 people was provided through technology deployment

2	Yes	Installation of Distillation Unit (under CSIR-Aroma Mission)	MoUs signed with farmer Societies, Panchayat Level, NGOs for installing the distillations units in different parts of the country	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Aroma Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops	51No. of societies installed distillation unit , 2816 hectare brought under cultivation in 11 states and two UT, generating revenue of Rs. 31.27 crores	H.P. ranks 1st in country with the production of 6.5 tons of aromatic marigold essential oil, Rs. 5.80 crores revenue from 730 ha. Installed 51 distillation units
3	Yes	Compost booster for cold regions	MoUs and MTA's signed with NGO's, Panchayat level, Army headquarters for the deployment of technology in high altitude areas	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	Clusters established through MSME Sfurti and awareness programmes organized by CSIR-IHBT in target areas	Technology deployed in two Cluster; one in Sikkim and One in Himachal Pradesh	Improved income for families of selected 400 beneficiries through SFURTI scheme of MoSME. Farmers can earn additional incope Rs. 30,000/ year by selling enriched compost
4	Yes	Shitake mushroom: vitamin D2 enriched	Technology transferred through MSME's to clusters in Sikkim for famers livelihood promotions	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing	Clusters established through MSME Sfurti and awareness programmes organized by CSIR-IHBT in target areas	Technology deployed in three clusters and six entrepreneurs	Improved income for families of selected 750 beneficiries through SFURTI scheme of MoSME. Farmers can earn additional incope Rs. 50,000/

				awareness programs in target areas for implementation of technologies for societal benefits			year by selling fresh and dry shiitake
5	Yes	Iron and zinc enriched spirulina based bars	Technology deployment through integration of products to POSHAN Abhiyaan and Integrated Child Development Services (ICDS)	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	Awareness programmes under POSHAN Abhiyaan and Integrated Child Development Services (ICDS) in Anaganwari and schools	Technology transferred to five entrepreneurs	A total of 100 malnourished children and 60 pregnant and lactating women benefitted by technology deployment through Poshan Abhiyan
6	Yes	Multigrain high protein mix	Technology deployment through integration of products to POSHAN Abhiyaan and Integrated Child Development Services (ICDS)	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	Awareness programmes under POSHAN Abhiyaan and Integrated Child Development Services (ICDS) in Anaganwari and schools	Technology transferred to Six entrepreneurs	
7	Yes	Protein & fibre enriched cereal bars	Technology deployment through integration of products to POSHAN Abhiyaan and Integrated	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and	Awareness programmes under POSHAN Abhiyaan and Integrated Child Development	Technology transferred to seven entrepreneurs	

			Child Development Services (ICDS)	Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	Services (ICDS) in Anaganwari and schools		
8	Yes	Iron enriched fruit bars and candies	Technology deployment through integration of products to POSHAN Abhiyaan and Integrated Child Development Services (ICDS)	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	Awareness programmes under POSHAN Abhiyaan and Integrated Child Development Services (ICDS) in Anaganwari and schools	Technology deployment through "Poshan Abhiyan"	
9	Yes	Canning technology for ready to eat (RTE) foods	Technology deployment through the ones affected by Cyclone Amphan in Orissa/Kolkata under the National Disaster Response Force (NDRF) supply and Making available food during Lockdown: COVID-19-related public lockdown led to the limited supply of food products	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies	Technology transferred to Three entrepreneurs	5,28,000 (220 tons) packs of RTE Tinned Food during COVID and Orissa disasters: 3,00,000 packs during Cyclone Amphan in Orissa/ Kolkata under NDRF supply; 1,00,000 packs in Odisha during Cyclone

			wherein the migrant laborers were seriously affected		for societal benefits		Fani; 68,000 packs supplied during COVID Pandemic in Orissa, H.P.,
10	Yes	Stevia: agro- and processing technology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR-IHBT showcases its products at national/intern ational level exhibitions for popularization.	Institute is providing its facility to two entrepreneurs for making stevia liquid drops at its campus	Stevia cultivation extended over 400-hectare area. Based on 3rd party assessment (By the administrati ve staff college of India Hyderabad) net income from stevia cultivation is 2-2.5 times higher than traditional crops
11	Yes	*Heeng* (*ferula assa-foetida*): agrotechnol ogy	Technology transferred to State Agriculture Department for implimentation in target areas and CSIR-IHBT is signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	HP State agriculture department in collaboration with CSIR-IHBT organizes awareness programs in targeted areas. CSIR-IHBT showcases its products at national/intern ational level exhibitions for popularization.	Technology transfer agreement signed with State Department of Agriculture, Himachal Pradesh	An area of 4.29 ha was covered under heeng cultivation. 290 famers were trained for heeng cultivation and 10 seed production centres were established during 2021-22
12	Yes	Damask rose (*Rosa damascena*): agro-and processing technology	Signing Material Transfer agreements and providing consultancy to	CSIR-IHBT is promoting its technologies through Social Media (Facebook,	CSIR popularizes this technology through Mission Mode i.e "CSIR	Planting material is provided to Farmers through signing	Under "CSIR Aroma Mission" 2816 hectare

			farmers and entrepreneurs for implimentation of agro and processing technology	Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	Aroma Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops	Material Transfer Agreements (MTAs) for technology deployment	brought under cultivation in 11 states and two UT, generating revenue of Rs. 31.27 crores. 1st time large scale cultivation of Saffron in H.P. Lauded by Hon'ble C.M., H.P. Capacity building for 189 farmers.
13	Yes	Wild marigold (Tagetus Minuta): agro-and processing technology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Aroma Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		
14	Yes	Lavender (*Lavandula officinalis*): agro- and processing technology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies	CSIR popularizes this technology through Mission Mode i.e "CSIR Aroma Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		

				for societal benefits			
15	Yes	Rosemary (*Rosmarinus officinalis*): agro and processing technology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Aroma Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		
16	Yes	Agro-technology for mass production of saffron (*Crocus sativus L*.)	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	HP State agriculture department in collaboration with CSIR-IHBT organizes awareness programs in targeted areas. CSIR-IHBT showcases its products at national/international level exhibitions for popularization.		
17	Yes	German chamomile (*Matricaria chamomilla*) : agro and process technology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes	CSIR popularizes this technology through Mission Mode i.e "CSIR Aroma Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize		

				technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	awareness camps to encourage farmers for growing Medicinal and Aromatic crops		
18	Yes	Improved bee hive for quality and hygienic extraction of honey	Signing Material Transfer agreements and providing imroved bee hives to to farmers and clusters for implimentation under "CSIR-Floriculture Mission"	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Floriculture Mission".	Technology deployment through clusters for integration of apiculture in floriculture through "CSIR Floriculture Mission	Eleven bee keping clusters (20 famers in 10 clusters and 10 farmers in 1 cluster) were formed in Himachal Pradesh and Uttarakhand
19	Yes	Lilium: agrotechnology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Floriculture Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops	Planting material is provided to farmers, NGOs, Government schools, colleges, hospitals and other offices for technology deployment and awareness	"Under Floricuture Mission" 250 hectare area brought under cultivation of floriculture crops benefitting 1004 farmers during 2021-22.
20	Yes	Calla lily: agrotechnology	Signing Material Transfer agreements and providing consultancy to	CSIR-IHBT is promoting its technologies through Social Media (Facebook,	CSIR popularizes this technology through Mission Mode i.e "CSIR		

			farmers and entrepreneurs for implimentation of agro and processing technology	Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	Floriculture Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		
21	Yes	Gerbera: agrotechnology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Floriculture Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		
22	Yes	Agro-technology of carnations	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies	CSIR popularizes this technology through Mission Mode i.e "CSIR Floriculture Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		

				for societal benefits			
23	Yes	Alstroemeria: agrotechnology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Floriculture Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		
24	Yes	Cut-roses: agrotechnology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	CSIR popularizes this technology through Mission Mode i.e "CSIR Floriculture Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize awareness camps to encourage farmers for growing Medicinal and Aromatic crops		
25	Yes	Chrysanthemum: agrotechnology	Signing Material Transfer agreements and providing consultancy to farmers and entrepreneurs for implimentation of agro and processing technology	CSIR-IHBT is promoting its technologies through Social Media (Facebook, Twitter, Instagram and Linkedin, etc.), Newspapers, and print media. CSIR-IHBT also promotes	CSIR popularizes this technology through Mission Mode i.e "CSIR Floriculture Mission". CSIR-IHBT and Industries linked with CSIR-IHBT organize		

				technologies by organizing awareness programs in target areas for implementation of technologies for societal benefits	awareness camps to encourage farmers for growing Medicinal and Aromatic crops		

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PQ/IHBT/2023
24.02.2023

Subject: Reply to Parliamentary Standing Committee Related Matter reg.

a) What are the activities undertaken by the Department in the area of food processing? What can the Department do to promote food processing technology in the country and what are its strategies in this regard?

Following activities in the area of Food Processing at CSIR-IHBT:

1. Crispy fruits and vegetable technology for reducing post-harvest losses
2. Ready to Eat products based on ethnic cuisines
3. Micronutrient (Fe & Zn), protein & fiber enriched multigrain and spirulina based foods and roasted barley grain based beverages to combat malnutrition
4. Gluten-free foods from buckwheat to prevent celiac disease
5. Developing scientifically validated nutraceutical product based on traditional knowledge using native medicinal plants to prevent life style associated health disorders such as diabetes, NFLD, cartilage, cardiovascular and neurodegeneration
6. Value addition of underutilized crops to make products like Instant energy, gel/powder/tablets/drink, cordial, fruit syrup, concentrate, preserve, chutney etc.
7. Low calorie sweetener based on Stevia
8. Vitamin D2 enriched shiitake mushroom based instant soups

Strategies:

Integrated with outreach programs of Government through CSIR Poshan Abhiyaan & ICDS programs under Mission Shakti in collaboration with Directorate of Women and Child Development of Himachal Pradesh & Odisha to combat Malnutrition

Technology Transfer to the industry

Start-ups and entrepreneurs hand holding

Supporting society by supplying nutritious food during disaster relief activities of CSIR, especially in labour migration in COVID-19 Pandemic, Cyclone Fani in Odhisa and Amphan in Kolkata and Kerala Floods.

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PQ/IHBT/4988
28.03.2023

Subject: Reply to Parliament Question Lok Sabha (Question No. 4988) "Production and processing of herbs" reg.

a) Whether any special scheme has been launched for the production and processing of herbs in the country including Tamil Nadu and if so, the details thereof;

I. The following project is being undertaken by the Institute for the production of herbal plants by CSIR-IHBT, Palampur.

Project Title: Production of quality planting materials of medicinal plants including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).

Under this project, about 13.05 lakh quality planting materials for 8 medicinal plants will be generated and distributed to the farmer in three years (2021-2024).

Further, the Institute has developed agrotechniques and new cultivars of important herbal crops such as *Hedychium spicatum*, *Valeriana jatamansi*, *Curcuma aromatica*, *Stevia rebaudiana*, *Ginkgo biloba*, *Acorus calamus*, *Panax ginseng*, *Hippophae spp.*, *Crocus sativus* etc.) and aromatic plants (*Tagetes minuta*, *Rosa damascena*, *Dracocephallum heterophyllum*, *Salvia sclarea*, *Lavendula officinalis* etc.). for livelihood improvement of farmers and promotes its cultivation.

i) Under this mission, about 3.02 crore of quality planting materials, 36.5 ton bulbs/rhizomes, and 1,524 kg seeds of targeted medicinal plants will be generated and distributed to the farmers/growers
ii) More than 2,500 farming families will be benefitted
iii) Increase the population of selected RET medicinal plant species
iv) Development of species-specific gene banks for the execution of conservation plan for the RET medicinal plant species

II. CSIR-IHBT participated in CSIR-Phytopharmaceutical Mission

Under Phytopharmaceutical mission mass multiplication and captive cultivation of selected medicinal plants like *Valeriana jatamansi, Stevia rebaudiana, Saussurea lappa and Inula racemosa* have been done.

Key achievements

- Area covered: ~75 hectares
- Training & awareness programs conducted: 22 Nos

Significant Achievements for conservation and sustainable utilization of MAPs including RETs species under CSIR Phyto-pharmaceutical Mission

- During 2017-2020, 2.9 crores of planting material was generated in Stevia rebaudiana, Valeriana jatamansi and Inula racemosa, and more than 11 ha brought under captive cultivation at a different location in India including Naxalite affected Baster areas of Chhattisgarh.
- Additionally, 701 accessions of 48 populations representing wider geographical distribution of RET species were included in the gene bank.
- Next-generation sequencing-based genomic resources have been created four targeted species.
- More than 5000 microsatellite markers were identified and validated in selected random genotypes of Podophyllum hexandrum and Picrorhiza kurroa.
- Standardized Picrorhiza kurroa extract enriched with picrosides including the analytical method for the quality control of prepared extract was developed during this period

b) whether provisions have been made for marketing and imparting training to the farmers in the technology required under the said scheme and if so, the details thereof;

CSIR-IHBT provides trainings to farmers on cultivation and processing of medicinal plants on *Valeriana jatamansi, Withania somnifera, Picrorhiza kurroa, Podophyllum hexandrum, Trillium govanianum* etc.

Targeted Area/state:

Punjab, Haryana, Uttarakhand, HP, UP, Maharashtra, Andhra Pradesh, Telangana, Assam, Jharkhand, Gujrat, Rajasthan, Tamil Nadu, North Eastern Region (NER), and Chhattisgarh

c) whether there is any proposal to connect the farmers with new research;

Yes

d) if so, the details thereof; and

Moreover, under this programme, about 100 one-day awareness cum-training programmes for farmers and progressive citizens will be organized to motivate them about the benefits of cultivation of medicinal and aromatic crops, and phytopharmaceutical drugs for different agroclimatic regions of the country.

e) whether skill development is being carried out in this sector and if so, the details thereof?

About 8 training programmes of 2-3 days' duration on cultivation and processing technologies for skill upgradation have been carried out.

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PQ/IHBT/7446
09.03.2023

Subject: Reply to Parliament Question (Diary No. 7446) "Traditional Knowledge Digital Library" reg.

a) the details of the Traditional Knowledge Digital Library (TKDL) which has been set up as an Indian digital knowledge repository of the traditional knowledge;

At the CSIR-IHBT, a CSIR-TKDL Point of Presence has been established. It focuses on digitizing information on Sowa Rigpa (Trans Himalayan System of Medicine).

b) the progress made in this regard along with the benefits realized thereof, and

A total of 377 formulation details have been digitized under the heads “User ID”, “Formulation ID/ Abstract ID”, “Formulation Name / Title”, “IPC Codes”, “Book Name”, “Book Code”, “Created By” and “Date & Time of Creation”

c) the details of other such measures taken/to be taken to protect the ancient and traditional knowledge of the country from exploitation through biopiracy and unethical patents?

Does not pertain to CSIR-IHBT

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PQ/IHBT/13478
28.03.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 13478) " Impact of Pesticide on Environment" reg.

a) whether prevalence of excessive pesticide use is having an adverse effect on climate change;

Not applicable

b) the if so, the details thereof, State-wise;

Not applicable

c) the steps taken by the Government to prevent the said practice during the last five years; and

Not applicable

d) whether any study has been conducted in this regard and if so, the details thereof?

CSIR-IHBT is not involved in the study of "Impact of Pesticides on the Environment".

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H-11016/02/2023-Estt.I

Annexure to Department of Science and Technology's O.M. No. H-11016/02/2023-Estt.I [FTS-44474] dated 27-03-2023

Reply to Lok Shabha Starred Question Diary No. 13788 answer on 05-04-2023 regarding Regular Scientists under SC/ST Category

Name of the Departmnet/Ministry/Instt.: **CSIR-Institute of Himalayan Bioresource Technology, Palampur (H.P.)**

Name & Designation of the Contact Person: **Sh. Virender Lamba, Administrative Officer**

Contact Detials: Ph.: **01894-230428**

Email: **ao@ihbt.res.in**

Question No.	**Consolidated inputs in respect of Department/Ministry (inclusive of its Offices and Autonomous Institutes)**	
a.	Total Number of regular Scientists (as on 20.03.2023)	Total Number of SC/ST Scientists (as on 20.03.2023)
	B-00	B-SC-00/ST-00
	C-08	C-SC-03/ST-01
	D-17	D-SC-01/ST-02
	E-18	E-SC-00/ST-01
	F-08	F-SC-01/ST-00
	G-01	G-SC-00/ST-00
	H-00	H-SC-00/ST-00
b.	Total Number of regular Scientists recruited in the last five years	Total number of regular SC/ST scientists recruited in the last five years
	B-00	B-SC-00/ST-00
	C-08	C-SC-03/ST-01
	D-07	D-SC-00/ST-01
	E-00	E-SC-00/ST-00
	F-00	F-SC-00/ST-00

	G-00	G-SC-00/ST-00
	H-00	H-SC-00/ST-00
c.	No, as per CSIR letter no. 19-20(15)/2001/Sc/ST Cell dated 18.07.2001	
d.	No, the promotion of Scientists in the Institute is governed by CSRAP Rules, 2001 by Recruitment and Assessment Board (RAB), New Delhi. The requisite information sought is closely related to RAB and may be obtained from RAB, New Delhi.	

Office-wise, Institute-wise inputs for Question No. a and Question No. b

Question a:

Name of the Department/ Office/Autonomous Institute	Total Number of regular Scientists (as on 20.03.2023)							Total Number of SC/ST Scientists (as on 20.03.2023)						
Department (proper)	B	C	D	E	F	G	H	B	C	D	E	F	G	H
Office 1														
Office 2														
…														
Autonomous Institute 1	0	8	17	18	8	1	0	0	4	3	1	1	0	0
Autonomous Institute 2														
…														

Question b:

Name of the Department/ Office/Autonomous Institute	Total Number of regular Scientists recruited in the last five years							Total number of regular SC/ST scientists recruited in the last five years						
Department (proper)	B	C	D	E	F	G	H	B	C	D	E	F	G	H
Office 1														
Office 2														
…														

Autonomous Institute 1	0	8	7	0	0	0	0	0	4	1	0	0	0	0
Autonomous Institute 2														
…														

PQ/IHBT/S4343
22.03.2023

Subject: Reply to Parliament Question (Diary No. S4343) "Youth Participation in Ayush" reg.

a) Whether it is a fact that there is a tremendous potential in AYUSH sector;

Yes

b) If so, what steps are being taken to exhort young researchers and scientists to work on evidence based scientific research and explain the benefits and research of Ayush system of medicine in native languages so that it reaches larger masses; and

Ph.D., M.Sc. and students of skill development programme are involved in different research activities related to AYUSH system of medicine for isolation, characterization, standard extract preparation, health care applications and its benefits under different medicinal plant related research and activities.

c) If not, will the Government take any specific initiatives to encourage the participation of youth in our AYUSH sector?

Does not pertain to CSIR-IHBT

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PQ/IHBT/S5276
15.03.2023

Subject: Reply to Parliament Question Rajya Sabha (Diary No. S5276) "The Total number of researchers and the number of new PHD's issued annually" reg.

Table 1:

(Till Date)

Total No. of Scientists working in the laboratory	Total No. of Scientists having PhD Degree	Total No. of Scientists having PhD Degree from abroad
52	49	01

Table 2:

(Till Date)

Total No. of students currently pursuing PhD in the laboratory	Total No. of students completed PhD in the year 2023	Total No. of students completed PhD in the year 2022
245	6	17

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Annexure-I

CSIR-Institute of Himalayan Bioresource Technology, Palampur (H.P.)

Cadre	**Sanctioned Strength (SS)**	**Men in Position (MIP) as on 28-03-2023**	**Vacancy Position as on 28-03-2022**
Scientist Gr.IV **(excluding Director)**	75	52	23
Technical Staff (Gr. I, II, III)	85	60	25
Admin Staff **(including isolated Cadre, Canteen Staff and CCOs)**	80	36	44
Total	**240**	**148**	**92**

2023-2024

PQ/IHBT/2083
07.08.2023

Subject: Reply to Parliament Question Rajya Sabha (Diary No. 2083) "Financial assistance to the farmers cultivating herbs" reg.

a) whether Government provides any financial assistance lo farmers cultivating herbs used in traditional system of medicine;

Does not pertain to CSIR-IHBT, Palampur.

b) if so, whether the herbs have been identified by Government for providing financial assistance;

Not applicable

c) if so, the herbs cultivation of which is requisite for financial assistance by Government; and

Not applicable

d) the number of farmers who have been provided financial assistance during the last five years along with the amount of such assistance, the details thereof?

Not applicable

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PQ/IHBT/2097
07.08.2023

Subject: Reply to Parliament Question Rajya Sabha (Diary No. 2097) "Special program to promote herbal cultivation" reg.

a) whether Government is considering to bring any special programme to promote herbal cultivation;

CSIR-IHBT is working in the area of medicinal plants.

b) if so, the details thereof; and

CSIR-IHBT is working in the area of medicinal plants in H.P. with projects sponsored by CSIR, DBT, DST, ICMB, NMPB, etc. The broad areas are domestication, agro and processing technology, chemical characterization, development of herbal formulation, micro and macro propagation.

CSIR-IHBT has also initiated promoting the captive cultivation of medicinal plants under CSIR-Phytopharmaceutical Mission Phase-III.

c) if not, whether this could be possible in future?

