MINUTES OF THE 10th RAMC MEETING OF BOTANICAL SURVEY OF INDIA HELD AT BOTANIC GARDEN OF INDIAN REPUBLIC (BGIR), NOIDA ON 20th & 21st SEPTEMBER, 2021

Day 1: 20th September, 2021

The 10th meeting of the Research Advisory & Monitoring Committee (RAMC) of Botanical Survey of India under the chairmanship of Prof. A. K. Koul was held on 20th & 21st September, 2021 at the Botanic Garden of Indian Republic (BGIR), NOIDA. The list of members who attended the meeting is as given below:

Prof. A. K. Koul (Retd. Prof.) University of Jammu, Jammu	Chairman
Shri. Ravi Agrawal, Addl. Secretary, MoEFCC, New Delhi - 110003	Chief Guest
Smt. Manju Pandey Joint Secretary, MoEF&CC, New Delhi -110003	Member
Prof. S. K. Barik Director, NBRI Lucknow – 226001	Member
Dr. Ashok Kumar (Director in Charge) Director, ICAR-NBPGR, New Delhi – 110012	Member
Dr. I.D. Bhatt, Sci. F (Nominated by Director in Charge) Director, GBPNIHESD, Almora-263 643, Uttarakhand	Member
Dr. R. R. Rao Former Director, CIMAP, Lucknow 226015	Member
Dr. A. A. Mao Director, BSI, Kolkata – 700064	Member
Dr. S. S. Dash Sci. E & Incharge, Tech. Section, BSI HQ, Kolkata – 700064	Member Secretary
Prof. Y. Vimala Pro VC, CCS University, Meerut – 250001	Special invitee
Prof. N. K. Dubey Prof. & Head, Dept. of Botany, BHU, Varanasi – 221005	Special invitee
Prof. S. B. Babbar Dept. of Botany, Delhi University, Delhi – 110007	Special invitee
Prof. M. Sabu Retd. Prof., Dept. of Botany, Calicut University, Kerala – 673635	Special invitee
Dr. J.L. Karihaloo Retd. Sci. , ICAR, New Delhi	Special Invitee

The RAMC meeting started at 10:00 AM on 20th September, 2021. At the outset, Dr. S.S. Dash, Member Secretary, welcomed the Chief Guest, the RAMC Chairman, Members, Special Invitees and officials from BSI.

Dr. A.A. Mao, Director, BSI briefed the members about background of the meeting; achievements of BSI during the last two years (2019-2021); and the future work plan. He highlighted the progress made in completion of Flora of India volumes and the Checklist of Flowering Plants of India. He briefed the members about availability of the checklist in the electronic platform, publication of e-flora of India and the recent update of BSI website with upload of type specimens, e-archive materials, botanical paintings and textile designs. He also acquainted the members with some of the challenges like shortage of resources and manpower. He also spoke about the various steps taken by BSI to fill all vacant posts.

Thereafter, Dr. S.S. Dash presented the proposed work plan for the next year. The presentation was followed by brief discussion during which members appreciated the efforts made by BSI in making substantial progress despite the constraints of manpower and budget. Prof. S.K. Barik, Director, NBRI stressed the need of collaborative research and better funding from MoEFCC under various schemes. This view was supported by other members as well. They urged that the BSI should facilitate universities and plant based research organizations for taxonomic training and capacity building.

Prof. A.K. Koul, Chairman, in his opening remarks, thanked the Chief Guest and all out station members for making to the meeting in spite of the COVID19 pandemic. He pointed out that their presence reflects the importance they attach to the RAMC meeting in BSI. He emphasized that the presence of the Additional Secretary facilitates appreciation of recommendations by RAMC by the ministry. He highlighted the important role played by BSI and its contribution in identification, enumeration and conservation of plant resources of the country. He emphasized the importance of having a national flora. He also expressed his satisfaction on the progress made by BSI during the past two years to take up the works, which is long pending, in a pilot mode. He urged members to focus on emerging global issues such as waning taxonomic expertise, nomenclatural changes, red listing, climate change, invasive species, etc. He thanked all members for participation and wished a fruitful outcome.

The Chief Guest, Shri Ravi Agrawal (Additional Secretary, MoEFCC) released the 'Plant Discovery 2020' of BSI and addressed the gathering. The chief guest started his address by reminding the members about the terms of reference of the Research Advisory and Monitoring committee of the Botanical Survey of India. He told the members that the committee has powers to strategize advice and monitor the research works of BSI, which is a premier research organization of the country with glorious history. He said he browsed the minutes of the meetings of RAMC held during last 10 years to acquaint himself to what extent the Committee has been exercising its powers. He suggested that the present RAMC should prepare a vision document for the BSI after holding discussions with in-house scientific staff and need of the hour.

He emphasized the need for Digitization to increase dissemination of information that BSI generates, the assets it has and the discoveries it makes from time to time. He referred to the variety of databases published during last decade and the impact they have made. He suggested that biology needs to be enriched by various kinds of technological advances which can help in

collecting, recording and retrieving volumes of information regarding the rich biodiversity of the country. He exhorted the members to find time to visit the Botanic Garden of Indian Republic (BGIR), where the Meeting was being held and give their inputs regarding its development. He expressed happiness for having been able to participate and acquaint himself with the way BSI is working and interact with members of the RAMC.

In response to the Chief Guest address, Dr. Avinash Bharati, Scientist C, BSI briefly presented BSI online database and successful launching of e-flora of India web portal (https://archive.bsi.gov.in). The online databases of collections of rare botanical paintings, natural dyes, textile design, economic botany and type specimens of Botanical Survey of India (BSI) which was inaugurated on 24th August, 2021. The Original set of Roxburgh's drawings consisting 2532 drawings preserved at Central National Herbarium, Howrah (CAL) is opened for public. Besides the 15 volumes of Thomas Wardle's specimens of "Fabrics dyed with Indian Dyes" contains information on 3000 samples of dye patterns, extracted from 64 plants; 18 volumes of textile designs contain about 1700 samples, starting with turbans and 'garment pieces' for men and women, are also now in the web portal. Apart from these, more than 27,000 type specimens of Phanerogams and 1700 type specimens of Cryptogams are available on the web portal which was a decade old exercise and an ambitious plan of BSI. The e-flora database of India provide information on 21558 taxa (including 1907 infra-specific taxa comprising of 1518 varieties, 337 subspecies, 52 forma and 1404 cultivated taxa) of angiosperms under 275 families and 2744 genera. This also includes 2.5 lakhs synonyms, which is one of the mega databases of plants. In addition to angiosperms checklist, the checklist also includes 9,066 taxa of algae, 3,005 taxa of Lichen, 926 taxa of Liverworts & Hornworts and 146 taxa of Gymnosperms are being opened for public. It was informed that around 78,000 people have visited the portal within a short time of one month and it is expected that, every year more than 5,00,000 may visit the web portal. The committee appreciated and said that it will have a great help to the society at large.

Mrs. Manju Pandey (JS, MoEFCC) in her short remarks thanked the RAMC Chairman and all members got participation in the meeting and wished the discussion lead to fruitful results.

The inaugural session ended with vote of thanks by Dr. Sandeep Chauhan, Scientist E & In-charge, BGIR, Noida followed by tea break.

Technical Session - 1

Prof. A. K. Koul, Chairman of RAMC welcomed all the members once again and invited Dr. S.S. Dash presented the action taken report on the decisions taken in the RAMC meeting, held on 30th and 31st May, 2019 along with scientific and technical achievements of BSI as given below.

Action taken reports on 9th RAMC

1. **Memorandum of Understanding (MoU):** As per the recommendations of the RAMC, BSI signed MoU with universities, various research organizations, listed below for exchange of scientific expertise in the field of Floral diversity, Plant systematics/taxonomy (both conventional and molecular), Bio-geographical and ecological studies, Long term ecological monitoring, Climate change-response, promoting taxonomic research and conducting Ph.D. programme for the research scholars.
   i. NBPGR on 03.03.2021
   ii. ICFRE, Dehradun on 15.02.2021
   iii. Sikkim University, Gangtok on 11.01.2021
   iv. Institute of Bio-resource and Sustainable Development (IBSD), Imphal on 20.11.2020
   v. Chaudhary Charan Singh University, Meerut, UP on 31.08.2019
   vi. Mansarovar Global University, Bhopal on 05.06-2019.

