BOTANICAL SURVEY OF INDIA

ANNUAL RESEARCH PROGRAMMES

2022-23

(Final)

भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA

AJC BOSE INDIAN BOTANIC GARDEN, HOWRAH

Sl. No.	Name of the Project	Period	Quantifiable deliverables for 2022-23
1.	**Development and Maintenance of aquatic plant section in AJCBIBG** Dr Devendra Singh, Scientist D Dr. S.P. Panda, Scientist-C Dr. R. Saravanan, Botanist Ms. Titir Saha, Bot. Assistant	**Ongoing**	**Q1 – Q4:** A circular pool measuring to 30 ft. diam. to be constructed. About 50 Nymphaea and all the Nelumbo of AJCBIBG will be introduced in the said section. *Victoria amazonica* and *V. cruziana* will also be introduced in this section.
2.	**Curatorial work in the Garden and Maintenance** Dr Devendra Singh, Scientist D Dr. S.P. Panda, Scientist-C Dr. R. Saravanan, Botanist Ms. Titir Saha, Bot. Assistant Dr. Arvind Parihar, Bot. Assistant Sri Arjun S.K., Bot. Assistant	**Ongoing**	**Q1:** Development of an Orchidarium in AJCBIBG through collection, introduction, and ex-situ conservation of the orchids of Eastern Ghats of India. **Q2:** Development of a section for succulent plants (cacti). **Q3:** Maintenance of Rosarium in AJCBIBG, Howrah. **Q4:**Woodland development in AJCBIBG (Indigenous species will be introduced in the garden).Development and maintenance of nursery of Palms, woody plants, endemic trees (at least 30 species with minimum of 500 seedlings of each species
3.	**Introduction and *ex-situ* conservation of RET species in AJC Bose Indian Botanic Garden** All staff members of AJCBIBG up to the level of Preservation Asst. *cum* Garden Overseer *New Project*	**Ongoing**	**Q1 – Q4:** 4 field tours (one in each quarter) for collection and introduction of RET plants. **Target: 50 Species each year.** **Total tours: 4**
4.	**Bryo-flora of Jharkhand** Dr. D. Singh, Scientist-E	**2018 – 2023** *(Extended for one year)*	**Q1-Q4:** Literature Survey, documentation and identification from previous collections. Submission of final Manuscript. Q3: One Field tour to Gautam Buddha WLS. Q4: One HCT / SEM study tour to BSI NRC, Dehradun.
ANDAMAN & NICOBAR REGIONAL CENTRE, PORT BLAIR			
5.	**Conservation Assessment, ENM studies including GIS mapping of Endemic trees of Andaman & Nicobar Islands (50 Endemic Species)** Dr. Chandan Singh Purohit, Scientist-C Dr. Lal Ji Singh, Scientist-E #Dr. Vivek C.P., Bot. Asstt. Shri Bishnu Charan Dey, Bot. Asstt.	2021-2023	Q1. Processing & identification of Herbarium specimens collected in the previous tour. Q2. One field tour to South Andaman, Processing & identification of herbarium specimens collected in the previous tour. Q3. One field tour to North Andaman, Processing & identification of herbarium specimens collected in the previous tour. Q4. One field tour to Nicobar Islands, Processing & identification of herbarium specimens

			collected in the previous tour. **Target: 50 Species each year.** **Total tours: 3**
6.	**Curatorial work of Botanical Garden : (Multiplication and Nursery development of Bamboos, Palms, Zingibers, Endemic trees species of Andaman & Nicobar Islands at Dhanikhari Experimental Garden Cum Arboretum** Shri Bishnu C. Dey (Bot. Asstt.), Shri Basil Paul (Bot. Asstt.) & Shri Gautam Anuj Ekka (Bot.Asstt.) *New Project*	2022-2024	Q1: Literature survey, Herbarium Consultation. Monitoring and maintenance of Garden (raise nursery, and recording of flowering and fruiting of tree species). Q2: Monitoring and maintenance of Garden (raise nursery, and recording of flowering and fruiting of tree species). One field tour to Middle Andaman Q3: Monitoring and maintenance of Garden (raise nursery, and recording of flowering and fruiting of tree species). One field tour to South Andaman Q4: Monitoring and maintenance of Garden (raise nursery, and recording of flowering and fruiting of tree species). One field tour to Nicobar Islands **Total tours: 3**
ARUNACHAL PRADESH REGIONAL CENTRE, ITANAGAR			
7.	**Floristic studies in selected High Altitude Wetlands (HAWs) and its environs representing 5 districts of Arunachal Pradesh** Dr. M. R. Debta, Scientist-C	2020 – 2023	**Q1:** Literature survey of study areas. **Q2:** One Field tour for survey and collection of plants. **Q3:** One Herbarium consultation tour to ASSAM, Shillong & CNH, Howrah **Q4:** Finalization and submission of the manuscript to HQ. **Total tours: 2** **(1 FT & 1 HCT)**
8.	**Curatorial work at Botanic Garden of ERC, Itanagar** Dr Ranjit Daimary, Botanist	Ongoing	**Q1-Q4:** Maintenance of economically important, endemic and RET plants of Arunachal Pradesh at Botanical Garden, BSI, APRC, Itanagar and documentation of live plants of the garden. **Target: 50 Species each year.**
ARID ZONE REGIONAL CENTRE, JODHPUR			
9.	**Flora of Mount Abu Wildlife Sanctuary, Rajasthan (2021-23)** Dr. Sanjay Mishra, Scientist-C & Dr. S. L Meena, Scientist-E	2021-2023	Q1: Identification of specimens collected during the previous tour and screening of regional herbarium and collection of relevant literatures. Q2: One field tour and identification & documentation of collected plants. Q3: One field tour and Identification and documentation of collected plants. Q4: One Herbarium Consultation tour to Blatter Herbarium (BLAT) & BSI, WRC Pune. **Total tours: 2 & 1 HCT**