Not applicable

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PQ/IHBT/4536
24.07.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 4536) "Schemes for Indigenous Medicinal / Herbal Plants in Rajasthan" reg.

a) the details of the schemes being implemented by the Government for identification, documentation, conservation / preservation, processing and commercial use of indigenous medicinal / herbal plants in Rajasthan;

Nil

b) whether the Government has imparted any training to the farmers / entrepreneurs / youths to facilitate them in the production, processing and marketing of medicinal / herbal plants in Rajasthan;

No

c) if so, the details thereof and if not, the reasons therefor;

Our institute is working on medicinal plants grown in Hill regions of the country.

d) whether the Government proposes to set up any research institute in Rajasthan to study about indigenous herbal plants for their medicinal and aromatic use; and

Does not pertain to CSIR-IHBT

e) if so, the details thereof?

Not applicable

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PQ/IHBT/LSQ8441
01.08.2023

Subject: Reply to Lok Sabha un-starred Question diary No. 8441 regarding "Herbal Medicines"-reg.

a) Whether herbal medicines are found in Madhya Pradesh;

Does not pertain to CSIR-IHBT

b) if so, details thereof?

Not applicable

c) The efforts being made for the conservation of herbal medicines?

CSIR-IHBT is working in the area of medicinal plants in H.P. with projects sponsored by CSIR, DBT, DST, ICMB, NMPB, etc. The broad areas are domestication, agro and processing technology, chemical characterization, development of herbal formulation, micro and macro propagation.

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PQ/IHBT/9471
05.08.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 9471) "Pradhan Mantri VRIKSH AYUSH Yojana" reg.

a) whether the National Medicinal Plant Board (NMPB) has allocated funds to establish Postharvest Management Infrastructure and marketing under "Pradhan Mantri VRIKSH A YUSH Yojana" to boost the cultivation and production of medicinal plants and herbs in the country, State/UT-wise including Maharashtra;

Does not pertains to CSIR-IHBT

b) if so, details thereof?

Not Applicable

c) the scientific steps taken/proposed to be taken by the Government for development of quality planting material of medicinal plants and herbs in different agro-climatic zones; and

- The CSIR-Institute of Himalayan Bioresource Technology (IHBT), Palampur, Himachal Pradesh has established a plant conservatory in the trans-Himalayan region at 'Centre for High Altitude Biology (CeHAB)'. This is a research centre of CSIR-IHBT and is located in the Lahaul-Spiti district of Himachal Pradesh. The conservatory comprising of field gene bank and field nurseries conserves 35 species of medicinal plants, which are threatened in their natural habitats in the high-altitude region, due to overharvesting for their medicinal uses.

- The following project has been undertaken by CSIR-IHBT, Palampur sponsored by NMPB

    1. Production of quality planting materials for medicinal plants, including the rare endangered, and threatened species, for conservation and distribution (Funded by NMPB, Ministry AYUSH)

    Under this project, about 13.05 lakh quality planting materials for 8medicinal plants (*Valeriana jatamansi, Inula racemose, Bacopa monnieri, Stevia rebaudiana, Aloe vera, Ocimum sanctum, Picrorhiza kurroa, Hippophae rhamnoides*) will be generated and distributed to the farmers in three years (2021-2024). About 5 lakh quality planting materials (QPM) have already been distributed to the farmers/growers free of cost.

    2. Development of probiotics for plant tissue culture: boosting the performance of micropropagated plant materials by supplementing plant-associated useful endophytes

    The project aimed at lowering cost of cultivation and production of extracts, phytochemicals, natural colours, flavours and fragrances by using latest R&D technologies. In this project, two important Himalayan medicinal plants

(*Fritillaria roylei* and *Rhodiola imbricata*) are being studied, and from these plants, potential endophytic microbes are being identified that may be used for improving the hardening efficiency and performance of *in-vitro* generated plants.

3. CSIR-IHBT has been granted one project on Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur for conservation of 125 medicinal plant species at IHBT palampur. A total of 100 species have been conserved in CSIR-IHBT Palampur which falls under Western Himalayan agro-climatic zone of India.

d) whether the NMPB has also signed an Memorandum of Understanding (MoU) with National Botanical Research institute (NBRI) under Council of Scientific and Industrial Research (CSIR) for the development of quality planting material of medicinal plants and herbs; and

Yes

e) if so, the details thereof?

CSIR-IHBT has signed an MoU with NMPB on 4th October, 2021 regarding quality planting material, research for mass propagation and agrotechnology development of medicinal plants and herbs.

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Subject: Reply to Parliament Question Lok Sabha (Diary No. 9532) "Cultivation of Tulsi and Aloevera Medicinal Plants" reg.

a) the details of the areas of cultivation of Tulsi, i.e. Holy Basil and Aloevera medicinal plants in the country, State/UT-wise;

Under CSIR Aroma mission, CSIR IHBT has extended cultivation of aromatic plants over 3000 ha and 3100 farmers are associated with the institute whereby the farmers are trained on the cultivation of aromatic plants and processing the produce for production of essential oils which are in demand by the Aroma and flavour industry.

b) whether the Government provides any grants for cultivation of medicinal plants;

Not applicable

c) if so, the details thereof along with the subsidy provided in this regard during the last three years and the current year, state/UT-wise;

Not applicable

d) if not, the reasons therefor; and

Not applicable

e) the details of the steps taken/proposed to be taken by the Government to encourage the farmers for cultivation of such medicinal plants?

Under Aroma Mission:

- CSIR-IHBT is providing quality planting materials.
- Conducting large scale awareness and training programs.
- Have established distillation units as a central processing facility to extraction of essential oil.

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07.08.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 9913) " Efforts for Medicinal Plants in Gujarat" reg.

a) Whether the Government has launched any programme or scheme for 'Cultivation and promotion of Medicinal Plants' for health benefits to the farmers and consumers;

CSIR-IHBT is working in the area of medicinal plants in H.P. with projects sponsored by CSIR, DBT, DST, ICMB, NMPB, etc. The broad areas are domestication, agro and processing technology, chemical characterization, development of herbal formulation, micro and macro propagation.

b) If so, the details of the proposals or efforts being made in this regard in Gujarat particularly in the Bhuj, Abdasa, Gandhidham, Rapar, Mandavi and Anjar districts of the Kachchh Lok Sabha constituency; and

Not applicable

c) if not, the reasons therefor?

Not applicable

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Subject: Reply to Parliament Question Lok Sabha (Diary No. 11297) "Efforts to Support the Cultivation of Herbal Plants" reg.

a) the efforts made/proposed to be made to encourage and support the cultivation of herbal plants in the Gujarat;

Does not pertain to CSIR-IHBT, Palampur. Institute is working in the area of cultivation of herbal of hilly terrain.

b) whether the Government has identified any herbal hubs across Gujarat;

Not applicable

c) if so, the details thereof along with the beneficiaries, district-wise in Gujarat; and

Not applicable

d) the details of cultivation of herbal plants during the last five years and the current year, year wise?

Not applicable

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PQ/IHBT/LSQ6549
29.07.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 6549) "Setting up of Research Centres for Medicinal Plants" reg.

a) whether the Government has established any research centres to promote research and development on medicinal plants, State/UT-wise;

Yes

b) if so, details thereof?

CSIR-IHBT is working in the area of medicinal plants in H.P. with projects sponsored by CSIR, DBT, DST, ICMB, NMPB etc. The broad area domestication, agro and processing technology chemical characterization development of herbal formulation, micro and macro propagation.

c) whether the Government proposes to establish any research centre in West Bengal;

Does not pertain to CSIR-IHBT

d) if so, the details thereof alongwith the details of ongoing projects pertaining to medicinal plants; and

Not applicable

e) if not, the reasons therefor?

CSIR-IHBT is working in hilly area of H.P.

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PQ/IHBT/S2941
24.07.2023

Subject: Reply to Parliament Question Rajya Sabha (Diary No. S2941) "Affordable Medicines for Autoimmune Disease" reg.

a) whether the Government has taken steps to boost research on Autoimmune Diseases in the country;

CSIR-IHBT, Palampur conduct preclinical research in the area of autoimmune diseases including rheumatoid arthritis (RA). Medicinal plant extracts have been evaluated for efficacy against RA. Collagen and adjuvant induced animal models established and used for RA.

b) if so, the details thereof;

As above

c) whether the Government ensures making affordable medicines available to Autoimmune Disease patients; and

Does not pertain to CSIR-IHBT

d) if so, the details thereof?

Not Applicable

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PQ/IHBT/RSQ-U4006
01.08.2023

Subject: Reply to Parliament Question RAJYA SABHA Starred /Unstarred Diary No. U4006 regarding "Research institutes under the ministry and Vigyan Prasar" reg.

a) How many institutes under the department run academic courses like PG, MPhil, PhD and Postdoc? Provide institute wise list of courses, the number of seats in each course

SNo.	Name of Institute	Type of Course (PG/ M.Phil/ PhD/ Postdoc)	Name of Course	No. of seats
1.	CSIR- Institute of Himalayan Bioresource Technology, Palampur, Himachal Pradesh	PhD under the ambit of Academy of Scientific and Innovative Research (AcSIR)	Biological Sciences & Chemical Sciences	Biological Sciences: 18 Chemical Sciences: 04 (Based on average enrolment during last 5 years). Also, varies as per prevailing norms of AcSIR for the intake of the PhD students.

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PQ-227/IHBT/2023
15.12.2023

Subject: Reply to Parliament Question Lok Sabha (Q. No. 227) reg.

a) whether the Government has taken any steps to set up Food Processing Industries (FPis) in the State of Tamil Nadu and if so, the details and outcome thereof;

CSIR-IHBT has transferred technology for commercial production of "Spriulina enriched energy bars" (Iron enriched spirulina peanut bar) to M/s. Daziran Health Products, Coimbatore, Tamil Nadu on 5th May 2020. In addition, CSIR-IHBT is pursuing to commercialize technologies on value added millet products (Millet based panjeeri) against the interest expressed by M/s. Moon Foods, Namakkal District, Tamil Nadu.

Yes, the CSIR-IHBT is promoting Food processing industry in the state of Tamil Nadu. CSIR-IHBT has signed Technology Transfer Agreement on dated 05th May, 2020 with M/s Daziran Health Products 31, Lgb Nagar 2nd Street Ramakrishnapuram, Sivanandhapuram, Ganapathy, Coimbatore for manufacturing / processing of Spirulina based products.

b) whether inadequate Research and Development (R&D) activities are adversely affecting the food processing sector in the country;

Does not pertain to CSIR-IHBT

c) if so, the details thereof and the reasons therefor along with the corrective steps taken by the Government in this regard;

Not applicable

d) whether the Government is providing any investment-linked incentives for inhouse R&D expenditure incurred by companies and if so, the details thereof; and

Does not pertain to CSIR-IHBT

e) the details of the indigenously developed technologies which have been utilized gainfully for enhancing production and improving quality of food products during the last three years and the current year?

CSIR-IHBT has developed and transferred technologies based on indigenous systems. Value added product technologies "Multigrain protein mixes" involve utilization of indigenous cereals and millets for improving the nutritional security. Further novel foods such as "Protein and fiber enriched energy bars" utilizing indigenous crops such as millets, pseudo-cereals and pulses have been developed and commercialized.

Utilizing local food bio-resources for traditional food products has gained income for farmers by improve productivity of local crops and also explored the traditional food market in the region. CSIR-IHBT has developed and transfer the technologies to the entrepreneurs as 1) Ready to eat "Kangri Dham" 2) Ready to eat Himachal sweet “seera”

During the last three years following technologies have been developed and transferred by CSIR-IHBT

a) Shiitake Mushroom: Vitamin D2 enriched
b) Iron and zinc enriched spirulina based bars
c) Iron enriched fruit bars
d) Multigrain high protein mix
e) Protein & fiber enriched cereal bars
f) Canning technology for ready to eat (RTE) foods
g) Herbal formulation for immunity modulation

During the current year, work is being done on these food products

a) Millet Panjiri (In house technology at lab scale)

b) Moong Dal Badi (under CM Startup Scheme, H.P.)

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PQ/IHBT/2023
30.11.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 1111) "Research and Development in Ladakh" reg.

c) whether any steps are taken/being taken by the Government to increase the Research and Development in UT of Ladakh; and

Under **CSIR-Aroma Mission** program, CSIR-Institute of Himalayan Bioresource Technology, Palampur (HP) has installed distillation unit for the processing of aromatic

crops such as Damask rose, clary sage and white dragonhead that are suitable for the region for producing essential oils that have high demand in the aroma and flavour industry.

Under **CSIR-Floriculture Mission**, CSIR-IHBT with the help of line departments like Department of Industry and Commerce, Department of Agriculture and Cooperative society, laid for the first time demonstration plots of Lilium in four villages i.e. Ranbirpura, Stakna, Sankar, and Tukcha of Leh district and three villages i.e. Kargil, Sankoo, and Kurbathang of Kargil district, Ladakh (UT) in May, 2021. With regards to the important floral characteristics such as spike length, number of florets and bulb production; the crop is performing very well.

A dedicated researcher with independent fellowship (JRF/SRF) is working for the PhD in the area.

d) if so, the detail thereof and if not, the reasons therefor?

Under **CSIR-Aroma Mission** program, CSIR-IHBT has installed a distillation unit at Village Ranbirpura, Leh, Ladakh under a Memorandum of Understanding with Ladakh Farmer's & Products Cooperative Ltd., Leh for the processing of aromatic crops such as Damask rose, clary sage and white dragonhead that are suitable for the region for the production of essential oils which are in high demand in the aroma and flavour industry. Trainings on cultivation aspects of aromatic crops along with handling of the distillation unit was provided to the farmer groups.

Under **CSIR-Floriculture Mission**, during 2021-2023, the institute supplied good quality bulbs to the farmers and farmer groups like self-help group in Leh and Rangyul Ladakh Organic Farmer's Society, Kargil with trainings on its cultivation, post-harvest handling and packaging.
A total of 7.48 lakh bulbs of floriculture crops (Lilium: 2.61 lakhs, Gladiolus: 4.7 lakhs, and Tulip: 17 thousand) were provided to the farmers of Ladakh. In August, 2022, farmers from Leh and Kargil were able to sell their produce to Delhi flower market through air-flight. The farmers are also selling Lilium flowers in local market of Leh, Kargil and Srinagar (J&K). The region has a potential to be developed as bulb production centre of the country.

A PhD candidate, who is availing fellowship (JRF/SRF) from the CSIR, is working on ecosystem characteristics and resource use patterns of the resident communities in the Nubra valley, Ladakh.

IHBT has developed bacterial consortia containing cold tolerant efficient hydrolytic bacteria supplemented with biofertilizers and plant growth promoters. The aerobic consortia can be used for rapid degradation of organic waste and generation of enriched compost. Lately, we have provided 1.0 tonne Compost Booster to Army for human waste management in Ladakh region. Also, we are working in coordination with Ladakh authority to implement the technology in Ladakh.

CSIR-IHBT has trained entrepreneurs from UT of Ladakh for processing and value addition of Apricot and Seabuckthorn fruits. 22 entrepreneurs from UT of Ladakh visited IHBT from 25 August to 28 August 2022 for onsite training on value addition process such as dehydration, value added products like jams, jellies, fruit candies.

Further CSIR IHBT is the technical partner for the PMFME scheme for UT of Ladakh where Apricot and Seabuckthorn are the designated ODOP - One District One Products.

In addition, the following MTA/MoU were signed:

1. CSIR-IHBT Signed MTA (Material Transfer Agreement) with Kargil Mendok Cooperative Society Main Kargil Bazar, Kargil, Ladakh UT for providing them planting material- Gladiolus corms (1,10,000), Tulip bulbs (1000), Lilium bulbs (programmed-19,500), Lilium bulbs (un-programmed-6080) on 10.08.2023 under CSIR Floriculture Mission Phase -II
2. CSIR-IHBT Signed MTA (Material Transfer Agreement) with the Ladakh Progressive Flower Cooperative Ltd, Agling Leh Ladakh UT for,providing them planting material-Gladiolus corms (1,10,000), Tulip bulbs (1000), Lilium bulbs (programmed-19,500), Lilium bulbs (un-programmed-6080) on 10.08.2023 under CSIR Floriculture Mission Phase –II
3. CSIR-IHBT signed MoU (Memorandum of Understanding) with Director, Directorate of Industries & Commerce, UT Ladakh on 15.11.2023 in the area of Food processing Technologies comprising crispy food technology, Retort/Canning Technology. In this MoU, CSIR-IHBT will provide training to 30 entrepreneurs and an incubation centre for Apple and Sea Buckthorn.

A MoU will be signed shortly with Department of Industries, UT of Ladakh for establishing a Common Incubation Centre (CIC) for the designated ODOP products and handholding entrepreneurs from UT of Ladakh.

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CSIR-Institute of Himalayan Bioresource Technology, Palampur-176 061 (H.P.)

PQ-2173/IHBT/2023
01.12.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 2173) "Species of Medicinal Plants" reg.

a) whether it is true that as much as 10 percent of 900 major medicinal plant species found in India fall under the 'threatened' category, as per experts observations;

The figure may be higher than 90 (10 percent of 900).

In India, about 11.53% of vascular plants (18,532), i.e. about 2,142 species are Red Listed or Threatened. Out of these 8 are Extinct, 432 species are Threatened (Critically Endangered (CR), Endangered (EN) and Vulnerable (VU)) and nearly 54 species are grouped under 'Near threatened' category.
It is estimated that around 1,000 medicinal plant species may be under threat in different eco-systems across India.

(Source: Gowthami et al., 2021. Status and consolidated list of threatened medicinal plants of India. Genet Resour Crop Evol. 68:2235–2263.)

In the site-specific study carried out by CSIR-IHBT in the Lahaul Valley of Himachal Pradesh, a total of twenty species were recorded as critically endangered, 30 species as endangered and 60 species as vulnerable.

(Source**:** Singh, Ashok, Samant, S.S., Manohar, L., Sharma, P. 2022. Conservation prioritization criteria to identify rarity of the plant species, habitats and communities in the Lahaul Valley, trans north-western Himalaya, India. *Arid Ecosystems*. 12, 251–271. https://doi.org/10.1134/S2079096122030131

b) if so, the details of the steps taken/proposed to be taken by the Government to rectify and deal with reported causes, such as overexploitation, drug industry's high dependence on wildlife population, habitat destruction and urbanization;

CSIR-IHBT has carried out Rapid Vulnerability Assessment of 15 high-value medicinal plants and their habitat characterization has been done. Also, patterns of extraction of *Picrorhiza kurrooa* (Kutki-an important medicinal plant that is traded) from the wild have been documented along with quantification.

CSIR-IHBT has also prepared a geo-tagged digital database of medicinal plants in cultivation in the Himachal Pradesh and Uttarakhand regions in a National Medicinal Plants Board, Ministry of AYUSH, New Delhi funded project entitled Development of geo-tagged digital database and spectral library of medicinal plants in cultivation in the foothills of western Himalaya. It provides farmer's details, crop details, and geo-tagged GIS maps of such medicinal crops. The repository of hyperspectral reflectance signatures of medicinal crops in cultivation is another USP of the database of the CSIR-IHBT.

c) the details of the percentage of medicinal plants native to India that are currently being cultivated;

Under the project titled “Production of quality planting materials of medicinal plants including the rare endangered threatened species for conservation and distribution” (Funded by NMPB, Ministry AYUSH), about 13.05 lakh quality planting materials for 8 medicinal plants (i.e. *Valeriana jatamansi*, *Inula racemosa*, *Bacopa monnieri*, *Stevia rebaudiana, Aloe vera, Ocimum sanctum, Picrorhiza kurrooa, Hippophae rhamnoides*) will be generated and distributed to the farmer in three years (2021-2024) by CSIR-IHBT.

Also, CSIR-IHBT is making efforts towards cultivation of kutki (*Picrorhiza kurrooa)*, nag chatri (*Trillium govanianum)*, banafsa (*Viola odorata)*, manu (*Inula racemosa)*, basant (*Hypericum perforatum)*, kuth (*Sassurea costus)*, patish (*Aconitum heterophyllum), brahmi (Bacopa monnieri), etc.*

Further, the institute has developed agrotechniques and new cultivars of important herbal crops such as *Hedychium spicatum, Valeriana jatamansi, Curcuma aromatica, Stevia rebaudiana, Acorus calamus, Panax ginseng, Crocus sativus* etc. and aromatic plants such as *Tagetes min*uta, *Rosa damascena*, *Dracocephallum heterophyllum*, *Salvia sclarea*, *Lavendula officinalis* etc. for promoting their cultivation.

d) if so, the details thereof and if not, the reasons therefor?

National Medicinal Plants Board (NMPB), New Delhi has sanctioned a project for Establishment of Institutional herbal garden at CSIR-IHBT Palampur for the conservation of 125 medicinal plant species.