2. **Checklist of Flora of India:** As per the recommendations of the 9th RAMC, a dedicated team of 70 scientists and technical personnel of BSI was entrusted the task to bring out the complete Checklist of the Plants of India '*An Annotated checklist of the Flora of India'* (3 volumes) in one year. It has been accomplished successfully. These volumes enumerate accepted names of 21,600 taxa with over 2.5 lacs synonyms and their distribution in India. The three volumes were presented to the Chairman, Chief Guest and all Members of the RAMC.

3. **Flora of India:** Manuscripts of 14 volumes of the Flora of India, listed below, have been submitted and are under publications, whereas five volumes are under process. Sixty-eight scientific experts are involved in this work. The actual status is tabulated below:

Sl. No.	Volume number	Details of the families included in the volumes	Contributors and team leaders	Status of the manuscript
1.	Volume 8	Rosaceae	Team leader: Dr S. S. Dash Members : Dr Debasmita D. Pramanick	Completed and submitted in December 2020.
2.	Volume 10	Melastomataceae to Datiscaceae	Team leader: Dr. S.S. Dash and Late Dr B.K. Sinha	Completed and submitted in March 2020.
3.	Volume 14	Rubiaceae to Dipsacaceae.	Team leaders: Dr S.S. Dash & Dr. A.A. Mao Contributors: Dr. M. Gangopadhyay & Dr Arti Garg	Completed and submitted in March 2020

4.	Volume 15	Stylidiaceae to Primulaceae.	Team leader: Dr A.A. Mao, Dr S.S. Dash	Completed and submitted in December 2020
5.	Volume 16	Myrsinaceae to Apocynaceae.	Team leader: Dr S.S. Dash, Dr A.A. Mao & Dr. U.L. Tiwari	Completed and submitted in March 2020.
6.	Volume 17	Asclepiadaceae to Menynthaceae.	Team leader: Dr J. Jayanthi	Completed and submitted in March 2020.
7.	Volume 19	Scrophulariacae to Lentibulariaceae.	Team leader: Dr Arti Garg	Completed and submitted in March 2020.
8.	Volume 20	Gesneriaceae to Acanthaceae.	Team leader: Late Dr P. Laxminarasingham	Completed and submitted in August 2019.
9.	Volume 22	Nyctaginaceae to Elaeagnaceae.	Team leader: Dr. Manas Bhaumik	Completed and submitted in March 2020.
10.	Volume 24	Urticaceae to Ceratophyllaceae.	Team leader: Dr P.K. Pusalkar	Completed and submitted in March 2020.
11.	Volume 25 & 26	Hydrocharitaceae to Orchidaceae.	Team leader : Dr D.K. Agrawala	Under editing
12.	Volume 28	Pontederiaceae to Juncaginaceae	Team leaders Dr M.U. Sharief	Under editing
13.	Volume 30	Poaceae-Bambusoideae	Team leader: Dr. Puspa Kumari	Completed and submitted in December 2019
14.	Volume 31 & 32	Poaceae.	Team leader: Dr. P.V. Prasanna	Under editing

4. **<u>State Floras</u>:** Dr. K. Karthikeyan, Sci. E, CNH, Howrah was entrusted to complete the editing of 2nd volume of Flora of Andaman and Nicobar. He has completed the work and submitted the manuscripts for publication.

5. **List of five (5) projects for which extension is being sought requested.**

Sl. No.	ARP No	Name of the Project	Project Tenure	Executing Scientist	Regional Centre	Remarks
1	1	Caterpillar fungi in Himalaya: Morpho-taxonomy, Molecular phylogeny, Chemical & nutraceutical properties	2019 – 2021	Dr. Kanad Das, Sci. -E ; Dr. M. Hembrom, Botanist; Sri Arvind Parihar, Bot. Asstt	AJCBIBG	*Extension for one year (up to March 2022) is being sought.*
2	19	Study of Micro-Algae and monitoring of water quality of Sadir Lake of AJCB IBG	2019 – 2020	Dr. (Mrs.) Pratibha Gupta, Sci. -E	CBL	*Extended up to March 2022 is being sought.*
3	22	Revision of the genus *Gastrochilus*	2018 – 2021	Dr. Avishek Bhattacharjee, Sci. -C	CNH	*Extended up to*

		(Orchidaceae) in India.				*March 2022*
4	32	Flora of Nagaland (Vol. 1 & Vol. 2). Vol. I: Ranunculaceae to Asteraceae (Approx. 1500 taxa) by March 2020. Vol. II & III: Campanulaceae to Ceratophyllaceae and Hydrocharitaceae to Poaceae (Approx. 1500 taxa) by March 2021	2016 – 2021	Dr. N. Odyuo, Sci. – E Dr. Chaya Deori, Sci. –E Dr. David Lalsama Baite, Sci. C Dr. S.R. Talukdar, Bot. Assistant (under guidance of Dr. A. A. Mao)	ERC	*Extended up to March 2022*
5	57	Flora of Eagle Nest Wild Life Sanctuary and its adjacent regions, West Kameng District, Arunachal Pradesh.	2019 – 2022	Sri Sanjay Kumar Botanist Dr. S. S. Dash, Sci.-E	HQ	*Extended up to 2023*

Post Lunch Session (3:00 to 6:00 pm)

Discussion on Red List of Indian plants and nomenclatural changes: BSI has been doing significant work in documentation of Red listed species. From 1987 to 1990, BSI published 'Red Data Book of Indian plants' in 3 volumes mostly based on herbarium records. This publication has not followed and not as per the recently IUCN criteria. In 2003, BSI ENVIS published 'Red List of Threatened Vascular Plant Species in India' based on IUCN's 1997 Red List of Threatened Plants. The Red listing criteria change with time IUCN published the Red list categories and criteria version 3.1 in 2001. BSI is assessing the plants as per this version (Version 3.1), both at global and country level. Some of these assessments are available online on IUCN's website. From 2013-2019, BSI completed the Red list assessment of 770 North-east Indian orchids. There is need to re-assess all threatened plants of the country as per the recent categories and criteria of IUCN and publish the data in consolidated form. These assessments can be acceptable globally only after uploading in IUCN's portal, (where these will be validated by the expert panel of IUCN. Then it alone can be utilised by the Government in policy making matters without any dispute.

Prof. S. K. Barik, Director, NBRI gave his experience on the mega project on conservation of threatened plants of India funded by department of Biotechnology, Govt. of India. He shared some of the successful story of the project and application of the ecological niche modelling (ENM). In addition, he also informed about the global plant checklist in which he is also involved and how BSI can contribute in that exercise. In the discussion the Chairman also raised the issue of frequent nomenclature changes of CITES plants which is being exploited by traders. The experts informed that this nomenclatural changes do not affect the status of the CITIES plant.

Pteridophytic Flora of India: Dr. A. Benniamin, Scientist-E, WRC, Pune (Team leader) made a presentation of the progress made before the committee. The final manuscript will be submitted on March 31, 2023.

The session ended with vote of Thanks by Dr. S. Chauhan, Scientist E & in-charge BGIR, Noida.

Day 2: 21st September, 2021

Technical Session – 2

The meeting started at 10.0 am. with the Chairman summarizing the ground covered in the previous day. This was followed by Dr. S.S. Dash's presentation on the remaining Flora of India work and discussion on the Annual Research Programmes of BSI for the year 2020-21 & 2021-22.

Dr. R.R. Rao suggested that the publications related to Flora of India need to be sent to the concerned experts for review, which should be published in reputed journals. He also recommended that before publication the internal editorial team should verify and cross check the other relevant worker name and their contribution for the manuscripts.

Dr. A.K. Koul Chairman emphasized the urgency to complete publication of Flora of India as was decided in the 9th RAMC meeting.

6. Review of Annual Progress Report: The Annual Reports of BSI for the period 2019-2020 and 2020-21 were presented before the RAMC. The committee discussed and approved both the Annual Reports.