10.	**Curatorial work at Botanic Garden of AZRC, Jodhpur** Dr. S.L. Meena, Scientist-E, Dr. Sanjay Mishra, Scientist-C, Ravi Prasad, Botanist & Amit Kumar, Pres. Asstt.	**Ongoing**	**Q1 – Q4:** Maintenance and conservation of Economically important, Endemic and Threatened species of the arid region in the experimental Garden of AZRC & their further multiplication. One field tour in Q3 for collection of 05 targeted RET species from field (arid & semiarid regions) and their introduction & multiplication. **Total tour: 1**
11.	**Curatorial work at Herbarium and digitization of herbarium specimens** Dr. M. K. Singhadiya, Botanist, Ravi Prasad, Botanist, Ramesh Kumar, Bot. Asstt. & Amit Kumar, Sr. Pres.Asst.	**Ongoing**	**Q1 – Q4:** Completion of metadata of herbarium specimens of BSJO. (5000 per quarter by each) 2. Digitization of herbarium sheets. 3. Identification of 200 unidentified specimens, accession and incorporation in every quarter. (50 specimen by each)
BOTANIC GARDEN OF INDIAN REPUBLIC, NOIDA			
12.	**Mass germination and multiplication of Horticultural and ornamental plants/ season flowers in BGIR.** Dr. Sandeep Kr. Chauhan, Scientist –E Dr C.M. Sabapathy, Botanist	**Ongoing**	**Q1 – Q4:** Establishment of about 300 medicinal plants germplasmcentre in BGIR for displays and awareness. Bar - coding for endemic plants in different plant sections of BGIR. Overall maintenance and development of different Horticulture landscape sections of BGIR Threatened Plant sps., collections from different Regional centres of the BSI Regional Circles, Botanic Gardens, Forest Dept., and their introduction and conservation in BGIR Noida. Setting up Seed Bank Laboratory and Tissue Culture laboratory in BGIR visa vis seed germination studies on scientific and conventional ways. Setting of Plant Conservatories and their management. Bio-composting /Vermi-compost development at BGIR and revamping thereof.
13.	**Establishment and enrichment of existing Forest Types and Proposed Phytodiversity at BGIR Noida (zone 5,6,7,8) by introduction of plant sps., based on respective forest types and phyto-diversity region, Development of Sacred Section** Dr.Priyanka Ingle, Scientist-C Ms L.I. Chanu, Botanist	**Ongoing**	**Q1 – Q4:** Establishment of 21 Thematic Botanic Garden sections in BGIR Noida. Precision Phenological Studies and preparation of Database of endemic trees, medicinal, fruit and endemic plants planted in BGIR Noida. Mass scale germination and Multiplication of cactus and succulents in BGIR Noida Plant sps., collections from different parts of the BSI Regional Circles, Botanic Gardens, Forest Dept., to BGIR Noida. Plant specimen collections Herbarium for strengthening at BGIR. Plant labelling in forest arboretum (Forest types 1 to 8) cactus and Succulent section.
CENTRAL BOTANICAL LABORATORY, HOWRAH			

14.	**Diversity of Soil Cyanoprokaryotes and Algae in AJC Bose Indian Botanic Garden, Howrah** Dr Pratibha Gupta, Scientist-'F' *New Project*	2022 - 2025	**Q1 – Q4:** Survey, collection and identification of soil cyanoprokaryotes and algal samples from various sites of all 25 divisions of AJCBIBG, Howrah to carryout taxonomic studies to assess the diversity of soil cyanoprokaryotes and algae and its distribution in nature as well as in culture. *Notes*: Duration of the project reduced to 3 years; No further extension will be given.
15.	**Effect of different cooking method on the nutraceutical value of wild edible plants of North-East Region in India** Dr. Tapan Seal, Scientist-D Dr. Kaushik Chaudhuri and Ms. Basundhara Pillai, Botanist *New Project*	2022-2025	**Q1:** Effects of various cooking method on Proximate composition and mineral contents. **Q2:** Water soluble vitamins (C, B1, B2, B3, B5, B6, B9) by HPLC. Anti-oxidative properties **Q3 & Q4**: Ant nutritive composition
CENTRAL NATIONAL HERBARIUM, HOWRAH			
16.	**Algal Flora of Purbasthali Wetland, Bardhaman, West Bengal** Dr. R.K. Gupta, Scientist-E	2020 - 2023	Q1: One field tour to Purbasthali wetland and limnological data to be recorded for all the collection site. Q2: Study of the collected samples and photomicrography. Q3: Study of the collected samples and photomicrography. Q4: Diatom samples will be studied under SEM and preparation of taxonomic description along with photomicrography. Finalization of the complete manuscript and submission to D/BSI. **Total: 1 Field tour**
17.	**Molecular phylogeny, morphology and taxonomy of Boletoid mushrooms in Uttarakhand** Dr Kanad Das, Scientist-E *New Project*	2022 - 2025	Q1: Literature and herbarium consultation. Q2: One macrofungal survey tour to Pauri and Rudraprayag Districts during July to September during rainy season. Macromorphological characterization will also be done in the field. Q3 – Q4: Thorough micromorphological characterization and one to multigene molecular phylogeny will be conducted with the collected samples. Description, micromorphological illustration, phylogenetic inferences will be prepared for the respective collections. Manuscript will be prepared and communicated for interesting collection(s). **Total: 1 Field tour**
18.	**Editing of the flora of Andaman & Nicobar Islands Volume – 3 (Monocotyledons)** Dr. K. Karthigeyan, Scientist-E *New Project*	2022-2023	Q1: Collection of data regarding new additions from online sources and library; manuscript editing Q2: Collection of data; manuscript editing Q3: Collection of data; manuscript editing Q4: Collection of photographs; manuscript editing; finalisation and submission of the Manuscript for publication