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PQ-2370/IHBT/2023
30.11.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 2370) "Research Study on Medicinal Plants" reg.

a) whether the Government has commissioned any recent research study on medicinal plants for their uses to treat modern diseases and if so, details thereof;

Documentation of folk knowledge of the communities residing in Kangra, Chamba, Lahaul & Spiti, Kinnaur (Himachal Pradesh) on the uses of plants for medicinal purposes is being carried out by the CSIR-Institute of Himalayan Bioresource Technology, Palampur (HP).

b) whether the Government is aware of the research study published in the World Journal of Diabetes, evidence-based trials in natural products that could lead to the development of "novel drugs in the modern management of diabetes" with over 400 medicinal plants present in nature having the potential to combat Type-2 diabetes;

Yes, CSIR-IHBT is aware about the said study (Citation: Giri S, Sahoo J, Roy A, Kamalanathan S, Naik D. Treatment on Nature's lap: Use of herbal products in the

management of hyperglycemia.World J Diabetes. 2023 Apr 15;14(4):412-423. doi: 10.4239/wjd.v14.i4.412. PMID: 37122430; PMCID: PMC10130899).

The institute is working on diabetes and associated complications for the last ten years which is very much in line with the subject matter for the above cited publication.

c) if so, whether the Government has taken/proposed to take any steps to generate more research on this in view of the increasing number of diabetic patients in India; and

Yes, CSIR-IHBT is conducting and supporting antidiabetic research to generate more data on tea catechins, EGCG, Phlorizin as well as its derivative Phloretin.

d) if so, the details thereof?

NA

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PQ-6187/IHBT/2023
08.12.2023

Subject: Reply to Parliament Question Lok Sabha (Diary No. 6187) "Species of Medicinal Plants" reg.

a) whether it is true that as much as 10 percent of 900 major medicinal plant species found in India fall under the 'threatened' category, as per experts observations;

The figure may be higher than 90 (10 percent of 900).

In India, about 11.53% of vascular plants (18,532), i.e. about 2,142 species are Red Listed or Threatened. Out of these 8 are Extinct, 432 species are Threatened (Critically Endangered (CR), Endangered (EN) and Vulnerable (VU)) and nearly 54 species are grouped under ‘Near threatened’ category.
It is estimated that around 1,000 medicinal plant species may be under threat in different eco-systems across India.

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In the site-specific study carried out by CSIR-IHBT in the Lahaul Valley of Himachal Pradesh, a total of twenty species were recorded as critically endangered, 30 species as endangered and 60 species as vulnerable.

(Source**:** Singh, Ashok, Samant, S.S., Manohar, L., Sharma, P. 2022. Conservation prioritization criteria to identify rarity of the plant species, habitats and communities in the Lahaul Valley, trans north-western Himalaya, India. *Arid Ecosystems*. 12, 251–271. https://doi.org/10.1134/S2079096122030131

b) if so, the details of the steps taken/proposed to be taken by the Government to rectify and deal with reported causes, such as overexploitation, drug industry's high dependence on wildlife population, habitat destruction and urbanization;

CSIR-IHBT has carried out Rapid Vulnerability Assessment of 15 high-value medicinal plants and their habitat characterization has been done. Also, patterns of extraction of *Picrorhiza kurrooa* (Kutki-an important medicinal plant that is traded) from the wild have been documented along with quantification.

CSIR-IHBT has also prepared a geo-tagged digital database of medicinal plants in cultivation in the Himachal Pradesh and Uttarakhand regions in a National Medicinal Plants Board, Ministry of AYUSH, New Delhi funded project entitled Development of geo-tagged digital database and spectral library of medicinal plants in cultivation in the foothills of western Himalaya. It provides farmer's details, crop details, and geo-tagged GIS maps of such medicinal crops. The repository of hyperspectral reflectance signatures of medicinal crops in cultivation is another USP of the database of the CSIR-IHBT.

c) the details of the percentage of medicinal plants native to India that are currently being cultivated;

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Also, CSIR-IHBT is making efforts towards cultivation of kutki (*Picrorhiza kurrooa)*, nag chatri (*Trillium govanianum)*, banafsa (*Viola odorata)*, manu (*Inula racemosa)*, basant (*Hypericum perforatum)*, kuth (*Sassurea costus)*, patish (*Aconitum heterophyllum), brahmi (Bacopa monnieri), etc.*

Further, the institute has developed agrotechniques and new cultivars of important herbal crops such as *Hedychium spicatum, Valeriana jatamansi, Curcuma aromatica, Stevia rebaudiana, Acorus calamus, Panax ginseng, Crocus sativus* etc. and aromatic plants such as *Tagetes min*uta, *Rosa damascena*, *Dracocephallum heterophyllum*, *Salvia sclarea*, *Lavendula officinalis* etc. for promoting their cultivation.

d) Whether the Government has taken any initiatives to encourage the cultivation of Medicinal Plants, considering their health benefits; and

CSIR-IHBT is working in the area of medicinal plants in H.P. with projects sponsored by CSIR, DBT, DST, ICMB, NMPB, etc. The broad areas are domestication, agro and

processing technology, chemical characterization, development of herbal formulation, micro and macro propagation.

e) if so, the details thereof and if not, the reasons therefor?

National Medicinal Plants Board (NMPB), New Delhi has sanctioned a project for Establishment of Institutional herbal garden at CSIR-IHBT Palampur for the conservation of 125 medicinal plant species.

Under CSIR Aroma Mission:

- CSIR-IHBT is providing quality planting materials.
- Conducting large scale awareness and training programs.
- Have established distillation units as a central processing facility to extraction of essential oil.

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PQ/IHBT/2023
30.11.2023

Subject: Reply to Parliament Question Rajya Sabha (Diary No. U877) "Natural ecosystems and biodiversity of Odisha" reg.

a) whether the Government has conducted/ proposes to conduct any study to assess the impact of climate change on the natural ecosystems and biodiversity of Odisha;

Nil

b) if so, the details thereof;

Nil

c) whether the Government intends to build a database to document the changes in natural ecosystems and biodiversity due to climate change in the said regions and if so, the details thereof; and

Nil

d) the details of other steps taken by Government to safeguard the biodiversity and help local communities adapt to climate change along with the funds provided in this regard?

Nil

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PQ-U2812/IHBT/2023
09.12.2023

Subject: Reply to Parliament Question Rajya Sabha (Diary No. U2812) " Related to Biotechnology and Bioeconomy for your response " reg.

a) the programmes implemented by the Government in the last decade in the fields of Bio-technology and Bio-economy;

In the past decade the following CSIR Mission Mode/FTT/FTC/FBR/NCP etc. projects under different theme i.e. Agri-Nutri-Biotech, Health/ Chemical project were implemented

S.No.	Project Title
1.	CSIR Aroma Mission
2.	CSIR Phytopharmaceutical Mission
3.	CSIR INPROTICS-Pharma and Agro
4.	Nutraceuticals and Nutritionals
5.	Crop Protection Chemicals (CPC)
6.	Developing L-*Asparaginase* with Low Glutaminase Activity for Therapeutic Applications (FTT)
7.	Process for substituted cyclohexane-1-3-dione synthesis (FTT)
8.	Introduction of high value spice Saffron (*Crocus sativus L.*) in unexplored areas (FTT)
9.	Identification of improved clone(s) of *Stevia rebaudiana* (Bertoni) (FTT)
10.	Combating Iron and Zinc deficiency using microalgae based foods) (FTT)

11.	L-*Asparaginase* (HimAspase™) with no Glutaminase Activity for Food Processing and Therapeutic Applications (FTC)
12.	Bioefficacy testing of botanical and microbial formulations for the control of pests and diseases (FTT)
13.	Development of quality standards for important phytomolecules (FTT)
14.	Rapid and Point Care Microfluidic Kit for Multiplex Diagnosis of Viral Diseases in Tomato and Apple (FTT)
15.	Facility for Enzyme Bioprocessing (FCP)
16.	Development of Bamboo Composite Structural Elements (FTT)
17.	Indigenouse enzymes for degumming of rice bran oil and other vegetable oils (FTT)
18.	Development of bacterial formulations and organic dustbin for organic waste degradation in cold hilly regions (FTT)
19.	Design and development of indigenized lyophiliser for preservation of Indian fruits and vegetables (FTT)
20.	UAV based high resolution remote sensing for modernized and efficient cultivation practices of commercially important medicinal and aromatic crops. (Acronym: DroneAgri) (NCP)
21.	Molecular mechanism underlying Apple scar skin viroid-whitefly interaction (NCP)
22.	Development of process for converting raw cellulosic biomass into textile fiber and nanocellulose (NCP)
23.	Creation of aroma bank by utilization of western Himalayan biodiversity (AROMA-BANK) (NCP)
24.	Bioprospection Microbiome from Himalayan niches (NCP)
25.	Non-invasive technology for production of naphthoquinone pigments from *Arnebia* species on sustainable basis (NCP)
26.	Conservation and sustainable resource generation of high altitude bioresources at CSIR-Centre for High Altitude Biology (NCP)
27.	Development of high-throughput genotyping platform for next generation plant breeding in tea (FBR)
28.	Characterization and development of agro and process technology for low calorie natural sweetener *(Siraitia grosvenorii)* (FBR)
29.	Exploration of Himalayan Plants for Novel Antimalarial Agents: Characterization of potential molecules (FBR)
30.	Development of Customized Flow Hive for Quality Honey Harvesting and Extraction (NCP)
31.	Development of applications of laccase for Diverse (Food health and cosmetic) Industries (DALDI) (FTT)
32.	Optimization of aeroponic and hydroponic conditions for increasing commercial crop productivity (FTT)
33.	Development of self-propelled specialty harvester for leafy crops with a minimum field capacity of a 4 acre/day (ex. Stevia, menthe, vegetables) (FTT)
34.	Development of Anti Thrombin-Clot Specific Streptokinase (ACSSK), for Treatment of Acute Myocardial Infarction and Ischemic Stroke
35.	Preclinical Efficacy Validation in Non-Human Primate Stroke Model of Anti-Thrombin-Clot Specific Streptokinase (ACSSK), With Dual Properties of Fibrin Specific Clot Dissolution and Prevention of Arterial Re-Occlusion, for the Treatment of Acute Myocardial Infarction and Ischemic Stroke
36.	iPRESS: Integrated Plant REgulomics Software & Server
37.	Genetic improvement of high value medicinal plants (NCP)
38.	Functional characterization of the host (plant) and vector (whitefly) proteins in systemic immunity and transmission of virus and virus-like pathogens
39.	Exploration of Himalayan Plants for Novel Antimalarial Agents: Characterization of potential molecules (Phase-II)
40.	High resolution NextGen remote sensing for medicinal, aromatic and commercially important crops
41.	Next generation genomics for genetic improvement of *Stevia rebaudiana* Bert
42.	Introduction, Characterization and cultivation of Ferula asafoetida (Heeng) in cold desert regions of Indian
43.	AI based methodology for grading machine Harvested tea leaves
44.	Development of bare-root seedling simulations system and automatic seedling transplanted for stevia (FBR)
45.	Up-scaled production of disease free corms of saffron (*Crocus sativus*)

46.	Development of processes for edible and industrial dyes from plant sources for enhanced income
47.	Biostimulants Network Project titled “Bio-stimulants for stress amelioration, enhanced plant productivity and soil health (FBR)
48.	Development of botanical formulation using *Artemisia maritima* extract for the control of aphids in cabbage/cowpea (DBAM)
49.	Genome-Editing Network Project entitled “Genome-editing for crop improvement (GE-Crop) (FBR)
50.	Endophytes Network Project entitled “Deciphering the mechanism(s) of host-endophytes’ coevaluation, enhanced secondary metabolite production and crop productivity (FBR)
51.	Conservation of threatened plant species of India (FBR)
52.	Development of microalgae based protein and micronutrient rich animal feed (FTT)
53.	Trapping glycation intermediates for the modulation of diabetes and its complications: a natural product derived therapeutic approach
54.	Corona Sample Testing Project
55.	Characterization of reverse transcriptase (RNA dependent DNA polymerase) activity from greenhouse whitefly *Trialeurodes vaporariorum*
56.	Bioprospecting kinetically stable lytic polysaccharide monooxygenase(s) (LPMOs) for accelerated degradation of lignocellulosic biomass
57.	Investigating mechanisms underlying transgenerational heat stress adaptation in plants
58.	Revealing the Chloroplast Oxi-proteome and Engineering ROS-insensitive Photosynthetic Apparatus
59.	What makes ‘asafoetida’ – understanding the specialized terpenoid metabolic pathway?
60.	Digitization of Indian System of Medicine – Siddha and Sowa Rigpa
61.	Design and development of Dry Bio-Toilet (DBT) for the Himalayan region [Renamed as “Utilization for compost booster for newly designed and developed sanitary dry toilets with the recovery of fertilizer from human urine in the Himalayan region (ComSan-DT)”]
62.	Low Temperature Adapted Methanogenesis (LTAM) process for sustainable sewage management in Himalayan and Sub-Himalayan climates (LTAM-HIMS)
63.	Technology upscale for production of naphthoquinone red pigments using *Arnebia euchroma* leaf-induced adventitious roots in indigenized bioreactors
64.	Process development for production of 4-alkyl resorcinol compounds for health care applications
65.	CSIR Floriculture Mission Phase II
66.	CSIR Aroma Mission Phase – III: Catalyzing rural empowerment and entrepreneurship development through cultivation, processing, value addition and marketing of aromatic plants
67.	CSIR Aroma Mission (Phase II)
68.	Advancing Technological Leads for Assuring safety of food (ATLAS)
69.	Immuno Modulatory Function of Nutritionals and Nutraceuticals for Health and Wellness (Immunity Mission)
70.	CSIR Floriculture Mission
71.	Jigyasa 2.0: Virtual Laboratory Integration
72.	Identification of potential locations across India for seaweed cultivation and their valorization (Phase II)
73.	Phenome India-CSIR Health Cohort Knowledgebase
74.	CSIR Integrated Skill Initiative (Phase II)

In addition, institute has received no of project from various funding agency e.g. DBT, DST, SERB, ICMR, NMPB etc. as listed below

SNo	Title
1.	Phytopharmacological studies on Amaryllidaceae alkaloid bearing medicinal plants and their value added products
2.	Identification and characterization of multiple stress responsive WRKY transcription factors in potato (*Solanum tuberosum* L)

SNo	Title
3.	Value addition of seasonal vegetables/traditional foods for improved nutritional and livelihood opportunities among highlanders
4.	Introduction, adaptation and value addition of important medicinal and aromatic plants in Trans Himalayan Region
5.	Promoting Socio-economic development in Shivalik Hills through alternate farming, bamboos and novel nutraceuticals products
6.	Characterization and consolidation of hippophae genetic resources and propagation of elite genotypes for varietal evaluation
7.	Chemical and bioactivity mediated chemosensing studies of phenolics and their heteroaromatic derivatives from natural sources
8.	Study of bacteria from the ice core of East Rathong glacier of Sikkim with reference to climate change
9.	Crop weather relationship studies in damask rose (*Rosa damascena* Mill) under Western Himalayas
10.	Identification of DNA based markers for sex differentiation and quality fruits production in *Myrica esculenta*
11.	Creation of DSIR-Common Research & Technology Hubs (CRTDH) in the area of affordable healthcare at CSIR-IHBT, Palampur
12.	Screening of elite plants of *Valeriana jatamansi* by chemical characterization and identification of suitable free species for their intercropping in Western Himalaya
13.	Assessment of carbon Dynamic in Temperate Forest of Indian Western Himalaya through Ground measurement and BIOME-BGC model
14.	Myocardial lipidomics and metabolmic fingerprinting of *Cratageous oxycantha* by NMR, LC-MS/MS technique to delineate it toxicity/safety in cardiac disorder
15.	Synthesis of nanoparticle impregnated on apple pomace (waste) for removal of heavy metals from wastewater
16.	Dissecting of Cold Tolerance in *Seabuckthorn* of leh Region
17.	Profiling and characterization of early phase differential mi-RNA(s) responsible for downstream development of insulin resistance in hMSC derived adipocytes
18.	Traditional Knowledge System-Network programme on convergence of traditional knowledge systems for integration to sustainable development in the Indian Himalayan Region
19.	Transition metal catalyzed simultaneous distant C-H activation and hetero-atom transfer synthesis of bioactive derivatives of heterocyclic compounds
20.	Detail investigation and understanding of newly described solid supported hybrid junction of transition metals nanoparticles for their physico-chemical behaviours in organic synthesis
21.	In vivo assessment of green tea epigallocatechin gallate on immunosenescence and gut dysbiosis during aging
22.	Development of gluten free food formulations for the management of intestinal allergies like celiac disease
23.	Sustainable development of nutraceuticals and formulations from underutilized parts of tea plant
24.	Unraveling DNA methylation as an epigenetic regulation of key drought responsive genes in horsegram
25.	Ru(II)-catalyzed tandem oxidative-trifluoromethylation of enamines and synthesis of analogs of bioactive compounds
26.	Development of new clones though integration of conventional and nonconventional methods of breeding for productivity, quality and stress tolerance
27.	Development of machines for tea harvesting and mechanization of cultural operations
28.	National Mission on Himalayan Studies – Himalayan Research Fellowships (NMHS-HRF)"
29.	Dynamics of DNA clamp loaders and DNA clamps
30.	Preparation of spectral library of forest tree species of Himalayan region

SNo	Title
31.	Development, adoption of green technology for commercial production of tea catechins and its formulations
32.	Adjunvants based on hybrid antibiotics to combat resistance: design synthesis and versatile therapeutic evaluation of novel fluoroquinolone-aminoglycosdide conjugates (FACs)
33.	Biological and chemical investigation of nutritive *Pyrus pashia* wildly grown in Western Himalayas
34.	Identification, expression analysis and comparative study of TIR-NBS-LRR gene analogs from potato against early blight disease caused by *Alternaria solani*
35.	Development and evaluation of the molecular mechanism of ketogenic diet for comprehensive management of epilepsy associated central and peripheral comorbidities in experimental animal models
36.	Fortification of mountain crops for value addition
37.	Next generation sequencing assisted development of genome wide marker resource for genetic characterization and conservation of *Trillium govanium*
38.	Bioprospection of higher altitude microbes in the Western Himalayas for bioplastic production
39.	*Ex-situ* conservation of rare, endangered, threatened, endemic and economic plant resources of Western Himalayan region through botanical garden
40.	Empowering rural population through dissemination of agro-technology of flower crops in H.P.
41.	Molecular insights and transcriptome data mining of medicinally important 'Astavarga' orchids: An important source of therapeutic biomolecules
42.	Development of Herbal Formulations from Seabuckthorn
43.	Protein corona of fluorescent nanomaterials: formation, characterization and identification for better understanding of nanoparticle-cell interactions
44.	Diversity oriented synthesis: exploring the chemical tools for scrutinizing biology
45.	Tea genome sequencing
46.	Development of standards operating procedure and manufacturing process and quality standards of extracts (water and hydro-alcoholic) ASU&H plants drugs
47.	Enhancement of Dactylorhin production through cell suspension culture and molecular dissection of dactylorhiza hatagirea, a high value medicinal orchid species of North-West Himalayas
48.	Targeting aurora kinase in colorectal cancer: rational drug design and validation
49.	Isolation and characterization of acidic class I chitinase from seabuckthorn and its analysis for antifreeze properties
50.	Development of novel functional foods for amelioration of Oxi-Inflamm-Aging and its pathogenesis in progression of inflammatory disorders during aging
51.	Deciphering the role of sugar and cytokinin interaction in root growth and development under abiotic stress conditions
52.	Development of geo-tagged digital database and spectral library of medicinal plants in protected cultivation in the foothills of western Himalaya
53.	High throughout genotyping to expedite the genetic characterization and dissection of important agronomic traits of tea
54.	Advanced diploma program in plant tissue culture
55.	Cultivation and processing of aromatic crops for socio-economic development in rural areas of Himachal Pradesh
56.	Ex-situ conservation and development of gene bank of four selected rare and threatened medicinal plants of cold desert region of Himalayan Pradesh
57.	Exploration of RBP-RNA interactions to reveal the post-transcriptional regulatory impact and development of related tools and resource server
58.	In vitro adventitious root cultures of *Picrorhiza kurroa* as an alternative source of nutraceutical ingredients
59.	Indian Bioresource Information Network (IBIN) Geoportal Phase III: Enhancing Bioresource Services, Institutional Linkages and Outreach