11.30 am: Tea Break

New Project Proposal:

1. Post Facto Approval of Annual Research Programme (ARP) (excluding Flora of India) of BSI for the year 2020-21

In the year 2020, RAMC meeting could not be conducted. Therefore, the department approved the Annual Research Programme (ARP) for the year 2020-2021 in anticipation of approval from RAMC as and when RAMC will be conducted. In this regard, The Annual Action plan for 2020-2021 listed below was discussed and approved.

List of 27 New Projects required for <u>Ex Post Facto Approval</u> during 2020 - 2021

Sl. No.	Name of the Project	Project Tenure	Executing Sci.	Regional Centre	Remark
1.	Development of Musa section (*Ex-situ* conservation) in AJC Bose Indian Botanic Garden, Howrah	2020 -2021	Dr. S.S. Hameed, Scientist-E Dr. R.Saravanan, Botanist	AJCB IBG, Howrah	Approved

2.	Revision of the family Musaceae in Andaman and Nicobar Islands along with population assessment.	2020 -2022	Dr. Lal Ji Singh, Scientist-E Mr. Gautam Anuj Ekka, Sr. Pres. Assistant	ANRC, Port Blair	Approved
3.	Enumeration of RET species of Arunachal Pradesh	2020-2022	Dr. Krishna Chowlu, Sci.-C	APRC, Itanagar	Approved
4.	Floristic studies in selected High Altitude Wetlands (HAWs) and environs representing 5 districts of Arunachal Pradesh	2020 -2023	Dr. M. R. Debta, Scientist-C	APRC, Itanagar	Approved
5.	Algal Flora of Purbasthali Wetland, Bardhaman, West Bengal	2020–2023	Dr. R.K. Gupta, Scientist-E	CNH Howrah	Approved
6.	Editing of Flora of Bihar Vol. 1 (Ranunculaceae-Mimosaceae)	2020–2021	Dr. Vinay Ranjan, Scientist-E, Dr. K. Avinash Bharati, Sci- C and Dr. Anand Kumar, Botanist	CNH Howrah	Approved
7.	Editing of Flora of Jharkhand Vol. 1 (Ranunculaceae-Mimosaceae)	2020–2021	Dr. Vinay Ranjan, Scientist-E, Dr. K. Avinash Bharati, Sci-C and Dr. Anand Kumar, Botanist	CNH Howrah	Approved
8.	Morphological and cytological studies of selected plants from CRC garden, Allahabad. (50 species).	2020-2021	Dr. Ashutosh Kumar Verma, Scientist-C	CRC, Allahabad	Approved
9.	Revamping of BSID herbarium, updation, incorporation & digitization.	2020-2021	Dr. M. Sankara Rao, Sci - C Mr. Ravikiran, Bot. Asst.	DRC, Hyderabad	Approved
10.	Herbaceous Flora of Meghalaya	2020-2021	Dr. Chhaya Deori, Scientist-E	ERC, Shillong	Approved
11.	Botanical illustration, art, flower painting and "plant portraits" of selected EET plants of India.	2020-2021	L. Ibemhal Chanu, Botanist	ERC, Shillong	Approved
12.	Floristic diversity of Dr. Y.S. Parmar University Campus, Nauni, Solan, Himachal Pradesh.	2020-2021	Dr. Kumar Ambrish, Sci-E and Dr. K.S. Dogra, Scientist-D	HAWHR, Solan	Approved
13.	Taxonomic revision of genus *Taraxacum* in India.	2020–2023	Mr. Sameer Patil, Botanist Mr. Sachin Sharma, Botanical Assistant Dr. S.K. Singh, Scientist 'E'	NRC, Dehradun	Approved

14.	In vitro mass multiplication and propagation and rehabilitation in natural habitat of useful and threatened species of the North-West Himalaya *Malaxis acuminata* D.Don. (Orchidaceae) *Dendrobium crepidatum* Lindl. & Paxton (Orchidaceae) *Delphinium denudatum* Wall. Ex Hook.f. & Thomson (Ranunculaceae) *Cyathea spinulosa* Wall. ex Hook. (Cyatheaceae) *Malaxis muscifera* (Lindl.) Kuntze (Orchidaceae) *Platanthera edgeworthii* (Hook.f. ex Collett) R. K. Gupta (Orchidaceae) *Magnolia kisopa* (Buch.-Ham. ex DC.) Figlar (Magnoliaceae) *Zanthoxylum armatum* DC. (Rutaceae) *Trachycarpus takil* Becc. (Arecaceae), *Selaginella adunca* A.Braun ex Hieron. (Selaginellaceae) and *Dalbergia latifolia* Roxb. (Leguminosae)	2020-2023	Dr. Giriraj Singh Panwar, Scientist-D Dr. Bhavana Joshi, Botanist	NRC, Dehradun	Approved
15.	Cytological studies of some selected chromosomally lesser-known/unknown plants and Liverworts from Botanic Garden of BSI, NRC, Dehradun and adjoining areas.	2020–2021	Dr. Puneet Kumar, Sci. - C & Dr. S.K. Singh, Sci. - E	NRC, Dehradun	Approved
16.	Ethnobotanical study of Tharu and Bhoxa tribe of Uttarakhand, India.	2020-2023	Dr. Harish Singh, Sci.-E	NRC, Dehradun	Approved
17.	Scanning Electron Microscopic (SEM) Study of Achenes of the genus *Ranunculus* L. *and Thalictrum* Tourn. ex L. in N.W. Himalaya.	2020-2021	Dr. Purushottam Kumar Deroliya, Bot. Asstt. & Dr. S.K. Singh, Sci. – E	NRC, Dehradun	Approved
18.	*Ex-situ* conservation of endemic endangered and threatened plants and recording of phenology of species found in the NOEG, Yercaud	2020-2021	Dr. S. Kaliamoorthy, Sci.-E Dr. T. S. Saravanan, Bot. Asstt	SRC, Coimbatore	Approved
19.	*Ex-situ* conservation of Endemic tree species of the region in NOEG, Yercaud	2020-2021	Dr. M.Y. Kamble, Scientist-D Shri. B. S. Elango, Bot. Asstt.	SRC, Coimbatore	Approved
20.	Flora of Kerala	2020-2022	Dr. C. Murugan Dr. K. Sujana Dr. M. Murugesan	SRC, Coimbatore	Approved
21.	Flora of Lakshadweep Islands – Manuscript finalization and updation.	2020-2021	Dr. Priyanka Ingle, Sci.-C	WRC, Pune	Approved
22.	Phyto-Database of Konkan (Maharashtra).	2020-2023	Dr. Prashant K. Pusalkar, Sci.-E	WRC, Pune	Approved
23.	Checklist of the Flowering Plants of Goa	2020-2021	Dr. C.R. Jadhav, Botanist & Dr. Prashant K. Pusalkar, Sci.E	WRC, Pune	Approved
24.	Bambusicolous Fungi of Goa.	2020-2024	Dr. Rashmi Dubey, Sci.-E	WRC, Pune	Approved

25.	Preparation of database on the algae specimens deposited at ISIM	2020-2021	Dr. K. Pagag, Botanist, Dr. S. Dutta and Dr M. Bhaumik, Sci.- E	ISIM, Kolkata	Approved
26.	Documentation of exhibits and materials of Botanical Gallery in Industrial Section, Indian Museum.	2020-2022	Dr. S. Dutta, Dr. K. Pagag, Botanist and Dr M. Bhaumik, Sci. -E	ISIM, Kolkata	Approved
27.	Pteridophytes Flora of India	2020-2023	Dr. A.Benniamin, Sci.-E, WRC,Pune (Dr. Jesubalan, Bot.Asst will assist Dr. A.Benniamin) Dr B.S.Kholia, Sci.-E, NRC, Dehradun Dr. Sachin Sharma will assist Dr. B.S. Kholia Dr. V. K. Rawat, Sci.-E, APRC, Itanagar Dr. Brijesh Kumar, Botanist, CRC, Allahabad (Dr. Pushpesh Joshi will assist Dr.Brijesh Kumar)	WRC, Pune, NRC, Dehradun, APRC, Itanagar and CRC, Allahabad	Approved

2. Approval of Annual Research Programme (ARP) of BSI for the year 2021-22

The RAMC discussed and approved seventeen new projects during 2021-22, which are listed below.