19.	**Plant diversity in Sacred Grooves of South Bengal** Dr Kumar Avinash Bharati, Scientist-C	2021-2023	Q1: Identification of collected specimens. Q2: One field tour to be taken in selected sacred grooves of South Bengal. Q3: One field tour to be taken in selected sacred grooves of South Bengal. Q4: Identification of collected specimens and preparation of the manuscript. **Total: 2 Field tours**
20.	**Digitization of the representative specimens of the species appeared in Flora of India vols. 1-5, 12, 13 & 23** Dr Kumar Avinash Bharati, Scientist-C and Dr Anand Kumar, Botanist *New Project*	2022-2023	**Q1 – Q4:** The representative specimens of the species appeared in Flora of India vols. 1-5, 12, 13 & 23 will be digitized.
21.	**Flora of Eagle Nest Wild Life Sanctuary and its adjacent regions, West Kameng District, Arunachal Pradesh.** Sri Sanjay Kumar, Botanist Dr. S. S. Dash, Scientist -E	2019 – 2023 *(Extended up to 2023 due to Covid 19)*	Q1: One field tour of 20–25 days, identification of collected specimens. Q2: One field tour of 20-25 days, identification of collected specimens. Q3: One field tour of 20-25 days, identification of collected specimens. Q4: Two Herbarium consultation tours: first to ASSAM and second to ARUN; preparation of the manuscript. **Total: 3 Field tours and 2 HCT**
22.	**Bio-prospecting and Economic Potential of selected Marine Macro Algae of India** Dr. M. Palanisamy, Scientist -E *New project*	2022-2024	Q1: Collection of literature from different sources; Procurement of equipment and chemicals; Scientific staff to be trained on the methodology of processing of seaweeds, assays on Phytochemical and biochemical of seaweeds, extraction of DNA and identification of bioactive compounds, antimicrobial screening, cytotoxicity. Q2: DNA sequencing using standard molecular markers; Phytochemical & Biochemical Assay on selected seaweeds; Collection of Literature Q3: DNA sequencing using standard molecular markers; Phytochemical & Biochemical Assay on selected seaweeds; Identification of bioactive compounds, antimicrobial screening, cytotoxicity. Q4: Tour to Gulf of Mannar, Kanyakumari, Vizhinjam and Thirumullavaram for selected seaweed collection & processing; DNA sequencing using standard molecular markers; Phytochemical & Biochemical Assay on selected seaweeds; Identification of bioactive compounds, antimicrobial screening, cytotoxicity**.**
CENTRAL REGIONAL CENTRE, ALLAHABAD			
23.	**Flora of Madhya Pradesh Vol-I including Pictorial Checklist** (Revised edition) Families Rannunculaceae-	2022-2024	Q1: Scrutiny of published literature. (1990-Till date). Q2: Scrutiny of Herbarium specimens at BSA. Q3/Q4: Preparation of Checklist & one FT to Madhya Pradesh.

	Plumbaginaceae: 83 families. Dr. Arti Garg Scientist - E Dr. A.K. Verma, Scientist C Mr. B. Lakshmanudu, Sr. Pres., Asstt. Dr. O.N. Maurya, Sci-D Dr. Nitisha Srivastava, Bot. Asst. Dr. Saurabh Sachhan, Bot. Asst. *New Project*		Completing Introduction and key to families of Manuscript.
24.	**Flora of Haiderpur wetland – a Ramsar site, Bijnor & Muzaffarnagar, Uttar Pradesh.** Dr. O.N. Maurya, Sci-D. Dr. Saurabh Sachan, Bot. Asst. *New Project*	2022-2024	Q1: Literature consultation. Q2: One Field Tour to the area. Q3/Q4: Collected specimen identification. One FT to the area. Identification of plants collected. **Total: 2 Field tours**
25.	**Curatorial work and maintenance of the RET and economically important species in the experimental garden of BSI CRC, Allahabad.** Dr. O.N. Maurya Sci- D Dr. AK Verma, Sci- C (Garden In charge) Dr. B. Kumar, Botanist Dr. S. Sachan, Bot. Asst.	2022-2023 **Ongoing**	**Q1–Q4:** Regular maintenance of the garden. Introduction of 10 RET species in the garden. Collection and introduction of RET/medicinal plants from different areas of Central India. Plants to be collected during routine tours.
26.	**Flora of Kunu National Park, Madhya Pradesh** Dr. A.K. Verma, Scientist C	2021-2023	Q1: Identification of plants collected. One Field tour to the area. Q2/Q3: Identification of plants collected. One Field tour to the area and Q4: Documentation of specimens collected. Q4: Submission of final report.
DECCAN REGIONAL CENTRE, HYDERABAD			
27.	**Curatorial work at herbarium and Museum of DRC, Hyderabad** Dr. G. Swarnalatha, Bot. Asstt. #Dr. Ravi Kiran, Bot. Asstt.	**Ongoing**	**Q1-Q4:** Digitization and development of Database of Herbarium specimen (Dr. Ravi Kiran, Botanical Assistant) **Q1-Q4:** Development of Museum of DRC, Hyderabad. (Dr. G. Swarnalatha, Botanical Assistant)
28.	**Lichens of Telangana state** Dr. Swamalatha G. Bot. Asstt. *New Project*	2022-2027	Q1 & Q2: Literature consultation. Q3:.One field tour. Drying, mounting and preparation of herbarium packets, field data incorporation. Study and identification of collected lichen specimens. Q4: One field tour. Drying, mounting and preparation of herbarium packets, field data