SNo	Title
60.	Enhancement of steroidal alkaloids production using cell suspension culture and elucidating sipeimine biosynthesis in *Fritillaria roylei*, a high value endangered medicinal herb of Himalayas
61.	Exploring cold active pectinases bacteria of Western Himalayan regions for industrial applications
62.	Understanding the nature of alpine timberlines of Himalaya: integrating ecological and scenario studies for assessing the impact of climate change
63.	Exploring the molecular mechanism of plant adaptation along an elevational gradient in *Picrorhiza Kurroa* through proteomic approach
64.	Bringing back the real green: eradicating invasive species and restoring ecosystem through community participation
65.	Trade chain, trade pattern and economic valuation of 15 RET valuable medicinal plant species
66.	Sustainable Harvest and Value Addition Protocols for 5 Bulk Traded and High value Medicinal Species
67.	Development of rapid and cost effective 'on-farm' diagnostics for plant viruses
68.	Valorisation of bioactive phytochemicals from underutilized tea plant parts and sustainable development of nutraceuticals/formulations
69.	Application of Improved Tea Agrotechnologies for Higher Productivity, Quality and returns for Upliftment of Small Tea Growers In Himachal Pradesh
70.	Evaluation of genetic consequences of climate change on high altitude specialist species at the altitudinal range limit of the Himalayan mountains
71.	Commercial scale production of tea catechin from green tea leaves, development of formulations as nutraceuticals and their human intervention studies
72.	Introduction of aromatic crops, establishment of demonstration plots of potential aromatic crops and generation and supply of planting material to growers
73.	Improvisation of the traditional practices of night soil composting using microbiological intervention for sustaining agro-ecosystems in the Lahaul valley of North Western Himalaya
74.	Elucidating the role of host transcription factor (s) in disease development by cucumber mosaic virus
75.	*Ex-situ* conservation and development of gene bank of commercially important threatened medicinal plants in the high altitude areas, Himachal Pradesh
76.	Characterization patterns and process of alpine Ecosystem in Indian Himalaya with Special emphasis to Himachal Pradesh
77.	Value addition and characterization of traditional food crops of Western Himalayan for livelihood enhancement
78.	Improvement of Biomethanation in anaerobic digesters in cold regions with interventions of anaerobic psychrotrophic bacteria
79.	Promoting conservation of declining life support forest tree species in Himachal Pradesh
80.	Studies to identify host factors that are manipulated by cucumber mosaic virus for disease development and spread
81.	Rapid and onsite diagnostic for viruses and viroid infecting apple
82.	Exploring epigenetic control of grain filling in wheat under heat stress
83.	Establishment of small and Hi-Tech nurseries of bamboos at CSIR-IHBT, Palampur under restructured national
84.	Preparation of People's Biodiversity Register (PBR) of seven blocks of Kangra District, Himachal Pradesh
85.	Comparative structure modelling and simulation approach to improve the bio-physicochemical properties of industrial important enzyme Superoxide dismutase obtained from *Potentilla atrosanguinea*
86.	Development of remunerative organic waste management systems for colder regions of India with the intervention of psychrophilic aerobic and anaerobic microbial consortia
87.	Genetic dissection of micronutrient content and composition in foxtail millet grains for identification of novel genes and their characterization

SNo	Title
88.	Himalayan Alpine Biodiversity Characterization and Information System - Network
89.	Study the role epigenetics in Capsicum F1 hybrid heterosis and development of epigenetic markers to be used in future capsicum breeding programme
90.	Metagenomic exploration for efficient and stable bacterial *L-asparaginase* and its nano-conjugation for therapeutic application
91.	Developing bioplastic blends for food packaging using polyhydroxyalkanoate and violacein from Himalayan bacterium Iodobacter sp
92.	Deciphering Chloroplast Oxi-proteome for Engineering Oxidative Stress Resilient Chloroplasts in Plants
93.	Preparation of People's Biodiversity Register (PBR) at Panchayat level for Himachal Pradesh
94.	Identification and purification of antifreeze proteins and peptides from barley and enveiling their role in cryopreservation of RBCs
95.	Cisgenetic engineering of rice (*Oryza sativa*) susceptible elite cultivars for enhanced disease resistance using genome editing CRISPR/Cas9 technology
96.	Evaluation of micronutrient fortification and menu diversity on the health indices of angawadi attending children aged between 3 and 6 in Panchrukhi block, Palampur, Distt Kangra
97.	Studies on Technology and Innovation Management
98.	Evaluation of role of endophytes in mogroside production of *Siraitia grosvenorii*
99.	Investigation of novel Formulation approaches for improving the bioavailability of Dietary phytochemicals
100.	Taxonomic characterization and geospatial distribution of the genus *Cremanthodium Benth*. In Indian Himalaya
101.	Promotion and post-harvest value addition of four important herbs for improvement of livelihood security in cold desert areas of Himachal Pradesh
102.	Does it take two key regulatory genes ASYMMETRIC LEAVES1 and REVOLUTA to make a pitcher in *Nepenthes khasiana*?
103.	Development of Probiotics for Plant Tissue Culture Boosting the performance of micro propagated plant materials by supplementing plant associated useful endophytes
104.	Skill Vigyan Program
105.	Agro-ecology in Himalayan States with Special Emphasis on Marketing
106.	Next generation genomics for conservation and improvement of an endangered medicinal herb, *Angelica glauca*
107.	Introduction of Monk Fruit cultivation: A new initiative in Himachal Pradesh
108.	DBT City/Regional clusters for covid-r9 Testing-phase II: Scaling up of Covid-I9 testing by hub and spoke model
109.	Bio-prospecting and product development from Curcuma longa (turmeric) in Uttarakhand
110.	Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur
111.	The Himalayan Centre for High-throughput Computational Biology (HiCHiCoB) - BIC at CSIR-IHBT, Palampur (HP)
112.	Establishment of bamboo treatment & seasoning plants and incense stick making
113.	Chemometrics as Inventive Tool for Quality Assessment of Medicinal Plants: A Case Study with *Aconitum heterophyllun* (Nation Priority Plant)
114.	Nutrient enrichment of selected edible flowers of ayurvedic importance through hydroponics and popularizing their cultivation in Himachal Pradesh
115.	Ramanujan FeIlowship RJF 12020 I 000070- Effects of alpha2-antiplasmin on fibrosis, neovascularization and inflammation in chronic deep vein Thrombosis
116.	Development of processing technologies for traditional complementary foods of Western Himalayas and establishment of training and processing center for local artisans
117.	Elucidating the thermoresponsive pathway underlying the regulation of flowering in saffron (*Crocus sativus*)
118.	Deciphering the mechanism of epidermal cell differentiation leading to prickle formation in Rosa hybrida

SNo	Title
119.	Evaluation of thermostable variants of copper, zinc superoxide dismutase in combating oxidative stress in *Arabidopsis thaliana*
120.	Next-generation genomics for genetic improvement and conservation of endangered Himalayan medicinal herb, *Saussurea costus*
121.	Role of viral and host factors in circulative transmission of tomato begomoviruses by the whitefly *Bemisia tabaci*
122.	Production of Quality Planting Materials of Medicinal Plants Including the Rare Endangered Threatened Species for Conservation and Distribution
123.	Exploring stress sensitivity and nutritional quality of underutilized grain amaranth (*Amaranthus* spp.) under climate change
124.	Captive Cultivation, Development of Location Specific Agrotechnology, Downstream Processing and Value Addition of *Mentha piperita*: A Sustainable Option for Livelihood Improvement and Security in the Himalayan Region
125.	Modelling forest phenological parameters from time series remote sensing data
126.	Surveillance, multiplex virus diagnostics, raising quality rootstocks for promotion of low chilling varieties of apple (*Malus domestica* Borkh) in Manipur to improve the livelihood of local farmers
127.	Prospection and value addition of indigenous foods and vegetable crops of cold regions of Western Himalayas for livelihood and nutrition security Component A : (ASACODER-067/2018)-Survey and digitization of traditional foods of Lahaul & Spiti, Kinnaur, Chamba (Pangi)
128.	Prospection and value addition of indigenous foods and vegetable crops of cold regions of Western Himalayas for livelihood and nutrition security Component B : (ASACODER-085/2018)-Value addition of traditional vegetable crops of Lahaul & Spiti
129.	Development of mycovirus based biological control strategy for the control of *Rosellinia necatrix* infecting fruit crops and *Sclerotinia sclerotiorum* infecting vegetable crops in the Indian Himalayan Region
130.	Enhancing thermostability of Himalayan processive endoglucanase for application in bioethanol industry
131.	Enhancing C and N assimilation in *Brassica juncea* by genetic engineering for yield enhancement
132.	Inter-Institutional Programme Support on the Development and Sustainable Utilization of Bioresource of Mizoram Sub-Project 2 Title: Captive production of Shittake and oyster mushroom and their processing for Vitamin D2 enrichment
133.	Inter-Institutional Programme Support on the Development and Sustainable Utilization of Bioresource of Mizoram Sub-Project 3 Title : Introduction of low chilling varieties of apple (Malus domestica L.) in Mizoram to improve the livelihood of tribal farmers
134.	Inter-Institutional Programme Support on the Development and Sustainable Utilization of Bioresource of Mizoram Sub-Project 4 Title : Livelihood generation through cultivation and value addition of aromatic plants in Mizoram
135.	Population studies and establishment of field conservatories of threatened medicinal species *Eremurus himalaicus* Baker and *Polygonatum cirrhifolium* (Wall.) Royle in the cold desert, Himachal Pradesh
136.	Breaking the Barrier of Saffron Cultivation through Technological Interventions for Enhancing Production and Livelihood of Farmers in Kashmir and Non-traditional Areas
137.	Establishing efficient platform for genetic engineering in Indian Tea
138.	Germplasm characterization, genomics analysis and gene discovery for yield, metabolite and stress tolerance in Tea
139.	Process optimization and up-scale production of lignocellulosic extremozymes from Himalayan microbes for biomass valorization/depolymerization
140.	Value addition and product diversification in tea
141.	Targeting Hras-SOS1 interaction: Rational drug design and validation
142.	Investigation of novel formulation approaches for augmenting the bioavailability of a universal antioxidant

SNo	Title
143.	Genome wide identification, characterization and functional evaluation of basic leucine zipper (bZIP) transcription factors regulating biosynthesis of bioactive picrosides in *Picrorhiza kurroo*a, an endangered Himalayan medicinal herb
144.	National Network Project of CSIR-IHBT, Palampur
145.	Entrepreneurship Skill Development on Enzyme Bioprocessing
146.	Implementing multi-omics approaches to probe thermal sensitivity of C4 grain amaranths (*Amaranthus hypochondriacus*, *A. cruentus* and *A. caudatus*)
147.	Transcriptional and hormonal regulation of epicotyl dormancy in Kala Jeera (*Bunium persicum*)
148.	Anthocyanins as a food additive: Strategy for nanoencapsulation influences stability and bioavailability
149.	Allele Mining for High-temperature Tolerance in Buckwheat - a Cold Desert Pseudocereal from The Himalayas
150.	Integrated Scientific Solutions for Improving Legacy Municipal Solid Waste Management in the Indian Himalayan Region
151.	Technological innovations for development of functional foods from ethnic fermented foods of the Indian Himalayas
152.	Molecular approaches to understand the role of Apple scar skin viroid RNA structural features in pathogenesis and disease development
153.	Development of genomic resource and genetic diversity characterization to strategize sustainable cultivation and conservation of medicinally important *Hedychium spicatum*
154.	Genomic Surveillance program for SARS-CoV-2: Consortium of India and Sri Lanka (Ref: 223547/Z/21/Z Dated: 24.01.2022)
155.	Elucidation of plant responses to high UV radiation and low temperature stress at high altitudes in *Juniperus polycarpos* K. Koch, a highly adapted woody evergreen species of Trans-Himalaya
156.	Understanding the molecular mechanism underlying cambial meristematic cells (CMCs) differentiation and their utilization for specialized metabolite production in *Picrorhiza kurrooa*
157.	Study of ecosystem responses to early snow melting in western Himalayan alpine environment
158.	Computational investigation into the role of alternative splicing in cellular differentiation, tissue regeneration, diseases, and evolution
159.	Genome-wide association study for anti-nutrient traits in pearl millet to harness maximum health benefits
160.	Development of Bioelectronic Sensor Technology Coupled with High-Throughput Metabolomics for Quality Control of *Jatamansi*: An Economically Important medicinal plant
161.	Integrating imaging, multi-omics, and machine learning to capture stress-resistant leaf traits
162.	Investigation of Electrospun Fast Dissolving Nanofibers for Augmenting the Therapeutic Efficacy of Nutraceuticals against Intracerebral Haemorrhagic Stroke

b) the manner in which it will help the Indian economy;

Intervention of agrotechnologies helps farmers to diversify the cropping system with high commercial crops (medicinal and aromatic crops, floriculture and stevia). These crops give high profits (2-3 times higher than the crops under mono cropping systems). These commercial crops also require skilled manpower, hence capacity building programmes are also implemented that also enhances the employment in this sector.

Similarly, through transfer of technologies to industries, value addition of crops is enhanced which minimizes the post-harvest losses and also provides quality value added/ food products to customers in the market. Development and transfer of

technologies helps to increase the start-ups/ MSMEs and other industries for more production of quality products which increase the benefits and also generate the employment.

c) the technological and Human Resources advantages India have in comparison to other countries?

Due to intervention of CSIR-IHBT technologies, area under crops (medicinal and aromatic crops, floriculture and stevia) is extended to 1699 ha, more than 3200 farmers benefitted, revenue being generated is more than 6.00 crores / annum, and more than 4 lakh mandays per year are generated. Whereas more than 7000 mandays / year as employment is being generated by our industry partners, whereas Cumulative (estimated) value of benefit derived by each industry partner is more than Rs 2600.00 lakhs/year.

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PQ114/IHBT/2024
07.02.2024

Subject: Reply to Parliament Question (Lok Sabha Q. No 114) "Integration of Traditional Medicines in National Health System" reg.

a) whether the Government proposes to formulate any plan to integrate aspects like standardization, quality and safety of traditional and complementary medical system into the National Health System and also to disseminate those at the international level;

Does not pertain to CSIR-IHBT

b) if so, the details thereof and if not, the reasons therefor; and

Not applicable

c) the details of fresh steps taken/proposed to be taken by the Government for preserving the rich heritage of traditional and complementary medicines as well as making it modem, authentic and globally acceptable?

- Yes, the CSIR-IHBT has taken initiatives for documentation of Traditional Knowledge (TK), both collection of primary and secondary information. National Mission for Sustaining the Himalayan Ecosystem; National Mission on Himalayan Studies has a component on TK. Validation of the same is also being done such as under Immunomodulatory Mission (use of *Bunium persicum*).

- CSIR under Mission program on mode program on "Nutraceuticals and Nutritionals - Health and Wellness Reach out through Nutraceuticals and Nutritionals" (2018-2020) and "Immunity Mission - Immunomodulatory Function of Nutritionals and Nutraceuticals for Health and Wellness (2021-2023) and develop various health promoting nutraceutical products using locally available bioresources based on traditional knowledge. Nutraceutical formulations developed are Vitamin-D enriched shiitake mushrooms to reduce Vitamin D deficiency, Hadjod and Nirgundi-based formulations for improving cartilage health, and polyherbal-based products for neurodegeneration-related disorders in the elderly population. Also, CSIR-IHBT is continuously working on the

scientific validation of plants TK. Institute has scientifically validated *Tinospora cordfolia* and *Asparagus racemosus* for immunomodulation, *Cissampelos pareira*, *Fritillaria cirrhosa* and *Aconitum heterophyllum* for malaria fever, *Trillium govanianum* for inflammation. For scientific validation, the active plant extract/fractions, molecules responsible for the particular activity and standardisation of the identified extracts/fraction with respective to the active markers has been carried out.

- Few technologies have already been developed by scientific validation through Human Intervention Studies.

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PQ215/IHBT/2024
01.02.2024

Subject: Reply to Parliament Question (Lok Sabha Q. No 215) "Traditional Medicinal Knowledge" reg.

a) the steps taken/proposed to be taken by the Government to collate India's rich history and legacy of traditional medicinal knowledge and conduct research to understand their authenticity;

Yes, the GoI has taken initiatives for documentation of TK, both collection of primary and secondary information. National Mission for Sustaining the Himalayan Ecosystem; National Mission on Himalayan Studies has a component on TK.
Validation of the same is also being done such as under Immunomodulatory Mission (use of *Bunium persicum*).

b) whether the Government has collected medical books authored in Ancient and Medieval periods in India;

Yes, the Institute is collating information on Sowa Rigpa through digitizing information presently available in Bhoti language.

c) if so, whether they are being decoded with the help of modern medical researchers; and

Yes, by employing experts in the field such as National Institute of Sowa Rigpa, Leh and others.

d) if so, whether the Government has any plans to start a journal on traditional medicinal knowledge which will help to collect information and also suppress those who misuse the brand of traditional treatment and medicines?

Does not pertain to CSIR-IHBT.

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PQ224/IHBT/2024
30.01.2024

Subject: Reply to Parliament Question (Lok Sabha Q. No 224) "Production and Export of Medicinal Plants" reg.

a) the quantity of medicinal plants and herbs produced in the country particularly in Maharashtra during the last three years and the current year, State/UT-wise

CSIR-IHBT is working in "Production of quality planting materials of medicinal plants including the rare endangered threatened species for conservation and distribution" (Funded by NMPB, Ministry AYUSH). Planting materials for 8 medicinal plants (i.e. *Valeriana jatamansi*, *Inula racemosa*, *Bacopa monnieri*, *Stevia rebaudiana, Aloe vera, Ocimum sanctum, Picrorhiza kurrooa* and *Hippophae rhamnoides*) are being generated and distributed to the farmer.

Also, CSIR-IHBT is making efforts towards cultivation of kutki (*Picrorhiza kurrooa)*, nag chatri (*Trillium govanianum)*, banafsa (*Viola odorata)*, manu (*Inula racemosa)*, basant (*Hypericum perforatum)*, kuth (*Sassurea costus)*, patish (*Aconitum heterophyllum), brahmi (Bacopa monnieri), etc.*

Further, the institute has developed agrotechniques and new cultivars of important herbal crops such as *Hedychium spicatum, Valeriana jatamansi, Curcuma aromatica, Stevia rebaudiana, Acorus calamus, Panax ginseng, Crocus sativus* etc. and aromatic plants such as *Tagetes min*uta, *Rosa damascena*, *Dracocephallum heterophyllum*, *Salvia sclarea*, *Lavendula officinalis* etc. for promoting their cultivation.

b) the details of the financial assistance provided to promote the farming of medicinal plants and herbs during the said period, State/UT-wise;

Does not pertain to CSIR-IHBT as institute does not sponsored projects.

c) the quantity of medicinal plants exported from the country including Maharashtra during the said period;

Does not pertain to CSIR-IHBT

d) the steps taken to promote the production of Ayurvedic and herbal medicines in the country including Maharashtra;

CSIR-IHBT Palampur is presently working in close association with Rajiv Gandhi Government Post Graduate Ayurvedic College, Paprola (HP) to validate some molecules to develop Ayurvedic medicine. CSIR-IHBT is currently studying important plants like Nirgundi and Hadjod mentioned in Ayurveda to assess and validate their potential in relieving rheumatic complications, improving cartilage health, and respiratory disorders. CSIR-IHBT is also working on anti-malarial

aspect and identified lead extract/molecules from traditionally used medicinal plants.

e) whether the Government encourages/proposes to encourage the farmers for cultivation of medicinal plants under any scheme;

Yes

f) if so, the details thereof along with the steps taken/proposed to be taken by the Government to promote the emerging nutraceutical industry?

CSIR has taken a significant jump and develop various health promoting nutraceutical products based on locally available bioresource under Mission mode program on "Nutraceuticals and Nutritionals - Health and Wellness Reach out through Nutraceuticals and Nutritionals" (2018-2020) and "Immunity Mission - Immunomodulatory Function of Nutritionals and Nutraceuticals for Health and Wellness (2021-2023). The major breakthroughs from CSIR-IHBT are development of nutraceutical formulations for Vitamin –D enrichment, bone & cartilage health, cognition, immunity and sleep disorders management. Considering the societal responsibilities of CSIR, region specific and pan Indian Nutritious Breakfast/Tiffin/Snacks like products for School children that meets the RDA requirement of nutrients through food based approach were also developed. The nutraceutical products developed in these missions are scientifically validated and had undergone Human Intervention Trials for their safety and efficacy.

CSIR-IHBT was the nodal laboratory to coordinate the mission activities among different CSIR institutes (CSIR-CDRI, CSIR-CFTRI, CSIR-CIMAP, CSIR-CSMCRI, CSIR-IGIB, CSIR-IIIM, CSIR-IITR, CSIR-NEIST and CSIR-NIIST) across India.

- Under CSIR Mission on Nutraceuticals and Nutritionals following nutraceutical products developed:
  - ✓ Nutraceutical formulation for increased bioavailability of Vit B12
  - ✓ Development of vitamin D2 enriched formulations from *Lentinula edodes* (Shiitake)
  - ✓ Kaempferol-enriched nutraceutical for ageing bone
  - ✓ *Punica granatum* peel based nutraceutical for cartilage health based on traditional knowledge
  - ✓ Nutraceutical for management of Benign Prostatic Hyperplasia
  - ✓ Pan India nutrifoods for breakfast
    - Instant Nutri Upma
    - Instant Nutri Poha
    - Instant Nutri Khichdi
    - Instant Nutri Pongal
    - Instant Nutri-Kumol
    - Multigrain high protein beverage mix
    - Instant Nutria-Dhalia
- Under CSIR Immunity Mission a number of immunomodulatory herbs and their combinations, including tea polyphenols were explored to combat immune dysfunction. A comprehensive monograph with digital documentation and development of web portal on locally consumed fruits and vegetables, their phytoconstituents and immunity

boosting properties was also developed under the mission. Furthermore, the plant specific screening by computational approaches for immunoboosting phytochemicals, including their interaction and pharmacological profile was also revealed. An allergencity facility was also developed at CSIR-IGIB institute.