Sl. No.	ARP No	Name of the Project	Project Tenure	Executing Sci.	Regional Centre	Remark
1.	7	Conservation Assessment, ENM studies including GIS mapping of Endemic trees of Andaman & Nicobar Islands (at least 50 trees species)	2021-23	Dr. Chandan Singh Purohit, Sci. –C; Dr. Lal Ji Singh, Sci. -E Dr. Vivek C.P., Bot. Asstt. Shri Bishnu Charan Dey, Bot. Asstt.	ANRC	Approved
2.	12	Flora of Mount Abu Wildlife Sanctuary, Rajasthan(2021-23	2021-23	Dr. Sanjay Mishra, Sci-C & Dr. S. L Meena, Sci. -E	AZRC	Approved
3.	23	Digitization of Indian species belonging to the family Balsaminaceae and updation of Family Balsaminaceae in *e-flora* of India	2021-22	Dr Kumar Avinash Bharati, Sci. -C and Dr Anand Kumar, Botanist	CNH	Approved
4.	24	Exploration of plant diversity of Sacred Grooves of South Bengal	2021-23	Dr Kumar Avinash Bharati, Sci. -C	CNH	Approved
5.	26	Flora of Samaspur Ramsar Site, Raebareli, U.P. (799.4 hectare)	2021-22	Dr. Arti Garg, Sci. E Dr. Nitisha Srivastava, Bot. Asstt.	CRC	Approved

6.	27	Flora of Kunu National Park, Madhya Pradesh (344 sq km)	2021-23	Dr. A.K. Verma, Sci. C	CRC	Approved
7.	34	Herbaceous flora of Meghalaya (volume 2)	2021-22	Dr. Chaya Deori, Sci. -E	ERC	Approved
8.	35	Flora of Manipur Vol 2	2021-23	Shri B. B. T. Tham, Botanist, Shri. Harminder Singh, Bot. Asst. and Sri L.R. Meitei, Bot. Asst.	ERC	Approved
9.	38	Floristic diversity of Dr. Y.S. Parmar University Campus, Nauni, Solan, Himachal Pradesh.	2021 – 22	Dr. Kumar Ambrish, Sci. -E and Dr. K.S. Dogra, Sci. -D	HAWHRC	Approved
10.	42	Assessment of Plant diversity in Rajaji National Park, Uttarakhand.	2021 –24	Dr. Puneet Kumar, Sci. -C, Dr. S.K. Singh, Sci. -E Dr. P.K. Deroliya, Bot. Asst. & Poulami Ghosh, Bot. Asst.	NRC	Approved
11.	45	Development of Medicinal Plant Garden	2021-23	Dr. Harish Singh, Sci. -'E'	NRC	Approved
12.	47	Wild edible plants of Sikkim and Darjeeling Himalaya.	2021-23	Dr. Rajib Gogoi, Sci. E, Dr. J. H. Franklin Benjamin, Sci. C	SHRC	Approved
13.	48	Flora of Tamil nadu (1-7 Vols.) Vol. 1.	2021-24	Dr. W. Arisdason, Mrs. Ananthalakshmi & Ranunculaceae to Cornaceae (73 Fam.) [320 genera & 842 spp.]	SRC	Approved
		Vol. 2.		Dr. K. A. Sujana & Shri Rakesh Fabaceae to Sambucaceae (36 Fam.) [264 genera & 905 spp		
		Vol. 3.		Dr. C. Murugan Dr. M. Murugesan & Dr. S. Arumugam Rubiaceae to Gentianaceae (26 Fam.) [275 genera & 871 spp.]		
		Vol. 4.		Dr. V. Sampath Kumar Dr. R. K. Singh & Mrs. Lydia Thomas Menyanthaceae to Lamiaceae (19 Fam.) [224 genera & 812 spp.]		

		Vol 5.		Dr. R. Manikandan Mrs. Mehala Devi, R, Plantaginaceae to Ceratophyllacea e (33 Fam.) [191 genera & 648 spp.]		
		Vol 6.		Dr. M.U. Sharief, Sci. - E Dr. S. S. Hameed, Dr. V. Sampathkumar, Dr. Arisdason & Dr. M. Murugesan Hydrocharitacea e to Eriocaulaceae (39 Fam.) [210 genera & 567 spp.]		
		Vol 7.		Dr. C. Murugan Dr. A. A. Kabeer (CBL/BSI) & Dr. S. Arumugam Cyperaceae & Poaceae (2 Fam.) [152 genera & 652 spp.]		
14.	54	Supplement to the Flora of Maharashtra	2021-Dec. 22	Dr. M. Y. Kamble, Sci. E	WRC	Approved
15.	58	Red listing of Indian endemics as per IUCN criteria: Family Ranunculaceae	2021 - 23	Dr. A.N. Shukla, Sci. C., Dr. Debasmita Dutta Pramanick, Sci. C., Dr. D.K. Agrawala, Sci. D, Dr. J.S. Jalal, Sc. E & Dr. S.S. Dash, Sc.-E	HQ	Approved
16.	60	A Pictorial guide to the Plants of Kolkata	2021 – 23	Dr. S. S. Dash, Sci. -E Dr. R. K. Chakraborty, Retd. Sci. Dr. Umeshkumar L. Tiwari, Sci. -C (with assistance of Ms. Sinchita Biswas, Bot. Asst.)	HQ	Approved
17.	61	Pictorial Guide to the Wild useful/edible plants of Arunachal Pradesh	2021 –23. .	Dr. Umeshkumar L. Tiwari, Sci. -C, Dr. S.S. Dash, Sci. -E; Dr. K. Chowlu, Sci. -C and Dr. Ranjit Daimary, Botanist	HQ and APRC	Approved

With much deliberation, the committee approved the proposed Annual Research Programme (ARP) for the year 2021-2022. However, it stressed to complete the Flora of India on priority

basis. The committee also made the following suggestions in connection with new project proposals:

- An in-house evaluation committee be setup for identifying the gap areas and future goals of BSI. Therefore, the RAMC will decide and allot the projects accordingly. This will replace the existing practice of allotting projects on the basis of choice of the scientists.
- An in-house evaluation committee be set up to screen the proposed Actions Plans before putting these before the RAMC. Members of this committee be invited to RAMC meeting for discussion.
- Exchange of information on bio-prospective studies with ICAR, NBPGR and other institutes for development of products.
- The Manuscripts of the Flora of India be reviewed thoroughly before publication. The work be taken upon priority basis.
- Scientists who have submitted their project reports, be involved in clearance of backlog instead of initiating new projects as desired by the Director, BSI.
- The committee decided that no financial support be provided for extended projects, however, Director may consider only very genuine cases.

3. Increase in contingency amount for JRF and SRF: There has been a manifold increase in the price index since 2016. As a result, JPF and SPF cannot meet their research related tour expenditure, which adversely affects their research outputs. Therefore, RAMC proposes enhancement of annual grant from ₹15,000/- to 40,000/- and from ₹20,000/- to 50,000/- for JPFs and SPFs respectively. The committee agreed and approved the increase of contingency amount for Junior Research Fellows (JRF) grant from 15000/- to ₹ 40000/- and for Senior Research Fellow (SRF) for increase ₹ 20000/- to ₹ 50000/ - respectively.

4. Approval of committee for editing Flora of India: For refining and ensuring uniformity in the Flora of India left over volumes, the following internal editorial committee has been approved by RAMC. The committee will work under the guidance of Dr A. A. Mao, Director, BSI and under the supervision of Dr S.S. Dash Sci. E, In-charge, Technical Section BSI, HQ. The committee members as follows:

1. Dr. S.S.Dash, Scientist E, BSI HQ
2. Dr. J. Jayanthi, Sci. E, BSI, HQ
3. Dr. Jeewan Singh Jalal, Sci. E, BSI, HQ.
4. Dr. Dinesh Kumar Agrawala, Sci. E, In-charge Publication Section
5. Dr. Umeshkumar L. Tiwari, Sci. C, Technical Section
6. Dr. A.N. Shukla, Sci. C, Publication Section
7. Dr. Gopal Krishna, Botanical Assistant.