			incorporation. Study and identification of collected lichen specimens
29.	**Sri Penusila Narasimhaswamy Wildlife Sanctuary (1030.9 sq.km) project for 3 years)** Dr. L. Rasingam, Scientist E **#**Dr. J. Swamy, Botanist Dr. P. Harekrishna, Bot. asstt. *New Project*	2022-2025	Q1-Q2: Literature Survey, collection of relevant information. Q3:.One field tour. Q4:.One field tour. **Tours: 2 F.T.**
30.	**Flora of Sri Lankamalleswara Wildlife Sanctuary (464.42 sq.km) (Kadapa & SPSR District, Nellore)** Dr. Sankara Rao Mudadla Scientist C **#**Dr. Ravi Kiran Arigela, Bot. Asst. *New Project*	2022-2025	Q1-Q2: Literature Survey, collection of relevant information. Q4: One field tour. **Tours: 1 F.T.**
EASTERN REGIONAL CENTRE, SHILLONG			
31.	**Micropropagation of EET Plants of North East India in ERC, Shillong.** Dr. Deepu Vijayan, Scientist - C	**Ongoing**	**Q1 – Q4:** To standardize the protocol, mass multiplication of EET plants of Northeast India namely Eriodesbarbata (Lindl.) Rolfe, PholidotakatakianaPhukan and Microperarostrata (Roxb.) N.P. Balakr. Maintenance of in vitro raised plants of Armodorumsenapatianum and Cymbidumtigrinum in plant tissue culture, garden and polyhouse.
32.	**Flora of Manipur Vol 2** Shri B. B. T. Tham, Botanist Shri. Harminder Singh, Bot. Asst. Sri L.R. Meitei, Bot. Asst.	2021-2023	**Q1:** Documentation of Plants from Herbarium **Q2:** Documentation of Plants from Herbarium **Q3:** One Field tour **Q4:** Identification & Documentation.
33.	**Curatorial works and maintenance of the Experimental Botanic Garden, BSI, ERC, Barapani** Mr. B.B.T. Tham, Botanist Shri L.R. Meitei, Bot. Asst.	**Ongoing**	**Q1:** Maintenance of the endemic, rare, threatened and economically important plants of India. **Q2:** Analysis of the phenological data and mortality rate of already collected from EBG, Barapani. **Q3:** Introduction of at least 30 Threatened plant species and raising of seedling at least 500 of each species. **Q4:** Two local field tours.
34.	**Curatorial works at Herbarium of ERC, Shillong (ASSAM)** Smt. Nandita Sarma, Bot. Asst. Miss. Kankana Chakraborty, Bot. Asst., Shri. Vijay, Bot. Asst. Miss. Debala Tudu, Bot. Asst.	**Ongoing**	**Q1 - Q4:** Regular maintenance of herbarium Preparation of database and incorporation of metadata of all digitised herbarium specimens. Digitization of herbarium specimen of ASSAM. Target: 16,000 herbarium specimens.
35.	**DNA barcoding and Phylogenetic analysis of the**	**2022-2024**	Q1: Standardization of Genomic DNA extraction and Polymerase Chain

	endemic genus Hypericum of North-East India and Chemical composition, antioxidant activities of the essential oil produced. Dr. Deepu Vijayan, Scientist-C Mr. Harekrushna Swain, Senior Preservation Assistant		Reaction (PCR) conditions Q2: Polymerase Chain Reaction (PCR) amplification using selected nuclear and chloroplast markers; DNA sequencing and analysis Q3: Polymerase Chain Reaction (PCR) amplification using selected nuclear and chloroplast markers; DNA sequencing and analysis Q4: Analysis of Data and Preparation of Final report and submission
36.	**Backlog clearance of unidentified Herbarium sheets at ASSAM.** Smti. Nandita Sarma, Bot Asstt., Smti. Kankana Chakraborty, Bot Asstt., Shri. Vijay, Bot Asstt., Shri. Harminder Singh, Bot Asstt., Smti. DebalaTudu, Bot Asstt., Shri. Harekrushna Swain, Sr. Preservation Asstt., Shri. Y Mahesh, Sr.Preservation Asstt. Under the supervision of Dr. Chaya Deori, Sc-E.	**Ongoing**	Q1: Segregation of herbarium sheets. Collecting the field related information whose field books are not available. Data entry of herbarium sheets. Identification of 700 plants. Fumigation & incorporation of identified sheets. Q2: Identification of 700 plants fumigation & incorporation of them. Q3: Identification of 700 plants fumigation &incorporation of them. Q4: Identification of 700 plants & fumigation & incorporation of them. Preparation & submission of final report.
37.	**Understanding the phylogenetic relationships between the genus Tupistra and Rohdea complexity in Indian phyto-geographical context based on the analysis of DNA sequences.** Dr. David Lalsama Biate, Scientist – C	2022-2024	Q1- Q12: Collection tour in different areas of Meghalaya Q3: Collection tour to Assam. Q4: Collection tour to Arunachal Pradesh, Nagaland.
HIGH ALTITUDE WESTERN HIMALAYAN REGIONAL CENTRE, SHOLAN			
38.	**Flora of Himachal Pradesh, Vol-2** *(Jointly with BSI, NRC, Dehradun)* Cucurbitaceae & Caprifoliaceae [c.62 taxa] Dr. Ambrish Kumar, Scientist E & Dr. K.S. Dogra Scientist D *New Project*	2022-2023	Q1-Q4: Documentation of allotted taxa. Finalisation and submission of manuscript.
NORTHERN REGIONAL CENTRE, DEHRADUN			
39.	**In vitro mass multiplication and propagation and rehabilitation in natural habitat of useful and threatened species of the North-West Himalaya.** Dr. Giriraj Singh Panwar, Scientist-D and Dr. Bhavana Joshi, Botanist	2020 – 2023	**Q1:** Collection of seeds/ explants from the wild. In vitro germination of the seeds. **Q2:** Optimization of sterilizing agents for different explants. Screening of tissue culture medium for different explants of selected species. **Q3:** Screening of plant growth regulators for direct and indirect organogenesis in