The key outcomes from the mission program are:

- ✓ Polyherbal immunomodulatory supplements containing potent
- ✓ plant extracts
- ✓ Development of Nutraceutical formulation for renal health
- ✓ Regional tea based nutraceuticals for boosting immunity
- ✓ Development of spice based immunomodulatory nutraceuticals
- ✓ Facility for allergenicity assessment of developed nutraceutical/components
- ✓ Digital portal on Indian fruits, vegetables and molecules from plant materials (including their chemistry) with immune boosting properties
- ✓ Scientific validation by human intervention studies of nutraceuticals

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PQ14/5/487/IHBT/2024
12.02.2024

Subject: Reply to Assembly Question (Q. No 14/5/487) "Tulip Garden" reg.

c) what is the current status of Tulip Garden at Dharmshala; and

Does not pertain to CSIR-IHBT

d) during last year upto 15.01.2024, what steps have been taken by the Government regarding this garden and how much funds were spent on its construction; details be given?

The question does not pertain to CSIR-IHBT. It is submitted that a trial plot of Tulip has been laid at CSIR-IHBT, Palampur and R&D has been initiated to generate good quality material (bulbs) at hilly area with the support of farmers. Also, Institute plans to setup a few demonstration plots in hilly region.

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PQ/IHBT/2024
25.01.2024

Subject: Reply to Parliament Question Rajya Sabha (Diary No. S0182) reg.

a) whether the Government has established any research centres to promote research and development on medicinal plants, State/UT-wise;

Yes

b) if so, the details thereof;

CSIR-IHBT is working in the area of medicinal plants in H.P. with projects sponsored by CSIR, DBT, DST, ICMB, NMPB etc. The broad area are: domestication, agro processing technology, chemical characterization, development of herbal formulation, micro and macro propagation of medicinal plants. The major crops include *Valeriana jatamansi*, *Bacopa monnieri*, *Stevia rebaudiana, Aloe vera, Ocimum sanctum, Picrorhiza kurrooa, Trillium govanianum*, banafsa (*Viola odorata)* and *Hypericum perforatum)*, Further, the institute has developed new cultivars of important herbal crops such as *Hedychium spicatum, Valeriana jatamansi, Curcuma aromatica, Stevia rebaudiana* and *for* promoting their cultivation. Conservation and sustainable resource generation of high altitude bioresources is being done at CSIR-IHBT Centre for High Altitude Biology, Ribling, Keylong, Lauhal & Spiti district. This centre maintains germplasm of *Trillium govanianum, Aconitum heterophyllum, Picrorhiza kurrooa, Fritillaria roylei, Dactylorhiza hatagirea, Saussurea costus, Inula racemose* etc. Characterization and consolidation of *Hippophae* genetic resources and propagation of elite genotypes for varietal evaluation is being done there.

The institute is conducting floristic surveys (primarily in Himachal Pradesh) to generate information on floral resources of Himachal Pradesh that includes medicinal and aromatic plants. The institute has created a database "*himFlorIS*" on distribution and status of flowering plant resources in western Himalaya, depicting the information generated from the field surveys (ground truthing) as well as published literature. It was created under the aegis of National Bioreource Development Board, DBT, New Delhi. It has information on medicinal and rare plants.

c) whether the Government proposes to establish any research centre in Punjab;

Does not pertain to CSIR-IHBT

d) if so, the details thereof along with the details of ongoing projects pertaining to medicinal plants; and

Not applicable

e) if not, the reasons therefor?

CSIR-IHBT is working in hilly area of H.P.

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PQ/IHBT/2024
25.01.2024

Subject: Reply to Parliament Question Rajya Sabha (Diary No. S361) "Funds for the Farm Sector" reg.

a) the details of the number of beneficiary of various schemes of the central government since 2014, year wise, state-wise and scheme wise?

Nil input w.r.t. Agriculture and Farmers Welfare (AGR) on point c from CSIR-IHBT, Palampur.

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PQ/IHBT/2024
25.01.2024

Subject: Reply to Parliament Question Rajya Sabha (Diary No. U166) reg.

a) whether the National Medicinal Plant Board (NMPB) has allocated funds to establish Post-harvest Management Infrastructure and marketing under "PRADHAN MANTRI VRIKSHA AYUSH YOJANA" to boost the cultivation and production of medicinal plants and herbs in the country;

Nil

b) if so, the details thereof, State/UT-wise including Karnataka; and

Not applicable

c) whether the scientific steps taken/proposed to be taken by the Government for development of quality plating material of medicinal plants and herbs in different agro-climatic zones?

Nil w.r.t. “PRADHAN MANTRI VRIKSHA AYUSH YOJANA”

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सी.एस.आई.आर.-हिमालय जैवसंपदा प्रौद्योगिकी संस्थान, पालमपुर-176061 (हि. प्र.)
CSIR-Institute of Himalayan Bioresource Technology, Palampur-176 061 (H.P.)

PQ/IHBT/2024
27.01.2024

Subject: Reply to Parliament Question Rajya Sabha (Diary No. U715) "protect critical Ayurveda herbal plants" reg.

a) What actions are being taken by the government to protect critical Ayurveda herbal plants, which are essential for traditional medicine?

Establishment of field genebank of threatened medicinal plant species at Centre for High Altitude Biology, a research centre of CSIR-IHBT, located in Lahaul and Spiti.

National Medicinal Plants Board, New Delhi (Ministry of Ayush) has granted one project entitled "Establishment of Institutional herbal garden at CSIR-IHBT Palampur" for the conservation of 125 medicinal plants used traditionally in Ayurveda and other Indian Systems of Medicine.

NMPB Ministry of AYUSH has funded a project "Production of quality planting materials of medicinal plants including the rare endangered threatened species for conservation and distribution"

Under this project, quality planting materials for 8 medicinal plants (i.e. *Valeriana jatamansi, Inula racemose, Bacopa monnieri, Stevia rebaudiana, Aloe vera, Ocimum sanctum, Picrorhiza kurroa, Hippophae rhamnoides*) will be generated and distributed to the farmer. Among these plants *Valeriana jatamansi, Inula racemose, and Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

b) How many Ayurveda herbal species have been identified as critical, and what specific conservation efforts are in place for these plants?

A field genebank is established for 25 threatened species. Among these species, studies have been conducted in *Dactylorhiza hatagirea* (vern: *Hath Panja* or *Salem Panja*) to know the climatic & habitat requirements. It's *in-vitro*/micro-propagation protocols have been standardized. Further, with the help of modelling, the areas in Himachal Pradesh State which are suitable for re-introduction of it's populations have been identified.

A total of 100 medicinal plants have been conserved along with 07 threatened species under the project.

As per secondary information in the site-specific study of Lahaul Valley in Himachal Pradesh, a total of twenty species were recorded as critically endangered, 30 species as endangered and 60 species as vulnerable. **(Singh *et al.* 2022)**

According to the IUCN criteria, the recorded rare species specific to the Lahaul Valley were compared with Himachal Pradesh State, a total of 6 species as critically endangered, 16 species as endangered, and 17 species as vulnerable were recorded. **(Singh *et al.* 2022)**

Also in the global comparative study of recorded species of Lahaul Valley, a total of 3 species as critically endangered, 4 as endangered, and 3 as vulnerable were recorded. **(Singh *et al.* 2022)**

Conservation effort: Preparing a field genebank conservatory of Threatened species of high altitude areas at Lahaul Valley

The following conservation efforts have been taken by the Institute

1. Generation of Quality Planting Materials (QPMs)
2. Distribution of QPMs to the farmers
3. Promoting captive cultivation

c) Can the government detail any collaborative efforts with local communities or organizations for the sustainable cultivation and preservation of these critical Ayurveda herbs?

CSIR-IHBT is trying to create awareness among local communities regarding their conservation including taking up captive cultivation of plants like *Picrorhiza kurroa.*

d) Are there any national policies or programs dedicated to the research and development of cultivation techniques to ensure the survival of endangered Ayurveda herbal plants?

NMPB has sanctioned the aforesaid project under the 'Herbal Gardens' scheme. A total of seven endangered species have been conserved along with other commonly used medicinal plants.

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2024-2025

PQ/IHBT/2024
22.07.2024

Subject: Reply to Parliament Question Lok Sabha (Q. No. 716) "Research on Medicinal Plants" reg.

a) whether the Government has conducted any survey regarding availability of medicinal plants in the Kolli Hills region of Namakkal district of Tamil Nadu and if so, the details thereof;

Nil, CSIR-IHBT is not working in medicinal plants in the Kolli Hills region of Namakkal district of Tamil Nadu.

b) whether the Government has any plan to set up Herbarium and Museum based on medicinal plants at Kolli Hills region of Namakkal district of Tamil Nadu and if so, the details thereof?

Nil

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PQ/IHBT/2024
16.07.2024

Subject: Reply to Parliament Question Lok Sabha (Diary No. 1304) "Medicinal Plants" reg.

a) whether the Government has established any research centres to promote research and development on medicinal plants;

Yes

b) if so, the details thereof, State/UT-wise;

CSIR-IHBT is working in the area of medicinal plants in H.P. with projects sponsored by CSIR, DBT, DST, ICMB, NMPB etc. The broad area domestication, agro and processing technology chemical characterization development of herbal formulation, micro and macro propagation.

c) whether the Government proposes to establish any research centre in West Bengal particularly in North Bengal;

Does not pertain to CSIR-IHBT

d) if so, the details thereof along with the details of ongoing projects pertaining to medicinal plants; and

Not applicable

e) if so, the details thereof along with the details of ongoing projects pertaining to medicinal plants; and

CSIR-IHBT is working in hilly area of H.P.

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PQ/IHBT/2024
24.07.2024

Subject: Reply to Parliament Question Lok Sabha (Q. No. 2116) "Social Security Benefits for sanitary workers" reg.

a) the number of permanent and contractual sanitation workers employed in different Ministries and Central Educational Institutions.

No permanent worker employed in sanitation work in CSIR-IHBT and 23 contractual workers employed in sanitation work through contractor in CSIR-IHBT.

PQ/IHBT/2024
22.07.2024

Subject: Reply to Parliament Question Lok Sabha (Q. No. 716) "Research on Medicinal Plants" reg.

c) whether the Government has conducted any survey to ascertain the availability of medicinal plants in the country and if so, the details thereof including West Bengal;

Through field surveys, CSIR-IHBT is involved in generating population estimates of high value medicinal plants in the alpine areas of Himachal Pradesh, western Himalaya. Quantitative information on medicinal plants such as *Aconitum heterophyllum*, *Aconitum violaceum*, *Allium stracheyi*, *Angelica glauca*, *Bergenia stracheyi*, *Dactylorhiza hatagirea*, *Fritillaria roylei, Heracleum candicans, Jurinea dolomiaea*, *Picrorhiza kurrooa, Polygonatum verticillatum, Rheum australe*, *Selinum vaginatum*, *Sinopodophyllum hexandrum*, *Trillium govanianum* etc. has been generated by laying quadrats in different habitats. Also, Rapid Vulnerability Assessment of the above mentioned high value medicinal plants along with their habitat characterization has been done.

CSIR-IHBT is not working in West Bengal.

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PQ/IHBT/2024
31.07.2024

Subject: Reply to Parliament Question Lok Sabha (Diary No. 6339) "Promotion of Cultivation of Medicinal Plants" reg.

a) whether the Government has any plan to protect endangered Ayurvedic plant species through collaboration with States and local communities particularly in Kalimpong, Darjeeling and North Dinajpur constituency;

Prakriti kunj has been established in the institute that harbours close to 100 species including those used in ISM. CSIR-IHBT is not working in Kalimpong.

b) whether the Government is addressing quality control and authentication challenges in Ayurvedic herbal products and if so, the details thereof;

To address the quality control and authentication challenges in Ayurvedic herbal products, CSIR-IHBT is developing reference standards for selected Himalayan medicinal plants, including *Aconitum heterophyllum*, *Trillium govanianum*, *Nardostachys jatamansi*, and *Zanthoxyllum armatum*. These plants hold significant medicinal value as documented in Ayurvedic texts and are extensively used in the herbal industry. This underscores the need for stringent quality assessment.

The medicinal efficacy of these plants depends on their phytoconstituents, which must be thoroughly evaluated, highlighting the necessity of pure reference standards for quality assessment. Currently, reference standards for these plants are not available commercially. For few plants with existing reference standards, these are often imported, leading to high costs. To address this, CSIR-IHBT is developing pure certified reference standards of the marker compounds for these plants.

c) the steps taken by the Government to promote the cultivation and conservation of Ayurvedic medicinal plants across India, provide details and State-wise data thereof; and

The following project is being undertaken by the Institute to promote the cultivation and conservation of threatened medicinal plants.

1. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
2. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

For the promotion of captive cultivation of medicinal plants, about 2.5 lakh quality planting materials for 9 species (*Valeriana jatamansi, Ginkgo biloba, Inula racemose, Bacopa monnieri, Ferula assa-foetida, Stevia rebaudiana, Aloe vera, Picrorhiza kurroa, Hippophae rhamnoides*) have been distributed to the farmers/growers during last two years under these projects. *Valeriana jatamansi, Inula racemose,* and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

d) the measures taken to ensure the quality and availability of key Ayurvedic herbs used in traditional medicine?

To ensure the quality and availability, different types of studies were conducted and some are underway. Treatment of biostimulant (*Solieria chordalis*) maximizes plant growth, flower yield and floral traits of Calla lily (*Zantedeschia aethiopica*). Seaweed extract of *Kappaphycus alaverzi* is being considered as an alternative to reduce the use of chemical fertilizer in stevia farming. Organic technology for aromatic Marigold production is being used. Comparative investigation on the nutritional and phytochemical profiles of four edible flowers viz. Nasturtium, Kachnar, Chamomile and Marigold has been conducted.

Generation of new variation and G×E investigations to identify superior genotypes in German Chamomile are being conducted. Seven selections were evaluated for yield and essential oil content at multi-environments. LOH15141 was the best and stable performer. Introduction of *Ferula assa-foetida* (Heeng) for cultivation in cold desert regions of Indian Himalayas. Impact assessment of technologies related to cultivation of aromatic Marigold and Damask Rose have been done in the past. Compilation of data pertaining to other aromatic crops is in progress for impact assessment. Provided planting material of *Valeriana jatamansi* for cultivation in Champawat region of Uttarakhand. Station trials were conducted in 2023 for identifying potential selections of aromatic crops viz., aromatic marigold, German chamomile and Clary sage for biomass yield and essential oil content under rainfed conditions. Farmers are being trained on cultivation of multiple aromatic crops and linkages are being established with the industries to ensure sustenance of distillation units after the project is over.

S. No.	Germplasm	Status

1.	German chamomile	Submitted for registration (decision pending)
2.	Lavender	Submitted for registration (decision pending)
3.	Chrysanthemum	In process of submission (data published)
4.	Inula racemosa	In process of submission (data published)
5.	Geranium	In process of submission (data published)
6.	Stevia	In process of submission (data published)
7.	Clary sage	Publication in process
8.	Aromatic marigold	Multi-location trials in progress
9.	German chamomile	Selections made in Station trial; multilocation trials in coming season
10.	Clary sage	Selections made in Station trial; multilocation trials in coming season

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PQ/IHBT/2024
16.07.2024

Subject: Reply to Parliament Question Rajya Sabha (Diary No. U871) "KISAN" reg.

c) the details of other such measures being taken to provide for direct linkage between science laboratories and farms in the country; and the benefits and support that were provided to the farmers of Uttar Pradesh?

- **CSIR Aroma Mission:**

  Due to interventions of CSIR-IHBT, Palampur, Himachal Pradesh is the highest producer of aromatic marigold essential oil in the country. CSIR-IHBT catalyzed rural economy through cultivation of aromatic marigold covering 800ha area, leading to production of 4.0 tonnes of essential oil and revenue generation of Rs. 4.8 Crores annually. Overall, under the different phases of Mission program, the area under aromatic crops such as aromatic marigold, chamomile, damask rose, Indian valerian, lavender, rosemary, lemongrass and palmarosa was extended over 3931 ha in which 3121 farmers benefitted leading to production of 113.55 tonnes of essential oil and revenue generation of Rs. 51.805 Cr. So far, under the CSIR Aroma Mission 7,47,725 mandays have been generated. To empower the farmers growing aromatic crops, 61 distillation units for extraction of essential oils were provided to different farmer groups in the farmers' fields by CSIR-IHBT. One distillation unit was also installed in Uncha Gaon, The Jaleshar, Etah distt. , Uttar Pradesh– 282 007Agra, Uttar Pradesh.

- **CSIR Floriculture Mission:**

  In India, CSIR-Institute of Himalayan Bio-resource Technology (CSIR-IHBT) has been in the forefront of developing floriculture sector in the country and has been a major developer of varieties and agrotechnologies for several floriculture crops including Tulip, Lilium, Gladiolus, Carnation, Chrysanthemum, Gerbera, Marigold, Rose, Strelitzia, Alstromeria and Orchids. The institute have played a significant role in popularizing floral crops among the farmers. Under CSIR Floriculture Mission Phase-I and II, CSIR-IHBT has covered 882 ha area under floricultural crops in seven states i.e. Himachal Pradesh,

Ladakh (UT), Uttarakhand, Punjab, Haryana, West Bengal and J&K (UT) of the country. A total of 269 lakhs quality planting material was distributed to 2698 farmers. Through which farmers' have generated around Rs. 51.10 Cr revenue. To develop cool-chain infrastructure, the institute established four cold storages at farmers' field and deployed four refrigerated vans for marketing of floral produce to the markets. A total of 108 training programs were organized in for 4295 farmers to get acquainted with commercial floriculture, value addition of flowers and apiculture. During this period, CSIR-IHBT established 30 vertical gardens at Airports and other public places. Also, 252 gardens at different school and colleges of Ladakh, Uttarakhand, Haryana, HP, and Punjab were established.

- **Stevia:**

  Stevia [*Stevia rebaudiana* (Bertoni) Bertoni] is a perennial herb of the Asteraceae family native to Paraguay. Stevia leaves contain sweet-tasting diterpenoid steviol glycosides (SGs), which are used as a non-caloric sweetener in a wide range of food products. Amongst the identified SGs, the most abundant glycosides in stevia leaf are stevioside and rebaudioside-A (Reb-A), which are about 300 times sweeter than sucrose. Keeping in view the problems pertaining to stevia, particularly the lack of Reb-A rich variety, advanced agro-technology for different agro-climatic conditions, and process technology for the extraction of SGs from the leaves, the CSIR-IHBT prioritized developing improved varieties, Good Agricultural Practices (GAP) for higher biomass and SGs yields, and green process technology for extracting pure SGs from leaves. The institute has developed and released a Reb-A rich cultivar of 'Him stevia'. The cultivar possesses a high content of Reb-A (~7.4%) compared to stevioside (~5.8%). The Institute has developed advanced agro-technology with a 28% yield improvement. The net income from stevia cultivation under GAPs is about 2 to 2.5 times higher than traditional crops. The institute has also developed a green process for converting dry stevia leaf into SGs powder, which has a purity of more than 95%. The salient feature of the technology is the water-based extraction process. The Institute has also developed a process for converting dry stevia leaf into stevia clear liquid form, which can be used as ready-to-use liquid in tea, coffee and other food and beverage products. The technology has been successfully adopted by different entrepreneurs/farmers on PAN India basis.

  Outreach:

  In 2021-22: During 2021-22, M/s Agri Natural India with technical support of CSIR-IHBT has expanded area under stevia in over 250 acres, spread in 10 States. Another 200 acres' area is in advance stage of negotiation. About 200 farmers have been directly benefited through stevia cultivation, and about 25,000 mandays have been generated through cultivation and post-harvest management. The associated farmers are earning

about Rs. 0.70 to 1.0 Lakh/ acre/ year, which is double in income compares with traditional crops.

In 2022-23: During 2021-22, M/s Agri Natural India with technical support of CSIR-IHBT has expanded area under stevia in over 300 acres, spread in 10 States. About 225 farmers have been directly benefited through stevia cultivation, and about 30,000 mandays have been generated through cultivation and post-harvest management. The associated farmers are earning about Rs. 0.70 to 1.0 Lakh/ acre/ year, which is double in income compares with traditional crops. Right now Agri Natural India is involved in the development of complete Stevia value chain in Northern India.

Further M/s Agri Natural India under its new venture RJ Saints is also starting Stevia Prossesing Unit at Tahliwal, Dist Una, Himachal Pardesh with the Technical Support of CSIR-IHBT Palampur. CSIR-IHBT has transferred its stevia processing technology to RJ Saints, Una (H.P.).

For the promotion of captive cultivation of medicinal plants, about 2.2 lakh quality planting materials for 9 species (*Valeriana jatamansi, Ginkgo biloba, Inula racemose, Bacopa monnieri, Ferula assa-foetida, Stevia rebaudiana, Aloe vera, Picrorhiza kurroa, Hippophae rhamnoides*) have been distributed to the farmers/growers during last two years.

Valeriana jatamansi, Inula racemose, and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

Moreover, about 200 kg of planting materials of peppermint has also been distributed.