The chairman, RAMC suggested that the committee need to check the language, uniformity, relevant data, references of other workers and their contribution need to be acknowledged. The editorial committee should also discuss with relevant subject experts before submitting the manuscripts for publication. Dr. S.K. Barik stressed that time line for publication of the Flora of India adhered strictly.

5. Continuation of AJC Bose Post-Doctoral Fellowship Programme: The aim of the AJC Bose Post-Doctoral Fellowship Programme is to provide a platform to top quality scientists in the area of Plant Systematics/Taxonomy and conservation research. In the 9th RAMC meeting members suggested that BSI should immediately fill up all vacant Acharya Jagadish Chandra Bose Post-Doctoral Fellowships and utilize the selected fellows for completion of works related to publication of Flora of India.

6. Engagement of Emeritus Scientist in BSI and Smooth publication of state floras:
In recent past BSI use to engage 5 Emeritus Scientist under various research projects. Due to lack of funds, they were not engaged. BSI has published 45 volumes of flora belongs to 25 states of India. To complete all other state floras BSI need some assistance from the retired taxonomists who can devote their time and expertise to update the content as well the nomenclatures of all the manuscripts. Therefore, retired scientist those who have work experiences in plant taxonomy may be engaged as an emeritus scientist on project basis. Each emeritus scientist can be engaged for the period one year which can be extended up to another year. In this connection, the committee agreed and approved the engagements of 5 'Emeritus Scientists' as per the budget availability of BSI. The committee also agreed for the remuneration for the Emeritus Scientist as per CSIR or DST guidelines.

7. Appointment of consultant for Botanic Garden: Botanical Gardens of BSI need to be developed as par with international standards into one of the most uniquely landscaped structures of international repute. In this connection a consultant that has expertise in landscape designing, etc. (as and when required) needs to be appointed for scientific advice and monitoring of garden development. The committee discussed on the need of a consultant for development of BGIR, Noida. The chairman agreed that based on the requirements of BSI, the experts in the relevant field of garden development may be engaged initially for the period of 3 months at the supervisory level. Members of RAMC visited Botanic Gardens of Indian Republic and appreciated the efforts being made by BSI scientists in developing it scientifically and aesthetically. They proposed association of an expert Consultant in development process. The committee recommends appointment of a qualified Consultant initially for one year.

8. Approval for revised user's charges of BSI: In reference to the Ministry letter No. 2-8/2021-IFD dated 9th August, 2021 regarding **Implementation of the recommendations of Expenditure Management Commission (EMC) on user's charges in BSI**, Director BSI constituted a committee of scientists for a revision and recommendation of new user's charges in BSI. The committee met on **11.08.2021** through virtual mode and discussed the existing rates, which are around 10 years old, and compared them with rates charged by other research Institutions. After discussion, the committee recommended the revised rates for a period of 5 years. Recommendations of the committee were deliberated upon by the RAMC and approved.

The revised rates of user's charges are as follows:

Sl. No.	Services delivered	Existing users charges	Revised user's charges (in Rs.)
1.	Plant Identification	1. From Scientists, research scholars / students Rs. 50/- per sheet	A .UG & PG students: Rs. 250/- B. Research Scholars & Scientists: Rs. 500/-
		2. From NGOs and Commercial organizations Rs. 100/- per sheet	2. NGO / Other commercial organizations: Rs.500/-per sheet
2.	Authentication of crude plant samples	A. For Academic /Govt. agency purpose:Rs.500/- per sheet B. For Industrial / Commercial purpose: Rs.1000/- per sheet	A. For Academic /Govt. agency purpose: Rs.2500/- per sample B. For Industrial /Commercial purpose:Rs.10,000/ -per sample
3.	HPLC analysis for quantification of phenolic acids and flavonoids in plant samples (Against 21 standard phenolic acids and flavonoids available in our laboratory)	A. For Academic /Govt. agency purpose: No specified rates earlier B. For Industrial / Commercial purpose: No specified rates earlier	A. For Academic /Govt. agency purpose: Rs.3000/- per sample B. For Industrial /Commercial purpose: Rs.10,000/- per sample
4.	HPLC analysis for quantification of phenolic acids in plant samples (Against 12 standard phenolic acids available in our laboratory)	A. For Academic /Govt. agency purpose: No specified rates earlier B. For Industrial / Commercial purpose: No specified rates earlier	A. For Academic /Govt. agency purpose: Rs. 2000/- per sample B. For Industrial /Commercial purpose: Rs.7,000/- per sample
5.	HPLC analysis for quantification of phenolic acids in plant samples (Against 10 standard phenolic acids available in our laboratory)	A. For Academic /Govt. agency purpose: No specified rates earlier B. For Industrial / Commercial purpose:	A. For Academic /Govt. agency purpose: Rs.2000/- per sample B. For Industrial / Commercial purpose:

		No specified rates earlier	Rs.7,000/- per sample
6.	Estimation of seven water soluble vitamin (Vitamin C, B1, B2, B3, B5, B6, and B9) in plant sample by HPLC	A. For Academic /Govt. agency purpose: No specified rates earlier B. For Industrial / Commercial purpose: No specified rates earlier	A. For Academic /Govt. agency purpose: Rs. 2000/- per sample B. For Industrial / Commercial purpose: Rs.5000/- per sample
7.	Estimation of Protein carbohydrate, fat, sodium potassium and calcium in plant samples.	A. For Academic /Govt. agency purpose: No specified rates earlier B. For Industrial / Commercial purpose: No specified rates earlier	A. For Academic /Govt. agency purpose: Rs.350/parameter/sample B. For Industrial / Commercial purpose: Rs.350/parameter/ sample
8.	SEM Charges	A. For Research Scholar Academic purpose: No specified rates earlier B. For Industrial / Commercial purpose: No specified rates earlier	Dry Sample / Wet Sample A. For Research Scholar Academic purpose: Rs.1500/-/hour / Rs.2500/hour B. For Industrial/Commercial purpose: Rs.1500/-/ hour / Rs.2500/ hour
9.	Supply of Herbarium Digital Images	A. For Research Scholar Academic purpose: No specified rates earlier	A. For Research Scholar Academic purpose: I. Low resolution images (300 dpi): Free

			II. High resolution images (600 dpi):Rs.500/- per image
10.	Herbarium Methodology Training / workshop / Extension	Herbarium methodology Training Course: 15 days: I. Rs.5000/- for institutional candidates II. Rs.1000/- for unaided students	Herbarium methodology Training Course: 15 days: I. Rs.10,000/- for institutional candidates II. Rs.2000/- for unaided students
11.	Supply of Plant Material	I. Plants of common occurrence Rs.150/- per specimen+ cost of collection II. Plants of localised distribution Rs.200/- per specimen+ cost of collection III. Plants of rare distribution Rs.300/- per specimen+ cost of collection IV. Supply of material for research a. Dry: Rs.100/-+ cost of collection b. Pickled: Rs.150/- + cost of collection	I. Plants of common occurrence Rs.300/- per specimen+ cost of collection II. Plants of localised distribution Rs.400/- per specimen+ cost of collection III. Plants of rare distribution Rs.600/- per specimen+ cost of collection IV. Supply of material for research a. Dry: Rs.500/-+ cost of collection b. Pickled: Rs.500/- + cost of collection
12.	Field Work	Cost of transportation, boarding/lodging charges + materials + Rs.500/- per day and Rs.200/- for part of the day. (Double charges for commercial organisations and NGOs)	Cost of transportation, boarding/lodging charges + materials + Rs.5000/- per day. (Double charges for commercial organisations and NGOs). *Note: This is not a regular service and is*

			available only in exceptional cases.
13.	Sales of BSI Publications	As per BSI publication price list	

9. Discussion on Revised Mandate Proposal with Justification:

A draft revised mandate was put before the RAMC for discussion and necessary recommendation in the current changing scenario of applied taxonomy.