	1. *Malaxis acuminate* D.Don.(Orchidaceae) 2. *Dendrobium crepidatum* Lindl.& Paxton(Orchidaceae) 3. *Delphinium denudatum*Wall. ExHook.f. & Thomson(Ranunculaceae) 4. *Cyathea spinulosa* Wall. ex Hook. (Cyatheaceae) 5. *Malaxis muscifera* (Lindl.)Kuntze (Orchidaceae) 6. *Platanthera edgeworthii* (Hook.f.ex Collett) R. K. Gupta (Orchidaceae) 7. *Magnolia kisopa* (Buch.-Ham. ex DC.) Figlar (Magnoliaceae) 8. *Zanthoxylum armatum* DC.(Rutaceae) Besides, mass multiplication of *Trachycarpus takil* Becc. (Arecaceae), *Selaginella adunca* A.Braun ex Hieron. (Selaginellaceae) and *Dalbergia latifolia* Roxb. Leguminosae) will be undertaken		different explants of the selected species. **Q4:** Proliferation of cultures in the optimal medium and PGRs concentrations. Hardening of the in vitro regenerated plantlets. Dr. Bhavana Joshi will also work in Herbarium as and when required and as directed by the Scientist-in-charge. *Note*: One day tours will be conducted for the collection of seeds/ explants of the targeted species.
40.	**Ethnobotanical study of Tharu and Bhoxa tribe of Uttarakhand, India.** Dr. Harish Singh, Scientist-E	2020 – 2023	Q1: One field tour to Pauri district among Bhoxa and rural people. Processing of herbarium specimens, identification, documentation and compilation of data collected in previous quarter. Q2: Processing of herbarium specimens, identification, documentation and compilation of data collected in previous quarter. One local field tour to Dehradun district among Mahara Bhoxa and rural people. Hunting of additional ethnobotanical literature. Q3: One field tour to Udham Singh Nagar districtamong Bhoxa, Tharu and rural people. Q4: Processing of herbarium specimens, identification, documentation and compilation of data collected in previous quarter. Finalization of project report. **Total tours: 03**
41.	**Taxonomic revision of genus *Taraxacum* F.H.Wigg. in India** Dr. Sameer Patil, Botanist &	2020 –2023	Q1: Identification of plant specimens collected from previous field tour. Documentation of 30 spp. of genus *Taraxacum* F.H. Wigg. One field tour to Uttarakhand

	Dr. S.K. Singh, Scientist E		Himalayas (Valley of flowers NP and Nanda Devi NP) Q2: One field tour to Eastern Himalayas (Sikkim, Arunachal Pradesh and Meghalaya). Herbarium consultation tour at CNH, BSHC, ASSAM and ARUN. Q3: Identification of plant specimens collected from previous field tours. SEM and microscopic study of achenes collected from previous field tour. Q4: Documentation of c. 60 species of Taraxacum. Preparation and submission of final report. **Total tours: 02 & 1 HCT**
42.	**Assessment of Plant diversity in Rajaji National Park, Uttarakhand.** Dr. Puneet Kumar, Scientist-C, Dr. S.K. Singh, Scientist-E Dr. P.K. Deroliya, Bot. Asst. & Poulami Ghosh, Bot. Asst.	2021 –2024	**Q1-Q4:** One field tour in Q2. Processing, identification and documentation of collected Specimens. **Total Tour : 01**
43.	**Backlog clearance of unidentified Herbarium sheets at BSD.** Dr. S.K Singh Scientist E, Subhasmit Bhattacharyya, Bot. Asstt., PoulamiGhosh, Bot. Asst., Latika Sagarwal, Bot. Asstt. Priti Gangwar, Senior Pres. Asstt. Monal Kumar Singh, Pres. Asstt.-cum-Garden overseer *New Project*	2022-2023	Q1- Q4: Identification of 500 plants in each Q. Fumigation &incorporation of identified sheets. Preparation & submission of final report.
44.	**Curatorial works and maintenance of the garden of NRC, Dehradun.** Dr. S.K. Singh, Scientist E, Dr. Puneet Kumar, Scientist-C and Dr. P.K. Deroliya Bot. Asst.	**Ongoing**	**Q1-Q4:** Regular maintenance and conservation of the of endemic threatened and economic plant species in the garden of NRC. Documentation of monthly data on flowering and fruiting.
45.	**Development of Medicinal Plant Garden** Dr. Harish Singh, Scientist-'E'	2021-2023	**Q1-Q4:** Collection of medicinal plants from different areas and their plantation will be done in garden. Observation of progress and agricultural operation will be done by available Mali/ Mazdoor.
46.	**Grasses of western Himalayas** Dr. Manish Khandwal, Scientist-'E	2021- 2024	Q1: Herbarium tour to CAL. Processing, identification, documentation of collected specimens. Literature consultation. Listing and verification of specimens concerned with grass at BSD & DD herbarium. Q2: One field tour to Himachal Pradesh. One field tour to Ladakh. Processing of collected specimens. Q3: Local tours to different parts of Uttarakhand. Processing, identification, documentation of collected specimens.

			Literature consultation. Listing and verification of specimens concerned with grass at BSD & DD herbarium. Q4: Herbarium tour to IHBT, IIM Jammu, PUN & PAN. Processing, identification, documentation of collected specimens. Literature consultation. Listing and verification of specimens concerned with grass at BSD & DD herbarium. **Total Tour : 01**
47.	**Flora of Himachal Pradesh, Vol-2** **Fabaceae** [c.299 taxa] Dr. S.K. Singh, Scientist E & Dr. P.K. Deroliya, Bot. Asstt., Mr. Subhasmit Bhattacharyya, Poulami Ghosh, Bot. Asst., Ms. Latika Sagarwal, Bot. Asstt. Mrs. Priti Gangwar, Senior Pres. Asstt. **Rosaceae** [c. 133 taxa] Dr Puneet Kumar, Scientist-C **Saxifragaceae-Myrtaceae** [c. 116 taxa] Dr. Ramesh Kumar, Scientist D **Lecythidaceae-Caricaceae & Begoniaceae-Molluginaceae** [c. 74 taxa] Dr. Sameer Patil, Botanist **Cucurbitaceae & Caprifoliaceae** [c.62 taxa] Dr. Ambrish Kumar, Scientist E **Apiaceae- Alangiaceae** [c. 103 taxa] Dr. Giriraj Singh Panwar, Scientist-D & Dr. Bhavana Joshi, Botanist *New Project* *(Note: Project jointly with HAWHRC, Solan)*	2022-2023	Q1- Documentation of allotted taxa. Q2 - Documentation of allotted taxa. Q3- Documentation of allotted taxa *Herbarium consultation tour in Q.3 to RRLH, PUN, PAN, PLP. Q4: Documentation of allotted taxa. Finalisation and submission of manuscript.
SIKKIM HIMALAYAN REGIONAL CENTRE, GANGTOK			
48.	**Curatorial works and maintenance of Germplasm of *Rhododendron* L. (Ericaceae) and *Impatiens* Riv ex L. (Balsaminaceae) in EBG, BSI-SHRC.** Dr. Rajib Gogoi, Scientist E Dr. J. H. Franklin Benjamin, Scientist D	**Ongoing**	Q1 – Q4: Collection of 5 spp. of Rhododendron L. (Ericaceae) and 7 spp. of Impatiens Riv ex L. (Balsaminaceae) in Experimental Botanic Gardens, Gangtok.
49.	**Wild edible plants of Sikkim and Darjeeling Himalaya.** Dr. Rajib Gogoi, Scientist E Dr. J. H. Franklin Benjamin, Scientist D	2021-2023	**Q1:**Identification & description of the samples collected; 1(one) tour to unexplored areas of Sikkim **Q2:**Identification & description of the specimens; 1(one) tour to West & South Sikkim & Darjeeling (undivided) areas **Q3:**Identification & description of the