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Raj Sabha Provisionally Admitted Unstarred Question Diary No.U2199						
Female Researchers						
Lab name	**CSIR-Institute of Himalayan Bioresource Technology**					
Total Scientists	**Male**	**Female**				
49	43	6				

S No.	State	No of Farmers	
		Tuberose	Loose Rose
1.	Himachal Pradesh	33	51
2.	Uttrakhand	20	10
3.	Punjab	12	8
4.	Haryana	4	4
Total		69	73

PQ/IHBT/2024
02.08.2024

Subject: Reply to Parliament Question Lok Sabha (Diary No. 6642) "Traditional Medicine" reg.

a) whether the tribal communities treat many diseases using traditional medicines without any side-effects and if so, the details thereof;

Tribal communities of Himalaya (Gaddis, Gujjars, Pangwals, Lahulas etc) use plants for treating various ailments. Amongst others, *Aconitum heterophyllum* (fever), *Dactylorhiza hatagirea* (vigour), *Bunium persicum* (cough & cold), *Picrorhiza kurrooa* (liver problems), *Angelica glauca* (stomach problems) are used by them. They believe that these do not have any side effects.

b) the details of the efforts made by the Government to conserve these medicines;

Scientific validation of the claims is being done. Databases on plants and their uses as medicines are being prepared (TKDL)

c) whether the Government proposes to carry out research, conserve and include these valuable medicines and herbs in Ayurvedic treatment;

Yes

d) if so, the details thereof alongwith any time fixed for the same; and

The following projects have been undertaken by the Institute to promote the cultivation and conservation of threatened medicinal plants.

3. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
4. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

For the promotion of captive cultivation of medicinal plants, quality planting material for 9 species (*Valeriana jatamansi, Ginkgo biloba, Inula racemose, Bacopa monnieri, Ferula assa-foetida, Stevia rebaudiana, Aloe vera, Picrorhiza kurroa, Hippophae rhamnoides*) have been distributed to the farmers/growers during last two years under these projects. *Valeriana jatamansi, Inula racemose,* and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

e) if not, the reasons thereof?

Nil

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TOP PRIORITY

Rajya Sabha provisionally admitted question – Starred Dy. No. 1480

Name of Lab / Instt. : CSIR-IHBT, Palampur (H.P.)

Question No.							
2 (a)	Whether CSIR Lab / Instt. has appointed more employees on contractual basis than regular / permanent appointments since 2019 till date (Yes / No)	Yes					
2(b)	If so, the reasons for decline in regular / permanent appointments	1) recruitment to the post of MTS is restricted vide CSIR letter No.5-1(151)/2012 – PD dated 02.07.2013 2) direct recruitment in Gr.I except through Casual Worker Absorption Scheme is not allowed vide letter No. 5-1(88)/2010-PD dated 21.07.2010					
2 (c)	if not, the number of contractual appointments and regular/ permanent appointments in Central Government separately since 2019 till 1st November, 2024, Ministry/Department / PSU – wise and year – wise?	-					
	Year (as on 31st December)	**Manpower engaged on contract basis**				**No. of Regular / permanent appointments**	
		Horticulture	Cleaning/ Maintenance	Security	Others		

			/ Housekeeping		(excl. Project staffs)	
	2019	114	138	42		13
	2020	115	137	46		5
	2021	131	160	50		2
	2022	155	177	52		-
	2023	146	180	55		1
	Till 1st November 2024	138	177	58		3

PQ/IHBT/2024
22.11.2024

Subject: Reply to Parliament Question Lok Sabha (Diary No. 1601) "Technology Adoption by MSMEs" reg.

a) The details regarding the steps/initiatives undertaken by the government to increase/incentivize technology adoption by the MSME sector over the last five years across India, in Andhra Pradesh and in Bapatla Parliamentary Constituency (PC)

Under the MSME Sfurti scheme, CSIR-IHBT, Palampur as a technical agency developed two clusters namely Gondla and Shansha Cut Flower cluster located at Gondla and Dalang village of Lahaul & Spiti in tribal regions of Himachal Pradesh. The Gondla and Shansha cluster become operational in 2022 and 2023 respectively. The cluster is growing off-season lilium cut flowers and vegetables. The facilities included common facility centre, cold storage units, drying and sorting machines, and garden tool-kits.

b) The details regarding the total member of male and female business owners in the MSME sector who have been given proper access to technology and training regarding the same in order to increase the growth of their businesses;

- A total 308 men and 30 women are beneficiary farmers from the Cut Flower cluster
- CSIR-IHBT has licensed the technology for cultivation of Shiitake mushroom and its value addition to three clusters namely
  1. West Sikkim Shiitake Mushroom & Other Food Processing Cluster, Soreng
  2. Sumbuk Shiitake Mushroom & Other Food Processing Cluster, Namchi
  3. Norbu Cheoling Shiitake Mushroom & Other Food Processing Cluster, Namchi, Namthang

A total of 750 artisans were trained under SFURTI clusters in collaboration with state KVIC Department.

Totally, six (6) awareness programmes and eleven (11) technical training programees have been conducted to these artisans registered under SFURTI clusters.

The West Sikkim Shiitake Mushroom & Other Food Processing Cluster, Soreng has started commercial operations and so far, a revenue of approximately Rs. 2,00,000/- has been generated through cultivation and sale of Shiitake mushroom products.

The total no, of male and female business owners/artisans covered under the MSME SFURTI clusters include

- **Number of Female artisans – 500 nos.**
- **Number of male artisans – 250 nos.**

S.No	Activity	West Sikkim Shiitake Mushroom & Other Food Processing Cluster, Soreng	Sumbuk Shiitake Mushroom & Other Food Processing Cluster, Namchi	Norbu Cheoling Shiitake Mushroom & Other Food Processing Cluster, Namchi, Namthang
1	**Product Line**	Fresh *Shiitake* Mushroom, Dried Shiitake Mushroom, Vitamin D_2 enriched *Shiitake* powder, Value Added *Shiitake* products and otherproducts such as dried Chamomile, Kiwi, Traditional Local Achaar	Fresh *Shiitake* Mushroom, Dried *Shiitake* Mushroom, Vitamin D2 enriched *Shiitake* powder, Value Added *Shiitake* products and other products such as ginger, turmeric powder and chamomile tea.	Fresh *shiitake* mushroom, Dried *shiitake* mushroom, Vitamin D_2 Enrich *shiitake* powder, value added s*hiitake* products and other food products such as Jam, Juices, & Pickles
2	**Status of Functionalization**	Functional	Semi-Functional	Semi-Functional
3	**Awareness Program**	26th December 2020 to 6th January 2021	26th December 2020 to 6th January 2021	4th January 2021 to 6th January 2021
4	**1st Technical Training**	30th May 2022 to 1st June 2022	29th May 20222 to 3rd June 2022	-
5	**2nd Technical Training**	24th August 2022 to 1st September 2022	2nd September 2022	3rd September 2022
6	**3rd Technical Training**	23rd December 2022 to 25th December 2023	26th December 2022 to 2nd January 2023	8th March 2023 conducted one day awareness program
7	**4th Technical Training**	9th March 2023 to 10th March 2023	-	
8	**5th Technical Training**	24th September 2023	20th September 2023 to 22nd September 2023	1st October 2023 to 2nd October 2023
9	**6th Technical Training**	10th August 2024 to 12th August 2024	10th August 2024 to 12th August 2024	8th August 2024
10	**Production (2023-24)**	Production commenced Revenue - > Rs. 2,00,000/-	Production commenced Revenue - >20,000/-	Trials runs and facility creation under progress

c) The details regarding the funding allocated and utilized by the Government during the last five years to increase technology adoption in the MSME sector in a state-wise manner, in Andhra Pradesh and Bapatla PC, especially amongst rural sector of MSMEs; and

Gondla and Shansha clusters received Rs. 150 lakh and Rs. 167 lakh grant under the SFURTI scheme of MSME.

S.No	Activity	West Sikkim Shiitake Mushroom & Other Food Processing Cluster	Sumbuk Shiitake Mushroom & Other Food Processing Cluster	Norbu Cheoling Shiitake Mushroom & Other Food Processing Cluster
1	**Sanction date**	17/02/2020 32nd SSC	17/02/2020 32nd SSC	17/02/2020 32nd SSC
2	**State**	Sikkim	Sikkim	Sikkim
3	**District**	Soreng	Namchi	Namchi, Namthang
4	**Total Project Cost**	• Govt. of India Assistance - Rs. 234.71 Lakhs • Implementing agency Contribution- Rs. 10.19 Lakhs	• Govt. of India Assistance Assistance - Rs. 234.71 Lakhs • Implementing agency contribution– Rs. 10.19 Lakhs	• Govt. of India Assistance Assistance - Rs. 234.71 Lakhs • Implementing agency contribution - Rs. 10.19 Lakhs
5	**Building**	100% completed One Mother -CFC & Four Extension- CFC	100% completed One Mother-CFC & Four Extension- CFC	100% completed One Mother-CFC & Four Extension -CFC

d) Whether the Government has undertaken any promotional activities/campaigns to increase technology adoption by the MSME sector in the country, if so details thereof?

Gondla and Shansha clusters

A total 16 training programs organized on and off cluster site. One buyer-seller meet also organized during 2023. The clusters also participated in various trade fairs.

West Sikkim, Sumbuk Shiitake & Norbu Cheoling Shiitake Mushroom & Other Food Processing Cluster

CSIR-IHBT has provided awareness training programs to several Farmers Produce Organization and self-help groups.

Sustainable Development Research Centre, Chumoukedima, Nagaland has been a beneficiary of CSIR-IHBT training and has licensed the technology for commercial production of Shiitake mushroom and value-added products from CSIR-IHBT.

The agency has registered as a SFURTI cluster and funds have been approved for establishment of common facility centre and incubation facility under the title “Nagaland Shiitake Mushroom & Other Food Processing Cluster” vide OM. No.

SFURTI/NER/3001/NAGA/1/2020(15217)/93 dated 8/5/2023 with a GoI assistance of Rs. 212.84 Lakhs.

Further CSIR-IHBT participates in various scientific exhibitions and demonstrates the benefits of the technology and highlighting the success achieved by various MSME entrepreneurs and artisans in Shiitake mushroom cultivation and value-addition.

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PQ/IHBT/2024
26.11.2024

Subject: Reply to Parliament Question Rajya Sabha (Diary No. 1647) "Cluster centres for medicinal plants" reg.

a) whether government has received any proposal from State Government to establish more cluster centres for medicinal plants and herbs in Himachal Pradesh;

Does not pertain to CSIR-IHBT

b) if so, the details thereof;

Not Applicable

c) the funds allocated for the formation of infrastructure for creation of medicinal plants and herbs in Himachal Pradesh in the current year; and

Does not pertain to CSIR-IHBT

d) Whether Government has taken any steps to encourage the expansion of cultivation clusters for medicinal plants in Himachal Pradesh?

Yes, under CSIR Aroma Mission quality planting material of medicinal and aromatic plants (MAPs) have been distributed to the farmers across Himachal Pradesh. Capacity building of farmers and agriculture staff have been done. Several training cum awareness program have been conducted across the state benefitting 300 farmers and brought more than 500 ha area under these crops under CSIR mission projects. From CSIR Aroma mission phase 3, CSIR-IHBT Palampur have formed MAP clusters in Himachal Pradesh and will install four processing units for value addition of MAPs during 2024-2025. Already 61 multipurpose field distillation facility have been established in remote location of H.P. for promoting of essential oil.

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PQ/IHBT/2024
29.11.2024

Subject: Reply to Parliament Question Lok Sabha (Diary No. 4896) "Promotion of Cultivation of Medicinal Plants" reg.

a) Whether the Government undertaken initiatives to promote the cultivation of medicinal plants in rural areas in the country and if so, the details thereof;

The following projects are being undertaken by the Institute to promote the cultivation and conservation of threatened medicinal plants.

5. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
6. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

For the promotion of captive cultivation of medicinal plants, about 2.5 lakh quality planting materials for 9 species (*Valeriana jatamansi, Ginkgo biloba, Inula racemose, Bacopa monnieri, Ferula assa-foetida, Stevia rebaudiana, Aloe vera, Picrorhiza kurroa, Hippophae rhamnoides*) have been distributed to the farmers/growers during last two years under these projects. *Valeriana jatamansi, Inula racemosa,* and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

b) Whether any steps are being taken by the Government to support farmers cultivating medicinal plants under various schemes and if so, the details thereof;

The Institute is providing the quality planting material, capacity building and package of practice of medicinal plants to support farmers for cultivation under following projects.

1. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
2. CSIR-Aroma Mission: Phase-III from April 2023
3. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

c) Whether there is any Government-supported research programs for the scientific validation and utilization of medicinal plants and if so, the details thereof;

CSIR-IHBT is involved in the Phytopharmaceutical mission phase-III funded by CSIR to promote cultivation of *Picrorhiza kurroa*, *Inula racemosa* and *Ferrula asa-fotida* further utilization of *Picrorhiza kurroa*, *Inula racemosa* to develop Phytopharmaceutical product in collaboration with CSIR-CDRI institute.

d) The details of any initiatives have been taken by the Government to document traditional knowledge on medicinal plants

Survey and recordings of traditional knowledge on plants used for medicinal purposes by the communities (*Bhangalis*, *Gaddis*, *Gujjars*, *Lahulas* and *Pangwals)* of western Himalaya through the Institutional Fund, National Mission on Himalayan Studies, National Mission on Sustaining the Himalayan Ecosystem, & Traditional Knowledge Digital Library.

The CSIR-IHBT, in a collaborative mode, prepared a database on medicinal plants of the Indian Himalaya Region (funded by NMPB). This database contains taxonomy, distribution, habit, habitat, uses, agro technologies, etc. of 1572 plant species.

e) Whether the Government is aware of any endangered species of medicinal plants in the country and if so; the details thereof;

SNo.	Scientific Name	Family
1	*Aconitum deinorrhizum* Satpf	Ranunculaceae
2	*Aconitum heterophyllum* Wall	Ranunculaceae
3	*Arnebia benthamii* (Wall ex G. Don) I. M. Jonst.	Boraginaceae
4	*Atropa acuminata* Royle ex. Lindle.	Solanaceae
5	*Berberis aristata* DC.	Berberidaceae
6	*Betula alnoides* Buch. -Hem. Ex D. Don	Betulaceae
7	*Dactylorhiza hatagirea* D. Don	Orchidaceae
8	*Eremostachys superba* Royle ex Benth	Lamiaceae
9	*Fritillaria roylei* Hook.	Liliaceae
10	*Gentiana kurroo* Royle	Gentianaceae
11	*Habenaria edgeworthii* Hook. f. ex Collett	Orchidaceae
12	*Jasminum parkeri* Dunn	Oleaceae
13	*Lilium polyphyllum* D. Don	Liliaceae
14	*Malaxis muscifera* (Lindl.) Kuntze	Orchidaceae
15	*Nardostachys grandiflora* DC	Boraginaceae
16	*Paris polyphylla* Sm.	Liliaceae
17	*Sinopodophyllum hexandrum* (Royle) T.S. Ying	Berberidaceae
18	*Skimmia laureola* (DC.) Siebold & Zucc. ex Walp.	Rutaceae
19	*Staphylea emodi* Wall.ex Brandis	Staphyleaceae
20	*Swertia chirayita* (Roxb. ex Fleming) Karsten	Gentianaceae
21	*Taxus contorta* Griff.	Taxaceae
22	*Trillium govanianum* Wall. ex D. Don	Melanthiaceae

Yes, various plant species are threatened with extinction. The below-mentioned 22 plant species, many of which are medicinal, have been notified as threatened by the Himachal Pradesh State Biodiversity Board.

f) Whether any measures are being undertaken for the conservation and sustainable use of medicinal plants and if so, the details thereof;

- CSIR-IHBT in its Centre for High Altitude Biology at Ribling, Lahaul & Spiti has established a repository of 34 indigenous medicinal plants of the Himalaya. These include *Aconitum heterophyllum, Angelica glauca, Arnebia euchroma, Inula racemosa, Picrorhiza kurrooa, Saussurea costus*, *Sinopodophyllum hexandrum*, *Valeriana jatamansi* etc

- The institute is working on conservation of *Inula racemosa, Picrorhiza kurroa, Fritillaria cirrhosa* under following projects

    1. Collection, conservation and characterization of *Fritillaria cirrhosa* germplasm from June 2024
    2. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024

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PQ/IHBT/2024

29.11.2024

Subject: Lok Saba Unstarred Question Diary No. 5142 for 06.12.2024 regarding "Significant Medicinal Wealth and Biodiversity" - reg.

(a) whether the Government is aware of the significant medicinal wealth and biodiversity of the Gandhamardan Mountain in Narsinghnath, Bargarh district and if so, the details thereof;

CSIR-IHBT is not working in this region.

(b) whether the Government has plans to establish a Central Research Institute (CRI) and Regional Research Institute (RI) focused on medicinal plants in this region to preserve its unique biodiversity and if so, the details thereof;

Does not pertain to this institute.

(c) whether the Government is considering setting up a specialized hospital/college of naturopathy, and AYUSH Yoga Center at Narsinghnath to promote traditional medicine and health care;

Does not pertain to this institute.

(d) If so, the details thereof along with the steps are being taken by the Government to declare the Gandhamardan Mountain a national protected area to safeguard its natural and medicinal resources; and

NA

(e) whether there is any collaborations with Ayurvedic medicine industries to utilize and promote the medicinal resources of this region for healthcare and research purposes and if so, the details thereof?

Nil

PQ/IHBT/2024
25.11.2024

Subject: Reply to Parliament Question Rajya Sabha (Diary No. 1646) "Clustering of scientific excellence" reg.

a) whether the clustering of scientific excellence and development has been contrived by boosting investments in scientific activities and manpower progress;

Yes

b) if so, the details thereof;

The "Indian Himalayan Central Universities Consortium" (IHCUC) was formed and supported by the NITI Aayog. It was funded by the UGC. The IHCUC focussed on the Indian Himalayan Region (IHR) wherein five thematic areas were identified.

- Enumeration and valuation of the economic impact of Female labour in the Hills
- Agro-ecology in Himalayan states with special emphasis on marketing
- Development of eco-friendly and cost effective tourism in hills
- Opportunities of livelihood to check migration from hills
- Water conservation and harvesting strategies

The IHCUC comprised of the Central Universities located in the IHR, namely Assam University, Silchar, Central University of Himachal Pradesh, Central University of Jammu, Central University of Kashmir, HNB Garhwal University, Manipur University, Mizoram University, Nagaland University, North Eastern Hill University, Rajiv Gandhi University, Itanagar, Sikkim University, Gangtok, Tezpur University, Tripura University. Herein the CSIR-IHBT was identified as the technology partner.

c) the funds allocated for encouraging innovations and infrastructure during last two years and current year in Himachal Pradesh; and

Reply not required

d) Whether Government has taken any steps to boost creation of science and technology infrastructure in Himachal Pradesh?

- Centre for High Altitude Biology (CeHAB) Ribling (Lahaul & Spiti) Himachal Pradesh (altitude 3450m amsl) is started its establishment since in the year 2011, and which is one of the Centre of CSIR-Institute of Himalayan Bioresource Technology Palampur (Himachal Pradesh). The Centre is focusing its research on conservation and cultivation of high altitude medicinal and aromatic plants for sustaining the High altitude Himalayan bio resources. This centre has a plant conservatory comprising of field gene bank and field nurseries conserves 35 species of medicinal plants, which are threatened in their natural habitats in the high-altitude region, due to overharvesting for their medicinal uses.
- **Enzyme Bioprocessing Facility:** CSIR-IHBT has a fully functional Enzyme Bioprocessing Facility. Enzyme bioprocessing facility is useful for industrially feasible up-scale production and purification of proteins/enzymes. This facility (Fermenters, continuous centrifuge, high capacity centrifuge, homogenizer, protein purification system, and lyophilizer, industrial scale) is available to be used by the research institutions and industries in the state of Himachal Pradesh and adjoining areas of Jammu and Kashmir, Chandigarh, Punjab, and Haryana. Further, the facility would also facilitate in developing partnerships and networking with entrepreneurs, industry, and investors besides opening the scope for training and outreach programs to the younger generation for skill development.

  Currently, two start ups are being incubated at our facility and one has utilized the facility for two years as the MoA with CSIR-IHBT.

- **Autonomous Green House System:** Autonomous Greenhouse Facility is created under CSIR Floriculture Mission. The facility designed for execution of experiments on commercial flower crops for soil less farming, early flowering and quality of flower crops. We have an MoU with M/s Red Mirchi Associates, Palika Bazar, Jind, Haryana to give know how to produce Tulips by using this facility at CSIR-IHBT premises for its commercial sale.

  Crops: Tulips and Liliums

  Capacity: 2 lakh bulbs

  Facility: Washing, grading, sorting and cold storage

- **A state-of-the-art food processing facility:** A traditional food processing centre has been established with a built-up area of 200 m^2 at CSIR-IHBT campus in Palampur with following facilities
  1. Process line and machinery for dehydration of wild edibles such as vegetables, fruits, mushrooms and medicinal plants

2. Process line and machinery for preparation of instant premixes-based food products and value-added millet products
3. Process for preparation of fortified snack products such as pasta and energy foods such as bars

The facility has the capability to produce finished product up to 200 kg per day with completely food grade equipment made of SS-304 grade.