Major Mandates

1. Exploration inventory and documentation phytodiversity of Indian subcontinent.

This is the core mandate of BSI since its inception. It need to be continued for following reasons:

1. There are areas which are not yet fully explored.
2. New technology like the GIS need to be employed during exploration for getting a holistic approach for geospatial database of plants.
3. Intra-specific variation will be explored whenever it exists.
4. Adding of new species and loss of species reported earlier will be recorded.
5. Population studies will be undertaken wherever possible.
6. Earlier explorations were confined to flowering plants now non-flowering plants and fungi will also be included
7. Final outcome of the aforementioned objective will be made available to the public in the form of e-floras as well as user friendly field guides.
8. For biodiversity assessment, population study monitoring of EET species and mapping will be done during floristic explorations. This process cannot be carried out by all the officials, so one dedicated GIS cell/unit (Mapping cell equipped with modern tools) may be envisaged with 2-3 scientists at any centre and they will take up mapping of vital species in throughout India.

2. Revisionary/ Monographic studies of selected taxa.

Species complexes need resolution through critical taxonomic, Biosystematic studies and data on morphology, cytology and molecular biology and other branches will be undertaken in this regard.

3. Identification and assessment of Red list species as per the IUCN criteria.

Loss of any taxa is a serious concern which needs to be halted as early as possible. The first step in this direction is identification of vulnerable species. BSI published the red list of vascular plants species in three volumes between 1987 and 1990 These are not based on field data nor are they based on criteria as laid by IUCN. Unless they are revised as per these requirements they are of little use. The work needs to be undertaken at the earliest to identify threatened species and save them from getting lost.

4. *Ex situ* conservation of critically endangered plant species

There is no state or central agency which is involved in conservation of threatened plants. If the work is not taken up immediately, many taxa will be lost. BSI made a beginning in this direction through establishment of lead botanic Gardens. Therefore, the work needs to be taken on a larger scale at the earliest with the help of field stakeholders such as state forest Department, working government institutions, Uniersities, NGo's, etc..

5. Species restoration and rehabilitation in natural habitats.

The efforts being made to conserve threatened plants should culminate in transferring the *ex situ* raised plants to natural habitat to restore broken food chains and food webs. This is the most challenging task without accomplishment of which work on conservation means little. BSI will attempt to devlop a network with other Central Agencies and State Government to accomplish the task.

6. To undertake Climate Change Impact/Vulnerability study on Indian flora and vulnerable habitats/ecosystems.

The need to initiate work in this area requires no elaboration in this view of its awareness and importance climate changes induced by ecological changes is affecting vegetative as well as reproductive phases of wild as well as cultivated plants. Due to which species distribution performance and reproductive efficiency are getting affected. It is time to select species that can sustain humankind even under altered environmental conditions. The herbarium resources raised during more than two centuries (19th to 21st centuries) is a gold mine that can provide good lead in making out the plant response to climate change.

7. Population studies, ecological niche modelling (ENM), mapping and development of GIS database of endemic, threatened, economically important and traded plant species.

The outcome of the studies will be helpful in the restoration of threatened plants in their natural habitats. This study will also helpful to identify critical habitat for specific plant conservation. Thus it will help in planning and conservation management.

8. Development of 'Molecular Data Base' of Indian Plants

The database will serve in elucidating phylogenetic relationship among plants that help in systematics, plant improvement and bio-prospecting.

9. Capacity building in Plant taxonomy

Following substitution of classical Botany by Modern Biology in under and postgraduate curriculum, taxonomic teaching has suffered serious setback. Young botanists cannot undertake work related to biodiversity, bio-resources and plant identification. For last several years BSI has been organising capacity building programmes. It is proposed to organise post M.Sc. refresher courses and certificate courses. BSI fellowship will be floated for Doctoral and Post-doctoral programmes. For acquiring scientists with modern tools and technique related to biodiversity and bio-prospecting over-seas. Fellowship programs will also be floated.

10. Survey and documentaion of traditional knowledge (ethnobotany), Identification/ documentation of wild relatives of cultivated plants, economically important, high valued medicinal and threatened species and analysis of nutritive value of ethno-food plants of the country.

BSI has proven expertise in documentation of traditional knowledge (ethnobotany). This very much required to preserve the valuable knowledge possessed by the tribes for posterity.
Compendium on wild relatives of edible plants, aromatic and medicinal plants of India has to be brought out with their state wise distribution maps.

11. Documentation of Invasive - Plant Species.

BSI will collect and analyse the enormous data in its possession and bring out a compendium on Invasive Alien Species. Fragmentary publications available on this subject will be consolidated, enriched, supplemented with photographs and illustrations. A dedicated cell/section will be established for achieving this objective. A compendium of all Invasive Alien Species in India will be prepared which will include the period of introduction, migration history, threat impact, and control measures.

12. Developing an online national database of herbarium holdings, museum collections, botanical literature and live specimens; networking the information within the BSI and with other stakeholders

BSI has rich repository of botanical archives besides its live plant collections. By developing an online portal for Phyto Database on various aspects of Indian Flora such as Invasive Alien Plants, Endemic Species, Red-Listed Species, museum holdings, archival materials etc.

13. Public Private partnership on outreach activities

Public is evolving into well informed communities. The survey will strive to take its research activities/findings etc. to the doorstep of public through community participation, user-friendly floras. We require building people-friendly and more innovative interpretation centres to maximize awareness among people. Emphasis will be given to outreach component for increasing the awareness about the flora or floristic wealth/Threatened species of the area or region surveyed to the local communities by the team BSI as a part of adequate conservation measure at the grassroots level.

14. Preparation of seed, pollen and spore atlas of Indian plants; deposition of materials collected in appropriate national repository.
This a part of exploration and documentation work, which will enhance our understanding on the plant resources of the country.

15. Revival and Revamping of Pharmacognosy and Phyto-chemistry units.

Pharmacognosy and Phytochemistry Units have to be revamped with laboratory facilities and adequate staff; the edible, medicinal and other economic plants identified through ethnobotanical surveys should be subjected for pharmaceutical and nutraceutical studies.

16. Providing assistance to Governments (Central/State), Local administrations, Industries and people in Phyto-research, management, conservation and sustainable utilization.

BSI can play a greater proactive role in providing the advisory services/assistance in the Phyto-research, management, conservation and sustainable utilization.

Based on the above discussion by RAMC members suggested that, in the changing scenario BSI need to revise its mandate as follows: (new additions mentioned as italic)

Primary Mandate:

1. Exploration, inventorisation and documentation of phytodiversity (including non-flowering plants) in India; Publication of National, State and District Floras; *Revisionary/Monographic studies on selected plant groups. Documentation of Invasive plant species.*
2. *Identification of Red list species as per IUCN criteria*; species rich areas needing conservation; ex situ conservation of critically endangered plant taxa in botanical gardens; *species restoration and rehabilitation in natural habitats*.
3. Survey and documentation of traditional knowledge (ethnobotany), Identification/ documentation of *wild relatives of cultivated plants, economically important, high valued medicinal and threatened species and analysis of nutritive value of ethno-food plants of the country.*
4. Develop National database of Indian plants, including herbarium specimens, live specimens, botanical paintings, illustrations etc.

Secondary Mandate:

1. Capacity building in plant taxonomy through *refresher courses and post M.Sc. certificate course; Public Private partnership on outreach activities*.
2. Preparation of seed, pollen and spore atlas of Indian plants; deposition of materials collected in appropriate national repository.
3. Develop and maintain Botanical Gardens, Museum and Herbaria.
4. *To undertake Climate Change Impact/Vulnerability study on Indian flora and vulnerable habitats/ecosystems; Population studies, ecological niche modelling (ENM), mapping and development of GIS database of endemic, threatened, economically important and traded plant species.*
5. *Development of 'Molecular Data Base' of Indian Plants;*
6. *Providing assistance to Governments (Central/State), Local administrations, Industries and people in Phyto-research, management, conservation and sustainable utilization.*

The Committee also suggested to finalize and put up in the next RAMC for final approval.

Open discussion:

In the post Lunch session an open discussion was held on issues concerning plant sciences in general and taxonomy in particular problems faced by BSI which slow down the pace of work were discussed by RAMC members for follow up with concerned agencies:

1. *Impact of change of nomenclature of RET species*: Dr. J. L. Karihaloo drew the attention of members to the practice of nomenclatural changes of plants including the Red-list species. Appreciating the need for changing plant names, he drew attention of members to the danger such name changes cause to conservation of Red- list plant species. He proposed that BSI should organise a conference of Senior Plant Taxonomists of the country to discuss the issue and find a way outs to save endangered plant species from plunder which will lead to their extinction. The members endorsed the suggestion made by Dr. Karihaloo.