			specimens; 1(one) tour to unexplored areas of Sikkim &Kalimpong areas. **Q4:** Identification & description of the specimens. Finalisation of the report & submission. **Total Tour : 03**
50.	FLORA OF KITAM BIRD SANCTUARY, SOUTH DISTRICT, SIKKIM Dr. Rajib Gogoi, Scientist E Dr. Monalisa Dey, Scientist C & Dr. Basant Singh, Bot. Asst. *New Project*	2022-2024	Q1**:** Literature survey, Herbarium screening 1 (one) field tour to KBS Q2: Processing and preparation of herbarium specimens, Identification of specimens. Q3: Identification & preparation of description Q4: 1(One) field tour to KBS for survey and collection. Processing, Identification & description of spp. **Total Tour : 02**
SOUTHERN REGIONAL CENTRE, COIMBATORE			
51.	**Flora of Tamil Nadu, Vol. 1 (Introduction, Ranunculaceae to Connaraceae)** Dr. W. Arisdason, Sci.'D' & Ms. M. Anantha Lakshmi, Bot. Asst.	2021-2024	**Q1 – Q4:** Two field tour (one in Q 2 & 3) to be clubbed and jointly conducted by all the team members to the Flora in the specific areas as per requirements. **Total tours: 2**
	Flora of Tamil Nadu, Vol. 2. (Fabaceae to Sambucaceae) Dr. K. A. Sujana Sci.'E' & Shri R.G. Vadhyar, Bot. Asst.		
	Flora of Tamil Nadu, Vol. 3 (Rubiaceae to Gentianaceae) Dr. C. Murugan, Sci. E' (Hqrs.) Dr. M. Murugesan, Sci. 'C' & Dr. S. Arumugam, Bot. Asst.		
	Flora of Tamil Nadu, Vol. 4 (Menyanthaceae to Lamiaceae) Dr. V. Sampath Kumar, Sci. 'E' Ms. Lydia Thomas, Bot. Asst. & Ms. RiniVijayan, Sr. Preserv. Asst.		
	Flora of Tamil Nadu, Vol 5. (Plantaginaceae to Ceratophyllaceae) Dr. R. Manikandan, Sci. 'E' Ms. R. Mehala Devi, Bot. Asst. & Shri Soumitra Bera, Preserv. Asst.-cum-Gard.		

	Flora of Tamil Nadu, Vol. 6 (Hydrocharitaceae to Eriocaulaceae) Dr. M.U. Sharief, Sci. 'E' Dr. S.S. Hameed, Sci. 'E' Dr. W. Arisdason, Sci. 'D' & Dr. V. Ravichandran, Sr. Preserv. Asst.		
	Flora of Tamil Nadu, Vol. 7 (Cypereaceae and Poaceae) Dr. C. Murugan, Sci. 'E' (Hqrs.)Dr. A.A. Kabeer, Sci. 'E' (CBL/BSI)& Dr. S. Arumugam, Bot. Asst.		
52.	**Revision of the Lichen family Pyrenulaceae in India** Dr. T.A.M. Jagadesh Ram Scientist-E	2017 – 2023 *(Extended for 1 year)*	**Q1:** Specimens brought on loan from BSI, CRC, Allahabad (257 collection numbers) will be studied morphologically, anatomically and chemically. Identification/verification and preparation of description and illustration. **Q2:** One Herbarium consultation tour to NBRI, Lucknow to study the earlier reported species. Preparation of descriptions and illustrations. **Q3:** Preparation of illustrations and discussion of the finalized species. **Q4:** Editing and submission of Manuscript. **Total tour: 1 (HCT)**
53.	***Ex-situ* Conservation of Endemic, Endangered and Threatened Plants (Orchids, Medicinal, Economic Important and Ornamental Plants)** Dr. S. Kaliamoorthy, Sci. 'E' & Dr. T.S. Sarvanan, Bot. Asst.	**Ongoing**	Q1: Maintenance of orchids and endemic tree species, and multiplication of the existing orchids and other endemic and threatened plants, and recording of phenology of plants in NOEG, Yercaud. Q2: Mid-level evergreen forests of Kakachi, Koadaiyar and core zone of KMTR Q3: One field tour Kanyakumari Wildlife Sanctuary Q4: Maintenance of orchids and endemic tree species, and multiplication of the existing orchids and other endemic and threatened plants, and recording of phenology of plants in NOEG, Yercaud.
54.	**Curatorial works and maintenance of the National Orchidarium and Experimental Garden (NOEG), Yercaud, associated with SRC, Coimbatore** Dr. S. Kaliamoorthy, Scientist-E & Dr. T.S. Saravanam, Botanical Asst.	**Ongoing**	**Q1:** Maintenance and conservation of the Endemic, Endangered and Threatened Plants (Orchids, Medicinal, Economic Important and Ornamental Plants). **Q2:** Multiplication and Maintenance of existing orchid collections, and other plants of the garden. Recording of phenology of orchids and other angiosperms present in the garden. **Q3:** One field visit to Wayanad district, Kerala for survey and live plant collection. Multiplication and Maintenance of existing orchid collections, and other plants of the garden. Recording of