Further the facility has a Quality assurance and quality control lab enabling training and demonstration to progressive entrepreneurs, Farmer's Produce Organization (FPO) and Self- Help groups (SHGs)

So far four companies are operating from the facility

SNo.	**Name of the company**	**Activities**
1	M/s. Nishu Lata Foods, Una	Production of traditional pulse-based nuggets and value-added vegetable products
2	M.s, Munisha Foods India Pvt. Ltd., Hamirpur	Production of mushroom based protein beverage mixes and dehydration of mushroom
3	M/s. ShudKrishna Pvt. Ltd., Panchkula	Production of 1. Rhododendron Tisane blends 2. Rhododendron Green Tea blends 3. Lavender based tea blends
4	M/s. Maatritava Foods, Kangra	Multigrain protein mixes and other traditional foods

- **Bulb processing facility:** A bulb processing facility has been developed at CSIR-IHBT, Palampur where in 2 lakhs bulbs could be handled at a time. The facility includes washing, grading, sorting under low temperature. Presently it is used for processing of tulips and lilium bulbs.

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TOP PRIORITY

Rajya Sabha provisionally admitted question- Starred Dy. No. U1170

Name of Lab/Instt. : CSIR-IHBT, Palampur (H.P.)

Question No.							
(a)	**How many seats are vacant in the agencies and institutions under the Ministry of Science and Technology**	103					
(b)	**How many recruitment have been done in the last 4 years?**	2020	2021	2022	2023	Till 1st November 2024	Cumulative
		5	2		1	3	11
(c)	**How many new posts have been created in the last 4 years?**	NA					

Rajya Sabha Provisionally Admitted Unstarred Parliament Question Diary No. U2553

S.No.	Name of Institution (Lab/ Institute)	Name of the Scientist	Designation of Scientist	Name of administrative position held	Mode of Engagement (Direct/ Deputation/ Additional Charge
1	CSIR-IHBT, Palampur	Dr. Aparna Maitra Pati	Chief Scientist	NA	Direct
2		Dr. Vipin Hallan	Chief Scientist		Direct
3		Dr. Ram Kumar Sharma	Chief Scientist		Direct
4		Dr. Sanjay Kumar Uniyal	Chief Scientist		Direct
5		Dr. Amit Kumar	Senior Principal Scientist		Direct
6		Dr. Rakesh Kumar	Senior Principal Scientist		Direct
7		Dr. Sanat Sujat Singh	Senior Principal Scientist		Direct
8		Dr. Shashi Bhushan	Senior Principal Scientist		Direct
9		Dr. Pralay Das	Senior Principal Scientist		Direct
10		Dr. Vijai Kant Agnihotri	Senior Principal Scientist		Direct
11		Dr. Ravi Shankar	Senior Principal Scientist		Direct
12		Dr. Probir Kumar Pal	Senior Principal Scientist		Direct
13		Dr. Gireesh Nadda	Principal Scientist		Direct
14		Dr. Dharam Singh	Principal Scientist		Direct
15		Dr. Mahesh Gupta	Principal Scientist		Direct
16		Dr. Rituraj Purohit	Principal Scientist		Direct
17		Er. Mohit Sharma	Principal Scientist		Direct
18		Dr. Amit Chawla	Principal Scientist		Direct
19		Dr. Yogendra Shantaram Padwad	Principal Scientist		Direct
20		Dr. Dinesh Kumar	Principal Scientist		Direct
21		Dr. Damanpreet Singh	Principal Scientist		Direct
22		Dr. Upendra Sharma	Principal Scientist		Direct
23		Dr. Pamita Bhandari	Principal Scientist		Direct
24		Dr. Amitabha Acharya	Principal Scientist		Direct
25		Dr. Vikram Patial	Principal Scientist		Direct
26		Dr. Vishal Acharya	Principal Scientist		Direct

27		Dr. Ashok Singh	Principal Scientist		Direct
28		Dr. Bhavya Bhargava	Senior Scientist		Direct
29		Dr. Kunal Singh	Senior Scientist		Direct
30		Dr. Sukhjinder Singh	Senior Scientist		Direct
31		Dr. Jeremy Dkhar	Senior Scientist		Direct
32		Dr. Rohit Joshi	Senior Scientist		Direct
33		Dr. Shiv Shankar Pandey	Senior Scientist		Direct
34		Dr. Ashish Rambhau Warghat	Senior Scientist		Direct
35		Dr. Rajiv Kumar	Senior Scientist		Direct
36		Dr. Narendra Vijay Tirpude	Senior Scientist		Direct
37		Dr. Arun Kumar	Senior Scientist		Direct
38		Dr. Vivek Dogra	Senior Scientist		Direct
39		Dr. Gaurav Zinta	Senior Scientist		Direct
40		Dr. Rajesh Kumar Singh	Senior Scientist		Direct
41		Dr. Vidyshankar Srivatsan	Senior Scientist		Direct
42		Dr. Ankit Saneja	Scientist		Direct
43		Dr. Poonam Kumari	Scientist		Direct
44		Dr. Vandana Jaiswal	Scientist		Direct
45		Er. Amit Kumari	Scientist		Direct
46		Dr. Satbeer Singh	Scientist		Direct
47		Dr. Ramesh	Scientist		Direct
48		Dr. Vikas Kumar	Scientist		Direct
49		Dr. Sarita Devi	Scientist		Direct
50		Dr. Ashok Kumar Pathera	Scientist		Direct
51		Dr. Vishal Sharma	Scientist		Direct
52		Dr. Amit Kumar	Scientist		Direct
53		Dr. Sandopu Sravan Kumar	Scientist		Direct

PQ/IHBT/2024

02.12.2024

Subject: Lok Saba Unstarred Question Diary No. 2067 for 06.12.2024 regarding "Storage of Medicinal Plants" - reg.

(a) the details of the Research and Development projects funded by the Government to promote Agro-techniques, post-harvest management and storage of medicinal plants;

The following project (Funded by NMPB, Ministry AYUSH) is being undertaken by the Institute to promote the cultivation and conservation of threatened medicinal plants.

1. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution
2. Collection, conservation and characterization of *Fritillaria cirrhosa* germplasm

CSIR-IHBT also has a NMPB funded project on Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur for conservation of 125 medicinal plant species. A total of 110 species have been conserved as of now in the Institute.

(b) the details of the medicinal plants that have been identified for conservation and resource augmentation under the said projects;

The institute is working on conservation of *Fritillaria cirrhosa* D. Don (syn. *F. roylei* Hook.) commonly known as Ban lahsun, Jangli lehsun, *Valeriana jatamansi*, *Inula racemose*, and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category under these projects. Institute is also generating quality planting material for distribution and captive cultivation.

(c) the corrective measures that have been taken in Kerala to conserve and enhance medicinal plant resources and the progress made in this regard; and

Does not pertain to this institute.

(d) the details of the medicinal plant species to Kerala that have been prioritized for conservation and development?

Does not pertain to this institute

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PQ/IHBT/2024
10.12.2024

Subject: Rajya Sabha Starred Question Diary No. 3798 for 17.12.2024 regarding "Ayurvedic treatment for life style diseases".

a) whether the Government has entered into any agreement with the Council of Scientific and Industrial Research (CSIR) for this purpose and If so, details thereof.

CSIR-IHBT has signed an MoU on 05.09.2023 with Department of Ayurveda, Govt. of Himachal Pradesh to promote academic and research co-operation with Rajiv Gandhi Government Post Graduate Ayurvedic College, Paprola (HP). Under this agreement, Research work on Ayurvedic drugs of MD students is underway. In addition, Ayurvedic College faculty also involved in the Human Intervention studies of various products developed at CSIR-IHBT.

b) Whether Government has developed any State / UT-of-the-art laboratories with the help of CSIR and if so, the details thereof.

CSIR-IHBT extended following support to the State Govt:

1. Construction of laboratory block and renovation of Existing Block at Research Institute in Indian System of Medicines (RIISM), Joginder Nagar
2. Construction of Seed Germplasm Centre at Joginder Nagar and Nery, Hamirpur
3. Construction of Drying Shed and Storage Godown at Ayurveda Pharmacy,Jogindernagar
4. Construction of Drying Shed and Storage Godown at Botanical Garden (RIISM), Jogindernagar
5. Construction of Drying Shed and Storage Godown at Rajiv Gandhi Government Post Graduate Ayurvedic College, Paprola (HP) Jogindernagar
6. Construction of Drying Shed and Storage Godown at Jungle Jhalera, Bilaspur

c) Whether the Government proposes to launch successful Ayurvedic medicines developed in the said laboratories on a large scale in foreign markets?

Does not pertain to CSIR-IHBT

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PQ/IHBT/2024
03.12.2024

Subject: Lok Sabha Starred Question Diary No. 8203 for 13.12.2024 regarding "Promotion of Medicinal Plants"- reg.

a) the steps taken/proposed to be taken by the Government to promote and conserve medicinal plants in different parts of the country particularly in Maharashtra, Dadra and Nagar Haveli and Madhya Pradesh

The Institute is undertaking the following project to promote the conservation of threatened medicinal plants, particularly in the western Himalayan regions (Himachal Pradesh and Uttarakhand).

- Collection, conservation and characterization of *Fritillaria cirrhosa* germplasm" (NMPB funded)
- Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur for the conservation of 125 medicinal plants in the herbal garden. (NMPB funded)

b) the funds allocated for conservation, cultivation and infrastructure development of medicinal plants under the Ministry during the last three years, State/UT-wise particularly Mumbai of Maharashtra, Dadra and Nagar Haveli and Madhya Pradesh; and

CSIR-IHBT has not allocated any fund.

c) the steps taken/ proposed to be taken by the Government to promote and propagate AYUSH system and medicines outside the country?

Does not pertain to CSIR-IHBT.

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PQ/IHBT/2024
09.12.2024

Subject: Lok Sabha Starred Question Diary No. 10684 for 19.12.2024 regarding "Development of Indigenous Civil Aircraft".

a) the specific measures taken/proposed to be taken the Government to promote and support the development of indigenous civil aircraft manufacturing in the country; and

Nil

b) the steps taken/proposed to be taken by the Government to address the challenges faced by domestic manufacturers in competing with established international aircraft producers?

Nil

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PQ/IHBT/2024
12.12.2024

Subject: Lok Sabha Starred Question Diary No. U9954 for 18.12.2024 regarding "Projects under Science and Technology in Punjab".

a) the details of schemes/projects relating to science and technology being implemented in Punjab; and

- **CSIR - Aroma Mission:**

CSIR-IHBT, Palampur is implementing CSIR-Aroma Mission at the National level including, Punjab.

- **CSIR - Floriculture Mission:**

  - Distribution of quality planting material of flower crops such as marigold, chrysanthemum, gladiolus corms and gerbera plants.
  - Establish 40 number of gardens in schools of Fatehgarh Sahib, Bathinda, Ludhiana and Moga districts of Punjab.
  - Organised 8 training programmes pertaining to floriculture crops in Fatehgarh Sahib, Ludhiana and Moga districts of Punjab.

b) the number of beneficiaries, particularly women, and the extent of employment generated under each such scheme/project during the last threeyears in Punjab?

- **CSIR - Aroma Mission:**

CSIR-IHBT, Palampur, under CSIR-Aroma Mission has extended cultivation of aromatic crops to the farmers of Punjab at five locations viz., Village Ghagwal, Tehsil Mukerian, District Hoshiarpur (lemongrass); Nurpur Bedi, District Ropar (Rupnagar) (lemongrass); Rure Kalan, Barnala (Damask rose); Village Chohan, P.O. Gharota,

Tehsil and District Pathankot (lemongrass); Pakhowal, Ludhiana (mints). The farmer groups at these locations were motivated through awareness and training programs, quality planting material of aromatic plants were provided to the farmers for cultivation, trainings were imparted on cultivation and processing techniques for benefit of the farmers. Five distillation units have also been installed at the respective locations for value addition of produce through processing of aromatic farm produce for the production of essential oils. Around 45 ha area has been covered under the aromatic crops leading to generation of about 34000 man-days and benefitting about hundred farmers.

- **CSIR-Floriculture Mission:**

  - Number of beneficiaries: 346 farmers
  - Women Beneficiaries: 25 numbers
  - Employment Generated: 2.53 lakh man-days generated from an area of 282.05 hectares

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PQ/IHBT/2025
24.03.2025

Subject: Reply to Parliament Question Lok Sabha (Diary No. 409) "Promotion of Medicinal Plants" reg.

a) the number of AYUSH schemes for promoting the cultivation of medicinal plants in the country, State/UT-wise;

S. No.	Title of the Project	Total Cost (*in lakhs*)
1.	Development of geo-tagged digital database and spectral library of medicinal plants in cultivation in the foothills of western Himalaya	36.771
2.	Development of Probiotics for Plant Tissue Culture Boosting the performance of micro propagated plant materials by supplementing plant associated useful endophytes	49.80
3.	Collection, Conservation and Characterization of *Fritillaria cirrhosa* gerplasm	32.765
4.	Development of Chemometric Database: A Futuristic Approach for the Quality Assurance of Commercially Important Himalayan Medicinal Plants	33.684
5.	Production of Quality Planting Materials of Medicinal Plants Including the Rare Endangered Threatened Species for Conservation and Distribution	75.00
6.	Establishment of Institutional Herbal Garden at CSIR-IHBT, Palampur	27.00

b) whether there is any procurement centre for purchasing domestic and foreign plants;

Does not pertain to CSIR-IHBT

c) if so, the details thereof;

Not applicable

d) whether any rates have been fixed for medicinal plants in the country; and

Does not pertain to CSIR-IHBT

e) if so, the details thereof?

Not applicable

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PQ/IHBT/2025
18.03.2025

Subject: Reply to Parliament Question Rajya Sabha (Diary No. 2374) "Evaluation of scientific activities of CSIR" reg.

Name of the State/UT	Agency/ Department involved	Name of the Technology transferred/deployed and/or Details of MoU/Agreement executed, if any	Year (2022 onwards)
Himachal Pradesh	Jagriti Self Help Group, Village Malghota. PO Kharanal Tehsil Baijnath District Kangra (H.P.)	Technology transfer agreement for making herbal incense cones and sticks from temple waste flowers.	21.09.2022
Himachal Pradesh	The Lahul Fruit & Vegetable Growers Cooperative Marketing cum Processing Society Ltd., Gondhla Distt. Lahul & Spiti (HP)	Technology on the development of compost booster single solution for stabilization of night soil/kitchen based containing cold tolerant efficient hydrolity bacteria supplemented with plant growth promoters.	15.11.2022
Himachal Pradesh	M/s HAUCH Ecovations Pvt. Ltd., Ludhiana (Pb.)	Establish facility for process for production of dual bio-products (bioplastic and violacein pigment) from Himalayan bacterial isolate PCH194	15.11.2022
Himachal Pradesh	Baba Kathak Mahila Mandal, Village Sakdi (Baba Kathak) Tehsil Baijnath Distt. Kangra (H.P.)	Technology transfer agreement for making herbal incense cones and sticks from temple waste flowers.	20.02.2023
Hyderabad (TG)	M/s Deccan Health Care Limited, H.No. 6-3-348/4, Dwarkapuri Colony, Punjagutta	Technology for manufacturing / processing of iron enriched bars.	02.07.2023

	Hyderabad TG 500082 INDIA		
Hyderabad (TG)	M/s Deccan Health Care Limited, H.No. 6-3-348/4, Dwarkapuri Colony, Punjagutta Hyderabad TG 500082 INDIA	Technology on formulation promoting cartilage health.	02.07.2023
Himachal Pradesh	M/s Munisha Foods India Pvt. Ltd. V.P.O Chowki Tehsil & Distt. Hamirpur (H.P.)	Technology for manufacturing / processing of multigrain protein powder.	05.09.2023
Himachal Pradesh	M/s Gaytri Plant Tissue Culture Lab., V.P.O. Rajeher, Tehsil Palampur Distt. Kangra (H.P.)	Establishment of tissue culture facility at Palampur for training and propagation of sub-tropical horticultural plants.	05.09.2023
Himachal Pradesh	M/s Gaytri Plant Tissue Culture Lab., V.P.O. Rajeher, Tehsil Palampur Distt. Kangra (H.P.)	Technology for *in* vitro propagation of apple and monk plants.	05.09.2023
Himachal Pradesh	M/s GULUR AYURVEDA (OPC) Pvt. Ltd. VPO - Jhinjri Tehsil - Anandpur Sahib Distt. Ropar (Pb.)	Technology for making herbal soap bars.	04.10.2023
Himachal Pradesh	M/S Yuktika Biotech and Nutraceuticals Pvt. Ltd. Bharmat, Tehsil-PALAMPUR, District-Kangra, (H.P.)	Technology for manufacturing / processing of multigrain protein powder.	16.10.2023
Hyderabad (TG)	M/s Deccan Health Care Limited, H.No. 6-3-348/4, Dwarkapuri Colony, Punjagutta Hyderabad TG 500082 INDIA	Technology on cultivation of *Shiitake* mushroom.	16.10.2023
Hyderabad (TG)	M/s Deccan Health Care Limited, H.No. 6-3-348/4, Dwarkapuri Colony, Punjagutta Hyderabad TG 500082 INDIA	Technology to make/ prepare Tea Mouthwash (2 variants).	16.10.2023

Himachal Pradesh	Ms. Rachna Devi w/o Sh. Ajay Kumar, Ward No. 5, Bheth Jhikli (817), Taragarh, Kangra, H.P.	Technology for artifact making using dry flowers.	22.11.2023
Tamil Nadu	M/S MOON FOODS PVT. LTD No.155/10, Kollapatti, Animoor PO, Kokkaraiyanpettai Main Road Near Velavan Kalyana Mandabam, Tiruchengode-637214, Namakkal District, Tamil Nadu	Technology for manufacturing / processing (i.) Plain millet panjeeri, (ii) Multi millet panjeeri i.e. multipurpose flour for ladoo.	29.12.2023
Assam	CSIR- NiScPR and Kirat Biotech Pvt. Ltd., H.No. 102, Dilip Huzuri Path, Dispur, Kamrup Metro Guwahati (Assam)	Technology on the cultivation of *Shitake* mushroom.	09.02.2024
New Delhi	M/S Notta Sin Foods Private Limited, Delhi	Transfer of Technology Agreement for Technical Support for plantation and cultural practices of Monk Fruit.	15.04.2024
Haryana	M/S Sudkrishna Himproducts Private Limited , Panchkula Haryana	Transfer of Knowhow for herbal tea (Rhododendron tisane and tea blends, Lavender tisane and tea blends and one more variant).	15.04.2024
Himachal Pradesh	Komal Innovations and Wellness initiative (KIWI), Nagrota Baghwan, Dist Kangra (H.P.)	Technology for the cultivation and production of Brahmi under the vertical aeroponic system).	13.05.2024
Rajasthan	Prorima health care having official address at Jobner, Jaipur (Rajasthan)	Technology Transfer Agreement (KNOWHOW for Lavender tea and Instant Seabuckthorn Tea).	13.05.2024
Uttar Pradesh	M/s. Satvik Agritech Labs Pvt. Limited	Technology Transfer Agreement (KNOWHOW for	19.06.2024

	Kanpur (U.P.) through NRDC, New Delhi.	Hydroponic technology for stevia cultivation).	
Punjab	M/S GOOD FOOD BOUTIQUE PVT. LTD, LUDHIANA	Technology for manufacturing / processing of multigrain protein powder.	24.06.2024
Punjab	M/S GOOD FOOD BOUTIQUE PVT. LTD, LUDHIANA	Technology for manufacturing/ processing Iron and Zinc enriched Spirulina base bars(for 2 variants).	24.06.2024
Punjab	M/S GOOD FOOD BOUTIQUE PVT. LTD, LUDHIANA	Technology for manufacturing of Energy/Granola bars (millet and cereal,.protein based).	24.06.2024
Tamil Nadu	Jnaani Nutritionals Pvt. Ltd. Plot No. 12, Survey Number 394/35-36, Modern Nagar, Dindigul, Tamil Nadu	Technology on Aeroponic technology for Valeriana Jatamansi production and extraction of the produce.	02.07.2024
Himachal Pradesh	Mani & Co., Saffrino Farms, Thakur Darshan Singh Filling Station, Village Amb, Distt. Una (H.P)	Technology on Saffron Production under Hydroponic Aeroponic system and extraction of the produce.	02.07.2024
Himachal Pradesh	Himalayan Bliss, Palampur (H.P.)	Technology to provide the Hydroponic Technology for plants (Lettuce, spinach, kale, microgreens, basil, tomatoes).	05.09.2024
West Bengal	Pragati Social Development Initiative, Kolkata	Technology to provide the technology for making artifacts using dry flowers.	05.09.2024
Uttarakhand	M/s Dhariti Agro Farms Pvt. Ltd. Uttarakhand	Technology on cold storage, grading, sorting, packaging and transportation of floriculture produce including Lilium and Tulip bulb production at large scale.	26.09.2024

Gujrat	Satvik Agritech Private Limited, Surat Gujrat.	Technology for Brahmi and Jatamansi production under aeroponics system.	17.10.2024
Himachal Pradesh	Shiv Shakti Self Help Group, Palampur, Kangra..	Artifacts making using Dry flowers Technology.	05.11.2024
Himachal Pradesh	Self Help Group, Kailashpur, Panchrukhi, Kangra	Artifacts making using Dry flowers Technology.	05.11.2024
New Delhi	Tashvika India Food Pvt. Ltd, New Delhi	Technology for Millet panjeeri (03 variants).	05.11.2024
Himachal Pradesh	Ucch Shikhariya Utpaad Mahila Samuh Jahalman, Udaipur, Lahaul & Spiti	Technology for making Herbal incense cones and sticks.	20.11.2024
Himachal Pradesh	Shansha Cut Flower Cluster (SCFC), Village Dalang, P.O. Gondhla, Tehsil Keylong, Distt Lahaul and Spiti	Transfer of Technology Agreement for the Lilium bulb processing including grading, sorting packaging and cold storage of bulbs.	01.12.2024
New Delhi	M/s Auretics Ltd., New Delhi	Technology for Herbal formulation for cartilage health.	17.01.2025
New Delhi	M/s Biomimicry Technologies Pvt. Ltd., Address at 120, Mayur Vihar, DLF Galleria, MV Extension, Delhi	Technology for full spectrum operations for preparation of biofertilizer using the desired microbe.	27.01.2025
Himachal Pradesh	Shailza Self Help Group Palampur (H.P.).	Transfer of Technology Agreement for the Incense Cone and Sticks.	26.02.2025
Himachal Pradesh	M/s Pahadicraft, Gagret Distt. Una (H.P).	Technology for making travel/pocket perfumes (4-5 variants).	26.02.2025
New Delhi	Mahalaxmi Malt Products Pvt. Ltd., D-13, Shopping Center-II, Mansarovar Garden, New Delhi-15	Technology for manufacturing / processing of multigrain protein powder.	15.03.2025

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PQ/IHBT/2025
17.03.2025

Subject: Reply to Parliament Question Rajya Sabha (Diary No. 2418) "Ayurvedic and Herbal Medicine Research in Odisha" reg.

a) whether the Government has conducted any research on Odisha's rich biodiversity for Ayurvedic and herbal medicines;

CSIR-IHBT has not carried out any such work.

b) the details of medicinal plant cultivation projects undertaken in Odisha under the National Medicinal Plants Board (NMPB);

CSIR-IHBT promoted cultivation of aromatic crops in Odisha viz., mints (50 ha), lemongrass (in mine affected area in Keonzhar District 10 ha) and palmarosa (100 ha) under CSIR Aroma Mission (Phases I-III). CSIR-IHBT is also promoting cultivation of stevia in Odisha (10 ha).

c) whether the Ministry has any collaboration with universities and research institutions in Odisha for AYUSH studies; and

'Nil' w.r.t CSIR-IHBT.

d) the steps taken to promote indigenous Ayurvedic medicines and traditional healing practices in Odisha?