2. *Revival of classical Botany in under and postgraduate Botany teaching programmes*: Dr. J. L. Karihaloo drew the attention of RAMC members to the need to find ways to achieve the objective of

reviving classical Botany in view of its importance in addressing issues concerning Biodiversity and Bioresources. He referred to the bill introduced in American Congress by nearly 50 senators in 2019. He proposed that BSI should initiate steps to cause awareness about this issue to the government.

3. *Concern about paucity of scientific staff and funds*: Members of RAMC expressed their concern regarding large number of vacancies of different positions of scientists in different circles of BSI which hampers work and adversely affects work output and delays project completion. The members requested the Director to pursue the two issues vigorously in the Ministry office.

Finally, the Chairman commended the accomplishment of scientific staff of BSI during the period 2019-20 and 2020-21, despite the pandemic. He expressed satisfaction with regard to the progress made in completion of work related to publication of Flora of India. He thanked the members of RAMC for their valuable inputs. He appreciated the keen interest of the Additional Secretary, Shri Ravi Agarwal and Joint Secretary, Mrs. Manju Pandey in facilitating the working of BSI to maintain its national and international status.

Annexure 1

ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA ON FLORA OF INDIA (2020 – 21)

I. DICOTYLEDONS

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
1.	**Flora of India, Vol. 8** 3 Families: *Rosaceae, Chrysobalanaceae, Neurardaceae* *ca* 513 species **Team Leader:** Dr. S. S. Dash, Scientist-E **Team Members:** Dr. Debasmita Dutta Pramanick, Scientist-C Sri Sanjay Kumar, Botanist	2019 – March 2021	The complete manuscript to be submitted by December, 2020.
2.	**Flora of India, Vol.10** 14 Families: *Melastomataceae, Lythraceae, Altingiaceae, Sonneratiaceae, Crypteroniaceae, Punicaceae, Onagraceae, Trapaceae, Turneraceae, Passifloraceae, Caricaceae, Curcurbitaceae, Begoniaceae, Datiscaceae* *ca* 80 genera and *ca* 475 species **Team Leaders:** Dr. B. K. Sinha, Scientist-F (Retd.) Dr. S. S. Dash, Scientist-E	2019 –2020 ***(Extended up to December, 2020)***	Manuscript submitted and is in editing stage. Edited manuscript to be submitted by December, 2020.
3.	**Flora of India, Vol. 11** 10 Families: *Cactaceae, Aizoaceae, Molluginaceae, Apiaceae, Araliaceae, Cornaceae, Alangiaceae, Nyssaceae, Caprifoliaceae, Adoxaceae* *ca* 94 genera and *ca* 375 species **Team Leader:** Dr. C. Murugan, Scientist-E **Team Members:** Dr. W. Arisdason, Scientist-D Dr. M. Murugesan, Scientist-C Dr. Manikandan, Scientist-E Dr. Sujana K. A., Scientist-D	2019 – 2020 ***(Extended up to October, 2020)***	Compiled and updated manuscript to be submitted by October, 2020.
4.	**Flora of India, Vol. 14** 3 Families: Rubiaceae, Valerianaceae & Dipsacaceae *ca* 85 genera & *ca* 610 species **Team Leader:** Dr. M. Gangopadhyay, Scientist-D (Retd.) **Team Member:** Dr. (Mrs.) Aarti Garg, Scientist-E	2018 – 2020 ***(Extended up to March, 2021)***	Manuscript has been already prepared. Edited manuscript to be submitted by March,2021.

5.	**Flora of India, Vol. 15** 12 Families: Stylidiaceae, Goodeniaceae, Campanulaceae, Sphenocleaceae, Ericaceae, Clethraceae, Pyrolaceae, Monotropaceae, Epacridaceae, Diapensiaceae, Plumbaginaceae, Primulaceae *ca* 41 genera and *ca* 500 species **Team Leader:** Dr. A. A. Mao, Director & Scientist 'G' **Team Members:** Dr. S. S. Dash, Scientist-E Dr. Umesh Tiwari, Scientist-C Dr. Vijay Mastakar, Botanical Assistant	2019 – 2020 ***(Extended up to December, 2020)***	Manuscript has already been prepared and will be submitted by December, 2020.
6.	**Flora of India, Vol. 16** 8 Families: Myrsinaceae, Sapotaceae, Ebenaceae, Styracaceae, Symplocaceae, Oleaceae, Salvadoraceae, Apocynaceae *ca* 69 genera and *ca* 389 species **Team Leaders:** Dr. S.S. Dash, Scientist-E Dr. A.A. Mao, Director & Scientist 'G' **Team Members:** Dr. Arati Garg, Scientist-E Dr. Umeshkumar L. Tiwari, Scientist-C Dr. Sanjay Mishra, Scientist-C Dr. Anand Kumar, Botanist Dr. A. Pramanick, (Retd.) Scientist-E Dr. Riju Palika,(former Research Scholar)	2019 – 2020 ***Re-alloted July 2020 to December, 2020)***	Compiled and updated manuscript to be submitted by December, 2020.
7.	**Flora of India, Vol. 17** 5 Families: Asclepiadaceae, Loganiaceae, Buddlejaceae, Gentianaceae, Menyanthaceae *ca* 114 genera and *ca* 641 species **Team Leader:** Dr. J. Jayanthi, Scientist-E **Team Members:** Dr. Prachiti - D. Mule, Botanical Assistant	2018 – 2020 ***(Extended up to September, 2020)***	Manuscript completed and submitted. Photos to be submitted by September, 2020.
8.	**Flora of India, Vol. 18** 6 Families: Polemoniaceae, Hydrophyllaceae, Boraginaceae, Convolvulaceae, Cuscutaceae, Solanaceae *ca* 73 genera and *ca* 625 species **Team Leader:** Dr. S. L. Meena, Scientist-E **Team Members:** Dr. Sanjay Mishra, Scientist-C Dr. P. Hari Krishna, Botanical Assistant	2019 – 2020 ***(Extended up to October, 2020)***	Manuscript completed and submitted. Photos to be submitted by October, 2020.

9.	**Flora of India, Vol.19** 3 Families: Scrophulariaceae *(*series : *Pseudosolaneae, Antirrhinideae* and *Rhinanthideae)*, Orobanchaceae and Lentibulariaceae *ca* 68 genera and *ca* 570 species **Team Leader:** Dr. Arti Garg, Scientist-E **Team Members:** Dr. O. N. Maurya, Scientist-D Dr. Achuta Nand Shukla, Scientist-C Dr. Ashutosh Verma, Scientist-C Dr. Manas Debta, Scientist-C Dr. Anand Kumar, Botanist	2019 – 2020 ***(Extended up to September, 2020)***	Manuscript completed and submitted. Photos to be submitted by September, 2020.
10.	**Flora of India, Vol. 20** 4 Families: Gesneriaceae, Bignoniaceae, Pedaliaceae and Acanthaceae 108 genera and *ca.* 646 species **Team Leader:** Late Dr. P. Lakshminarasimhan, Scientist-E (Retd) **Team Members:** Dr. K. Karthigeyan, Scientist-E Dr. W. Arisdason, Scientist-D Dr. Gopal Krishna, Bot. Asstt.	2018 – December 2019 ***(Extended up to September, 2020)***	Compiled and updated manuscript to be submitted by September,2020.
11.	**Flora of India, Vol. 21** 5 Families: Verbenaceae, Symphrometaceae, Avicenniaceae, Lamiaceae and Plantaginaceae 73 genera and ca 500 species **Team Leader:** Dr. V. Sampath Kumar, Scientist-E **Team Members:** Dr. Gopal Krishna, Botanical Assistant Dr. Anant Kumar, Botanical Assistant	2019 – 2020 ***(Extended up to October, 2020)***	Compiled and updated manuscript to be submitted by October, 2020.
12.	**Flora of India, Vol. 22** 21 Families: Nyctaginaceae, Amaranthaceae, Chenopodiaceae, Basellaceae, Phytolacaceae, Polygonaceae, Podostemaceae, Nepenthaceae, Rafflesiaceae, Mitrastemonaceae, Aristolochiaceae, Piperaceae, Saururaceae, Chloranthaceae, Myristicaceae, Monimiaceae, Lauraceae, Hernandiaceae, Proteaceae, Thymeleaceae, Elaeagnaceae *ca*. 128 genera 762 species **Team Leader:** Dr. Manas Bhaumik, Scientist-E **Team Members:** Dr. Sankar Rao, Scientist-C Dr. Geeta Chowdhury, Botanist Dr. (Mrs.) Sudeshna Dutta, Bot. Asstt. Sri S. K. Sharma, Sr. Pres. Asstt.	2019 – 2020 ***(Extended up to October, 2020)***	Compiled and updated manuscript to be submitted by October,2020.