			phenology of orchids and other angiosperms present in the garden. Field visit to Wayanad district, Kerala for survey and live plant collection. **Q4:** Multiplication and Maintenance of existing orchid collections, and other plants of the garden. Recording of phenology of orchids and other angiosperms present in the garden. **Total tour: 1**
WESTERN REGIONAL CENTRE, PUNE			
55.	**Phyto-Database of Konkan (Maharashtra).** Dr. Prashant K. Pusalkar, Scientist-E	2020-2024 *(Extended for one year)*	Q1: Data compilation of Phyto-Diversity of Konkan – Conservation dependent flora & habitats. Q2: Data documentation for Phyto-conservation status and needs. Q3: One field tour to Konkan, Maharashtra Data documentation for Phytoconservation status and needs. Q4: Finalization and submission of the report. **Total tour: 1**
56.	**Bambusicolous Fungi of Goa.** Dr. Rashmi Dubey, Scientist-E	2020-2024	Q1: Isolation, preservation and Documentation of bambusicolous fungi Morpho& Molecular characterization and Phylogenetic analysis of the samples identified. Documentation and taxonomic description of species identified. **Q2.** One Herbarium Consultation Tour to University of Agricultural Sciences, GKVK, Bangalore **Q3.** One Field tour to protected forest areas of Goa and its adjoining areas. **Q4.** Isolation, preservation and Documentation of bambusicolous fungi Scanning Electron Microscopic studies Morpho & Molecular characterisation and Phylogenetic analysis of the samples identified. Documentation and taxonomic description of species identified. **Total tour: 1 and 1 HCT**
57.	**Curatorial works and maintenance of the Herbarium of BSI, Pune** Dr. A. Benniamin, Scientist E and team	Ongoing	Digitization/ Scanning/ Photographs of Herbarium specimens housed at BSI, WRC, Pune.
58.	**Curatorial works and maintenance of the Botanic Garden of BSI, Pune** Dr. C.R. Jadhav, Botanist & Shri B.P. Kadam, Bot. Asstt. Dr. Prashant K. Pusalkar, Sc. E & Madhuri Pawar, Bot. Asstt	Ongoing	**Q1 – Q4:** Preparation of database on live plants of garden (real time data). Maintenance and development of Phytodiversity section of Konkan and adjoining areas of Western Ghats
59.	**Supplement to the Flora of Maharashtra** Dr. M. Y. Kamble, Scientist E	2021- 2023	**Q1.** Compilation of species as supplemented to the existing flora of Maharashtra (Preparation of descriptions) One Herbarium consultation tour to SUK, Shivaji University, Kolhapur, Maharashtra. **Q2**. Compilation of species as

			supplemented to the existing flora of Maharashtra (Preparation of descriptions) One Herbarium consultation tour to BAMU, Dr. Babasaheb Ambedkar Marathwada University, Aurangabad, Maharashtra Q3. Compilation of species and preparation of manuscript. Q4. Finalization and submission of Manuscript. **Total tour: 1 HCT**
INDUSTRIAL SECTION INDIA MUSEUM, KOLKATA			
60.	**Plants in the premises of Indian Museum – A pictorial guide** Dr. Debasmita Dutta Pramanick, Scientist-C, Dr. K. Pagag, Botanist & Dr. Sudeshna Datta, Botanist (CNH)	2022-2023	Q1: Identification and listing of tree species of seed plants in the premises of Indian Museum Q2: Documentation of listed plants comprising scientific name, family, common name, origin, distribution, ecology and uses Q3: Recording of phenological data and capturing good quality photographs; Preparing a location map of plants in Indian Museum premises Q4.Compilation of final reports. Preparing name plates containing Scientific name, family and common name *Notes:* QR codes for all the plants in Museum premises to be targeted
61.	**Barcoding, Database and Digitization of BSIS Herbarium.** Dr. Rajeev Kumar Singh, Botanist, Mrs. Sushreya Pal, Bot. Asstt, Ms. Shrabasti Das, Sr. Prev. Asstt	Ongoing	Q1-Q4: In every quarter about 1250 herbarium specimens will be barcoded and digitized. (5000 metadata target per year)
PUBLICATION DIVISION, HEADQUARTERS			
62.	**Red listing of Indian endemics as per IUCN criteria: Family Ranunculaceae** Dr. Debasmita Dutta Pramanick, Sci. C., Dr. D.K. Agrawala, Sci. E, Dr. J.S. Jalal, Sc. E & Dr. S.S. Dash, Sc.-E	2021 - 2023	**Q1 – Q4:** Literature survey, data collection and compilation. Preparation of taxon data sheet and entry of distribution data in the excel sheet for assigning geo-coordinates.
63.	**Revision of the genus *Aristida* L. (Poaceae) in India** Dr. Nagaraju Siddabathula Botanist *New Project*	2022-2024	**Q1-4:** Study of relevant literature pertaining to the study area.