'Nil' w.r.t CSIR-IHBT.

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PQ/IHBT/2025
24.03.2025

Subject: Reply to Parliament Question Rajya Sabha (Diary No. 7413) "Conservation and sustainable use of medicinal plants" reg.

a) whether Government is running any special programme for the in-situ (in natural habitat) and ex-situ (outside natural habitat) conservation and promotion of medicinal plants, if so, the details thereof;

The following project is being undertaken by the Institute for the Conservation and Promotion of medicinal plants.

Project Title 1: Production of quality planting materials of medicinal plants including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).

Under this project, about 13.05 lakh quality planting materials for 8 medicinal plants will be generated and distributed to the farmers in four years (2021-2025).

The targetted plants are

Valeriana jatamansi, Inula racemose, Bacopa monnieri, Ferula assa-foetida, Stevia rebaudiana, Aloe vera, Picrorhiza kurroa, and Hippophae rhamnoides

Valeriana jatamansi, Inula racemose, and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

Project Title 2: CSIR-Phytopharmaceutical Mission: Phase-III (Funded by CSIR):

The following ex-situ conservation efforts have been taken by the Institute under this project

1. Generation of Quality Planting Materials (QPMs)
2. Distribution of QPMs to the farmers
3. Promoting captive cultivation

b) the number of herbal gardens established in the country so far by the National Medicinal Plants Board (NMPB) along with the State-wise details thereof; and

National Medicinal Plants Board (NMPB), New Delhi has supported a project for Establishment of Institutional herbal garden at CSIR-IHBT Palampur for *ex-situ* conservation of 125 medicinal plant species.

c) whether Government is running any special scheme to link herbal gardens with tourism and Ayurvedic treatment centers, if so, the details thereof?

Does not pertain to CSIR-IHBT

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PQ/IHBT/2025
13.03.2025

Subject: Reply to Parliament Question Lok Sabha (Diary No. 9559) "Promotional and Cultivation of Medicinal Plant" reg.

a) whether the Government has undertaken by any initiatives to promote the cultivation of medicinal plants in rural areas in the country and if so, the details thereof;

The following projects are being undertaken by the Institute to promote the cultivation and conservation of threatened medicinal plants.

7. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
8. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

For the promotion of captive cultivation of medicinal plants, about 2.5 lakh quality planting materials for 9 species (*Valeriana jatamansi, Ginkgo biloba, Inula racemose, Bacopa monnieri, Ferula assa-foetida, Stevia rebaudiana, Aloe vera, Picrorhiza kurroa, Hippophae rhamnoides*) have been distributed to the farmers/growers during last two years under these projects. *Valeriana jatamansi, Inula racemosa,* and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

b) the steps being taken by the Government to support farmers cultivating medicinal plants under various schemes;

The Institute is providing the quality planting material, capacity building and package of practice of medicinal plants to support farmers for cultivation under following projects.

4. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
5. CSIR-Aroma Mission: Phase-III from April 2023
6. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

c) the details of the financial assistance disbursed for the cultivation of medicinal plants under these schemes;

Not applicable

d) where there are any Government-supported research programs for the scientific validation and utilization of medicinal plants and if so, the details thereof:

CSIR-IHBT is involved in the Phytopharmaceutical mission phase-III funded by CSIR to promote cultivation of *Picrorhiza kurroa*, *Inula racemosa* and *Ferrula asa-fotida* further utilization of *Picrorhiza kurroa*, *Inula racemosa* to develop Phytopharmaceutical product in collaboration with CSIR-CDRI institute.

e) the initiatives taken by the Government to document traditional knowledge on medicinal plants;

Survey and recordings of traditional knowledge on plants used for medicinal purpose by the communities (*Bhangalis*, *Gaddis*, *Gujjars*, *Lahulas* and *Pangwals)* of western Himalaya through the Institutional Fund, National Mission on Himalayan Studies, National Mission on Sustaining the Himalayan Ecosystem, & Traditional Knowledge Digital Library.

The CSIR-IHBT, in a collaborative mode, prepared a database on medicinal plants of the Indian Himalaya Region (funded by NMPB). This database contains taxonomy, distribution, habit, habitat, uses, agro technologies, etc. of 1572 plant species.

f) whether the Government is aware of any endangered species or medicinal plants in the country and if so, the details thereof:

Yes, various plant species are threatened with extinction. The below-mentioned 22 plant species, many of which are medicinal, have been notified as threatened by the Himachal Pradesh State Biodiversity Board.

SNo.	Scientific Name	Family
1	*Aconitum deinorrhizum* Satpf	Ranunculaceae
2	*Aconitum heterophyllum* Wall. ex Royle	Ranunculaceae
3	*Arnebia benthamii* (Wall ex G. Don) I. M. Johnst.	Boraginaceae
4	*Atropa acuminata* Royle ex. Lindl.	Solanaceae
5	*Berberis aristata* DC.	Berberidaceae
6	*Betula alnoides* Buch. -Hem. ex D. Don	Betulaceae
7	*Dactylorhiza hatagirea* (D.Don) Soó	Orchidaceae
8	*Eremostachys superba* Royle ex Benth.	Lamiaceae
9	*Fritillaria roylei* Hook.	Liliaceae
10	*Gentiana kurroo* Royle	Gentianaceae
11	*Habenaria edgeworthii* Hook. f. ex Collett	Orchidaceae
12	*Jasminum parkeri* Dunn	Oleaceae
13	*Lilium polyphyllum* D. Don	Liliaceae
14	*Malaxis muscifera* (Lindl.) Kuntze	Orchidaceae
15	*Nardostachys grandiflora* DC.	Boraginaceae
16	*Paris polyphylla* Sm.	Liliaceae
17	*Sinopodophyllum hexandrum* (Royle) T.S. Ying	Berberidaceae
18	*Skimmia laureola* (DC.) Decne.	Rutaceae
19	*Staphylea emodi* Wall. ex Brandis	Staphyleaceae
20	*Swertia chirayita* (Roxb.) H.Karst.	Gentianaceae
21	*Taxus contorta* Griff.	Taxaceae

22	*Trillium govanianum* Wall. ex D. Don	Melanthiaceae

g) the corrective measures being undertaken for the conservation and sustainable use of medicinal plants;

- CSIR-IHBT in its Centre for High Altitude Biology at Ribling, Lahaul & Spiti has established a repository of 34 indigenous medicinal plants of the Himalaya. These include *Aconitum heterophyllum, Angelica glauca, Arnebia euchroma, Inula racemosa, Picrorhiza kurrooa, Saussurea costus*, *Sinopodophyllum hexandrum*, *Valeriana jatamansi* etc.

- The institute is working on conservation of *Inula racemosa, Picrorhiza kurroa, Fritillaria cirrhosa* under following projects

  3. Collection, conservation and characterization of *Fritillaria cirrhosa* germplasm from June 2024
  4. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024

- Besides, the institute also established an herbal garden for the conservation of 125 herbal plants funded by NMPB.

h) whether the Government can provide details or schemes like the National Medicinal Plants Board (NMPB) for the development or the sector; and

Does not pertain to CSIR-IHBT

i) the manner in which medicinal plants are being integrated into the AYUSH healthcare system?

Medicinal plants are integrated into the AYUSH healthcare system through Research based cultivation initiative, and development of quality control methods and further more by validation of traditional health claims.

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PQ/IHBT/2025
12.03.2025

Subject: Reply to Parliament Question Lok Sabha (Diary No. 9766) "Biosafety Level (BSL)" reg.

a) **the details of the existing strength of bio-safety labs in India, state-wise classified as per their Biosafety level (BSL) in the country, State/UT-wise;**
As part of the National Health Mission - Himachal Pradesh, CSIR-IHBT established an ICMR-recognized biosafety level 2 (Plus) facility in Palampur to evaluate COVID 19 clinical samples from the state of Himachal Pradesh during the pandemic (2020-2022). However, the facility discontinued in October 2022 when NHM HP ceased providing samples for testing.

b) **the details of the number of bio-safety labs established and under construction under the scheme setting up of Nationwide Network of Laboratories for Managing Epidemics and National Calamities, State-wise and year-wise since 2021 as per their BSL and area level i.e. regional, State or medical college level; and**

Nil

c) **the details of the funds released by the Government and for the establishment of Biosafety labs under the said scheme, year-wise since 2021?**
Nil

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PQ/IHBT/2025
01.04.2025

Subject: Reply to Parliament Question Lok Sabha (Diary No. 15507) "Cultivation of Medicinal Plant Rural Areas" reg.

a) whether the Government has undertaken any initiatives/schemes to promote the cultivation of medicinal plants in rural areas;

The following projects are being undertaken by the Institute to promote the cultivation and conservation of threatened medicinal plants.

9. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
10. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

For the promotion of captive cultivation of medicinal plants, quality planting materials for 9 species (*Valeriana jatamansi, Ginkgo biloba, Inula racemose, Bacopa monnieri, Ferula assa-foetida, Stevia rebaudiana, Aloe vera, Picrorhiza kurroa, Hippophae rhamnoides*) have been distributed to the farmers/growers during last two years under these projects. *Valeriana jatamansi, Inula racemosa,* and *Picrorhiza kurroa* fall under the Rare, Endangered and Threatened (RET) category.

b) the steps being taken by the Government to support farmers cultivating medicinal plants under various schemes;

The Institute is providing the quality planting material, capacity building and package of practice of medicinal plants to support farmers for cultivation under following projects.

7. Production of quality planting materials of medicinal plants, including the rare endangered threatened species for conservation and distribution (Funded by NMPB, Ministry AYUSH).
8. CSIR-Aroma Mission: Phase-III from April 2023
9. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024.

c) the details of the financial assistance disbursed for the cultivation of medicinal plants under these schemes;

Not applicable

d) whether there is any research programs supported by the Government for the scientific validation and utilization of medicinal plants and if so, the details thereof;

CSIR-IHBT is involved in the Phytopharmaceutical mission phase-III funded by CSIR to promote cultivation of *Picrorhiza kurroa*, *Inula racemosa* and *Ferrula asa-fotida.* Further, Institute is also focusing on utilization of *Picrorhiza kurroa* and *Inula racemosa* to develop Phytopharmaceutical product in collaboration with CSIR-CDRI institute.

e) the initiatives taken by the Government to document traditional knowledge on medicinal plants;

Survey and recordings of traditional knowledge on plants used for medicinal purpose by the communities (*Bhangalis*, *Gaddis*, *Gujjars*, *Lahulas* and *Pangwals)* of western Himalaya through the Institutional Fund, National Mission on Himalayan Studies, National Mission on Sustaining the Himalayan Ecosystem, & Traditional Knowledge Digital Library.

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f) whether the Government is aware of any endangered species or medicinal plants in the country and if so, the details thereof:

Yes, various plant species are threatened with extinction. The below-mentioned 22 plant species, many of which are medicinal, have been notified as threatened by the Himachal Pradesh State Biodiversity Board.

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9	*Fritillaria roylei* Hook.	Liliaceae
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15	*Nardostachys grandiflora* DC.	Boraginaceae
16	*Paris polyphylla* Sm.	Liliaceae
17	*Sinopodophyllum hexandrum* (Royle) T.S. Ying	Berberidaceae
18	*Skimmia laureola* (DC.) Decne.	Rutaceae
19	*Staphylea emodi* Wall. ex Brandis	Staphyleaceae
20	*Swertia chirayita* (Roxb.) H.Karst.	Gentianaceae
21	*Taxus contorta* Griff.	Taxaceae
22	*Trillium govanianum* Wall. ex D. Don	Melanthiaceae

g) the measures undertaken for the conservation and sustainable use of medicinal plants;

- CSIR-IHBT in its Centre for High Altitude Biology at Ribling, Lahaul & Spiti has established a repository of 34 indigenous medicinal plants of the Himalaya. These include *Aconitum heterophyllum, Angelica glauca, Arnebia euchroma, Inula racemosa, Picrorhiza kurrooa, Saussurea costus*, *Sinopodophyllum hexandrum*, *Valeriana jatamansi* etc.

- The institute is working on conservation of *Inula racemosa, Picrorhiza kurroa, Fritillaria cirrhosa* under following projects

  5. Collection, conservation and characterization of *Fritillaria cirrhosa* germplasm from June 2024
  6. CSIR-Phytopharmaceutical Mission: Phase-III from April 2024

- Besides, the institute also established an herbal garden for the conservation of 125 herbal plants funded by NMPB.

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Annexure-I

Name of the Lab./Institute : CSIR-IHBT, Palampur (H.P.)-176 061

Sub: Rajya Sabha Provisionally Admitted Unstarred Parliament Question Diary No. U4441 regarding "Posts under the ministry"

a). How many seats are vacant in the agencies and institutions under the Ministry of Science and Technology?	101*
b). How many recruitments have been done in the last 4 years?	8
c). How many new posts have been created in the last 4 years?	Nil

*1. 01 Scientist is to be joined up to 14.04.2025

2. 11 posts of Scientists were advertised vide Advt. No.15/2024

3. For 04 posts of Technical Assistants, Trade test and written examination is scheduled to be held on 22.03.25 and from 07.04.2025 to 09.04.2025.

4. For 02 posts of Technician (1) Trade test and written examination is scheduled to be held from 20.03.25 to 21.03.2025.

5. For 11 posts of JSA(G./F&A/S&AP), Selection Committee meeting is scheduled on 13.03.2025 to select suitable candidates on the posts.

6. For 03 posts of Junior Stenographer, Selection Committee meeting is scheduled on 13.03.2025 to select suitable candidates on the posts.

7. 01 ASO (G.) has joined on 10.03.2025 the Institute and remaining 03 candidates selected through CASE,2023 were issued offer of appointment letters to join the posts of ASO (G./F&A/S&P).

8. 10 posts of JSA(G./F&A/S&P) were advertised vide Advt. No.1/2025.

Annexure-II

Name of the Lab./Institute : CSIR-IHBT, Palampur (H.P.)-176 061

Sub: Rajya Sabha Provisionally Admitted Unstarred Parliament Question Diary No. U4441 regarding "Posts under the ministry"

a). How many seats are vacant in the agencies and institutions under the Ministry of Science and Technology?	101*
b). How many recruitments have been done from January, 2021 to November, 2022	02
c). How many new posts have been created from January, 2021 to November, 2022	Nil

(Ranjeet Kr. Gupta)
Section Officer (R&A)
CSIR-IHBT, Palampur

22-03-2025

Inputs on Rajya Sabha Provisionally Admitted Unstarred Parliament Question Diary No. U6232 regarding "Indigenous technologies developed by the CSIR laboratories"

Sr. No.	Name of the Technology	Development Year	Whether transferred or not
1.	Technology for manufacturing of Tea Catechin	2014	Yes
2.	Technology for Tea Wines & RTD Tea	2015	Yes
3.	Technology for designing, manufacturing, and using the distillation units of different capacities	2015	Yes
4.	Technology for processing and packaging of Kangri Dham (Kangri Dham: Ethnic curries of Kangra H.P)	2016	Yes
5.	Processing technology for Value Added Crispy Fruit products	2016	Yes
6.	Technology for Ready to Eat Preservative free Khichri Product and other RTE Food products	2016	Yes
7.	Technology for Manufacturing/ processing of Nutri Bar Products	2017	Yes
8.	Technology for manufacturing / processing of multigrain high protein beverage mixes and soup mixes products	2017	Yes
9.	Technology for Large Scale Production of Bio fertilizers (NFB, PSB, KMB)	2017	Yes
10.	Technology for cultivation of Shiitake mushroom & its implication at large scale	2017	Yes
11.	Technology to take up Vertical Gardening and indoor air pollution abatement	2017	Yes
12.	Technology for manufacturing/ processing of multigrain protein powder	2017	Yes
13.	Technology for manufacturing/ processing of Spirulina based products	2018	Yes
14.	Technology for manufacturing/ production of Tissue culture plants (Gerbera, Potato, Bamboo).	2018	Yes
15.	Technology for manufacture of Granola bars - (millet and cereals based) products	2018	Yes

16.	Production of Natural Colours and Herbal Lipsticks from different natural sources	2018	Yes
17.	Making Herbal Incense Cones	2018	Yes
18.	Technology of Compost Booster- Single solution for stabilization of night soil/kitchen waste" containing cold-tolerant efficient hydrolytic bacteria supplemented with plant growth promoters	2018	Yes
19.	Technology for making Hand Sanitizers (tea based) and other disinfectant	2019	Yes
20.	Technology for Tea Vinegar	2019	Yes
21.	Technology for making Herbal Soaps and liquid hand wash	2019	Yes
22.	Agrotechnology of Heeng & Saffron	2019	Yes
23.	Technology of Rice puffed bars	2019	Yes
24.	Technology for establishment of hydroponic facility for production of Lilium and Tulip plants	2019	Yes
25.	Technology for making Herbal oil	2019	Yes
26.	Technology for cultivation and production of Kutki and Jatamansi plant under hydroponic system	2019	Yes
27.	Technology for cultivation and production of medicinal plants (*Picrorhiza, Valeriana*) under hydroponic system	2019	Yes
28.	Tissue culture technology of Saffron	2019	Yes
29.	Technology on formulation for promoting cartilage health	2020	Yes
30.	Technology to make Herbal formulation for Immunity Modulation	2020	Yes
31.	Technology for preparation of Tea Mouthwash	2020	Yes
32.	Technology for Instant Tea	2020	Yes
33.	Process for production of dual bio-products (bioplastic and violacein pigment) from Himalayan bacterial isolate PCH194	2020	Yes
34.	Technology for Iron enriched Fruit Bars	2020	Yes
35.	Technology for ready to reconstitute oral formulations utilizing microalgae and for development of Algae based nutraceuticals and derived food formulations	2021	Yes

36.	Technology for making travel/pocket perfumes (4-5 variants)	2021	Yes
37.	Technology/ process for Ready To Eat instant seera in the convenience package	2021	Yes
38.	Technology for artifact making from Dry Flowers	2021	Yes
39.	Ready to Eat instant Seera in the convenience package	2022	Yes
40.	Technology for extraction of Steviol glycosides	2023	Yes
41.	Technology for manufacturing/ processing of millet panjeeri having three variants (i) Plain millet panjeeri, (ii) Multi millet panjeeri (iii) Millet based beverage mixes i.e. multipurpose flour for ladoo and other preparation	2024	Yes
42.	Technology for Herbal Tea (Rhododendron tisane and tea blends, and one more variant)	2024	Yes
43.	Technology for Lavender Tea and Instant Sea buckthorn Tea	2024	Yes
44.	Technology for the Lilium and Tulip processing including grading, sorting, packaging and cold Storage of bulbs	2024	Yes
45.	Technology for full spectrum operations for preparation of Biofertilizer using the desired microbe	2024	Yes
46.	Technology for Aromatic Floral wax candles	2024	Not Transferred Yet
47.	Technology for Herbal Lip Balm	2024	Not Transferred Yet
48.	Technology for *Arnebia euchroma*	2024	Not Transferred Yet
49.	Formulation against acne and a process for the preparation thereof	2024	Not Transferred Yet
50.	Technology for Multi Millet Beverage (Kodra Tea)	2025	Not Transferred Yet