TECHNICAL DIVISION, HEADQUARTERS			
64.	**Plants of Kolkata** Dr. S. S. Dash, Scientist -E Dr. R. K. Chakraborty, Retd. Sci. Dr. A. A. Mao, Director Dr. Umeshkumar L. Tiwari, Scientist-C (with assistance of Ms. Sinchita Biswas, Bot. Asst.)	2021 – 2024	**Q1 – Q4:** Compilation and submission of the manuscript in the form of A Handbook on Plants of Kolkata.
65.	**Wild useful/edible plants of Arunachal Pradesh** Dr. Umeshkumar L. Tiwari, Scientist-C, Dr. S.S. Dash, Scientist-E; Dr. K. Chowlu, Scientist-C, APRC and Dr. RanjitDaimary, Botanist APRC	2021 – 2024	**Q1:** Preparation of Check list of edible plant of Arunachal Pradesh **Q2:** One Field tours (East Kameng, West Kameng, Tawang, KurungKumey, Lower Subansiri, Upper Subansiri and Kra Daadi **Q3:** One Field tours. (Anjaw, Lohit, Namsai, Changlang, Tirap and Longding) **Q4:** Finalization and submission of the report. **Total tours: 2**
66.	**Documentation of economically important seaweeds of the Indian Coast** Dr. S. K. Yadav, Botanist *New Project*	2022 – 2025	**Q1-4:** Study and collection of relevant literature pertaining to the study area, documentation of the economically important seaweeds from the various coastal states.
67.	**ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA ON PTERIDOPHYTES FLORA OF INDIA (2020 – 2023) (Vols. I, II, & III)**		
	Pteridophytic flora of India. 110 spp. ▪ Dr.A.Benniamin, Scientist-E, WRC,Pune ▪ Dr.Jesubalan, Bot.AsstWRC,Pune	2021-2023	Q1-Q2: Data compilation of Pteridophytes (Dryopteridaceae) from India. Q3: 1 Herbarium Consultation tour to Sikkim and Shillong. Q4: Finalization and submission of the report. **Total tour: 1**
	130 spp. ▪ Dr B.S.Kholia, Scientist-E, NRC, Dehradun	2021-2023	Q1: Review of Literature and description of 20 allotted species; A herbarium consultation tour to N.E. India BSHC, LBG Darjeeling, ASSAM and ARUN (Tour subject to covid -19 epidemic); Herbarium tour DD as and when required. Q2: Review of Literature and description of 20 allotted species; Preparation of reports; A herbarium consultation tour to South India and Allahabad (MH, BSI, BSHC, and LBG) (Tour subject to covid -19 epidemic); Herbarium tour DD as and when required. Q3: Description of allotted species; Preparation of reports; A herbarium tour to PBL. (Tour subject to covid -19 epidemic); Herbarium tour DD as and when required. **Total tour: 3 HCT**
	80 spp.	2021-2023	**Q1.** Literature survey; Identification of collected plant samples from earlier tours;

	▪ Dr. V. K. Rawat, Scientist-E, APRC, Itanagar		documentation of identified taxa. **Q2.** Literature survey; Identification of collected plant samples from earlier tours; documentation of identified taxa. **Q3.** One Field tour to Upper Siang, Lower and Upper Dibang Valley. One HCT to ASSAM. Literature survey; Identification of collected plant samples from earlier tours; documentation of identified taxa. **Q4.** Finalisation of the manuscript and submission to HQ. **Total tour: 1 F.T & 2 HCT**
	80 spp. ▪ Dr.Brijesh Kumar, Botanist, CRC, Allahabad	2021-2023	Q1: Review of literature & description of species. Q2: Data compilation and & Preparation of draft manuscript. HCT to BHSC, ASSAM & ARUN and FT to Sikkim and Arunachal Pradesh areas. Q3: Data compilation and & Preparation of draft manuscript. HCT to MH & PBL. Q4: Data compilation and compilation and submission of Manuscript.

Summary of Annual Research Projects 2022-2023

No. of new projects starting in 2022-23: 18

No. of ongoing projects: 21

No. of previous projects continuing during 2022-23 and beyond: 27

Total number of projects: 66*

 # The officials who have been selected as Scientist in BSI and transferred, have to resubmit their proposal after posting at new places.

**One project on Flora of Himachal Pradesh, Vol-2 allotted to NRC, Dehradun & HAWHRC, Solan Jointly.*

***

भारत सरकार / GOVERNMENT OF INDIA
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय / MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE
भारतीय वनस्पति सर्वेक्षण / BOTANICAL SURVEY OF INDIA
सी.जी.ओ. कॉम्प्लेक्स, तृतीय एम. एस. ओ. भवन /CGO COMPLEX, 3RD MSO BUILDING
ब्लॉक एफ, पाँचवाँ और छठा तल / BLOCK F, 5TH & 6TH FLOOR
डी एफ ब्लॉक, सेक्टर १, साल्ट लेक / DF BLOCK, SECTOR I, SALT LAKE
कोलकाता - ६४ / KOLKATA – 700 064
भारतीय वनस्पति सर्वेक्षण
BOTANICAL SURVEY OF INDIA

File No. BSI- 288/1/ARP/2022-23-Tech. 1949 **Date :** 11th / 14th **November, 2022**

सेवा में / To

All Heads of Offices / Units
Botanical Survey of India

विषय / Sub.: Final Annual Research Programmes (ARP) of BSI for 2022-23-reg.

Ref.: Final Annual Research Programmes (ARP) of BSI for 2022-23/ 905, dated 11th Nov. 2022 -reg.

महोदय / Sir,

In partial modification of the Annual Research Programmes (ARP) of BSI for 2022-23/ 905, dated 11th Nov. 2022, I am directed to send herewith the Revised **Annual Research Programmes (ARP) of BSI for the year 2022-23**. This is for kind information and necessary action.

सधन्यवाद / Thanking you,

भवदीय / Yours sincerely,

14/11/2022

(एस. एस. दाश / S. S. Dash)
वैज्ञानिक ई / Scientist 'E'
(प्रभारी, तकनीकी अनुभाग / In- charge, Tech. Section)

Encl.: As above

Distribution:

1. All Heads of Offices / Units of BSI for information and necessary action.
2. Hindi Section, for translation
3. Guard file

Tel.: (033) 2321 4050 [Scientist In Charge, Tech. Section, BSI Hqtrs.]
E-mail: tech@bsi.gov.in; tech.bsi2021@gmail.com