13.	**Flora of India, Vol. 24** 11 Families: Urticaceae, Moraceae, Cannabaceae, Ulmaceae, Juglandaceae, Myricaceae, Casuarinaceae, Fagaceae, Betulaceae, Salicaceae, Ceratophyllaceae *ca.* 63 genera and 363 species **Team Leader:** Dr. P. K. Pusalkar, Scientist-E **Team Member:** Dr. Priyanka Ingle, Scientist-C	2019 – 2020 ***(Extended up to December, 2020)***	Compiled and updated manuscript to be submitted by December, 2020.

II. MONOCOTYLEDONS

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
14.	**Flora of India, Vol. 25** (total *ca* 85 genera & 725 species) Family: Hydrocharitaceae (10 genera, 33 species) Family: Burmanniaceae (3 genera, 11 species) Family: Orchidaceae (72 genera, *ca*. 681 species) Sub-family-Apostasioideae (1 genus, 3 species) Sub-family-Vanilloideae (6 genera, 16 species) Sub-family-Cypripedioideae (2 genera, 13 species) Sub-family-Orchidoideae (37 genera, 239 species) Sub-family-Epidendroideae (in part) Tribe-Neottieae (4 genera, 31 species) Tribe-Tropidieae (2 genera, 7 species) Tribe-Gastrodieae (2 genera, 9 species) Tribe-Nervilieae (3 genera, 18 species) Tribe-Arethuseae (11 genera, 75 species) Tribe-Malaxideae Sub-tribe - Dendrobiinae (4 genera, 270 spp.) **Flora of India, Vol. 26** (*ca.* 83 genera & 579 spp.) *Remaining part of Family Orchidaceae* Sub-family Epidendroideae Tribe Malaxideae Sub-tribe Malaxidinae (4 genera, 134 species) Tribe- Cymbidieae (4 genera, 59 species) Tribe-Epidendreae (7 genera, 16 species) Tribe- Collabieae (15 genera, 58 species) Tribe -Podochileae (9 genera, 90 species) Tribe -Vandeae (44 genera, 222 species) **Team Leader:** Dr. D. K. Agrawala, Scientist-E **Team Members:** Dr. J. S. Jalal, Scientist-D Dr. Avishek Bhattacharjee, Scientist-C Dr. Chhaya Deori, Scientist-E	March 2019 to June 2020 ***(Extended up to December, 2020)***	Compiled and updated manuscript to be submitted by December, 2020.

15.	**Flora of India, Vol. 27** 17 Families: Agavaceae, Aloeacaceae, Amaryllidaceae, Asparagaceae, Bromeliaceae, Cannaceae, Costaceae, Dioscoreaceae, Hypoxidaceae, Iridaceae, Liliaceae, Marantaceae, Musaceae, Smilaceae, Stemoniaceae, Taccaceae, Zingiberaceae *ca* 64 genera and *ca* 592 species **Team Leader:** Dr. Rajib Gogoi, Scientist-E **Team Members:** Dr. S.K. Singh, Scientist E Dr. Ramesh Kumar, Scientist-D Dr. J. H. Franklin Benjamin, Scientist - C Dr. Mahua Pal, Botanist Dr. Basant Kumra Singh, Botanical Assistant	March, 2019 to December, 2020	Compiled and updated manuscript to be submitted by December, 2020.
16	**Flora of India, Vol. 29** 2 Families: Cyperaceae and Eriocaulaceae **Cyperaceae:** (*ca* 610 taxa comprising *ca* 555 species 23 subspecies & 32 var. under 33 genera) **Eriocaulaceae**: (*ca* 85 species) **Team Leader:** Dr. V. P. Prasad, Scientist - E (Retd.)	2019 – 2020 ***(Extended up to December, 2020)***	Compiled and updated manuscript to be submitted by December, 2020.
17	**Flora of India, Vol. 30** Family: Poaceae – Bambusoideae *ca* 30 genera and *ca* 150 species **Team Leader:** Dr. Pushpakumari, Scientist-D	2019 – 2020 ***(Extended up to July, 2020)***	Compiled and updated manuscript to be submitted by July, 2020.
18	**Flora of India, Vol. 31 & Vol. 32** Family: Poaceae *ca.* 248 genera and *ca.* 1480 species **Team Leader:** Dr. P.V. Prasanna, Scientist-G **Team Members:** Dr. K.A.A. Kabeer, Scientist-E Dr. L. Rasingam, Scientist-D Dr. Manish Khandwal, Scientist-D Dr. C. S. Purohit, Scientist-C Dr. Sangita Dey, AJCB-PDF Dr. K. Prasad, AJCB-PDF Dr. C. P. Vivek, Botanical Assistant Mr. S. Nagaraju, Botanical Assistant Dr. S. Arumugam, Bot. Assistant Dr. J. Swamy, Botanical Assistant Dr. P.Singh, Ex- Director Mrs. Suthrishna Kar, Ex Res. Sch. Dr. S.K. Srivastava Dr. S.R. Yadav Dr. G. Potdar Dr. K.V.C. Gosavi Dr. Alok Chorghe	2019 – 2020 ***(Extended up to November, 2020) for Vol. 31 and January, 2021 for Vol. 32***	Compiled and updated manuscripts of Vol. 31 and Vol. 32 to be submitted by November, 2020 and January, 2021 respectively.

ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA (2020 – 2021)
OTHER THAN FLORA OF INDIA

AJC BOSE INDIAN BOTANIC GARDEN, HOWRAH

Sr. No.	Name of the Project	Period	Quantifiable deliverables for 2020 – 21
1.	**Caterpillar fungi in Himalaya: Morpho-taxonomy, Molecular phylogeny, Chemical & nutraceutical properties** Dr. Kanad Das, Scientist-E Dr. M. Hembrom, Botanist Sri Arvind Parihar, Bot. Asstt	2019 – 2021	**Micromorphological characterization:** Micromorphological characterizations from 5 sets of samples will be re-observed as most of the fruiting bodies bear vegetative structures and comparison will be made to check the conspecificity or identify the species in different parts of Himalaya. Molecular phylogenetic relationship: To determine phylogenetic relationship amongst the collections from different states of Himalaya and to check the conspecificity one or two more target genes will be isolated and phylogenetic estimations/inferences with the sequence data will be drawn/prepared through Maximum Likelihood (ML) analysis from available sets of specimens as per the requirement. Nutraceutical properties: From available field nos. from different localities of Uttarakhand, Sikkim and West Bengal assessment of nutraceutical properties will be checked and comparison will be made.
2.	**Development of Musa section (*ex-situ* conservation) in AJC Bose Indian Botanic Garden, Howrah** Dr. S.S. Hameed, Scientist-E Dr. R.Saravanan,Botanist *New Project*	2020 – 2021	The germplasm of different *Musa* and *Callimusa* varieties shall be collected and through field tours.
3.	**Development of an Orchidarium in AJCBIBG through collection, introduction and ex-situ conservation of the orchids of Eastern ghats of India** Dr. S.P. Panda, Scientist-C Dr. R. Saravanan, Botanist *New Project*	2020 – 2022	Development of an orchidarium. Collection of live orchid specimens including rare and endemic species. Collection and introduction of orchid hybrids. Ex-situ /germplasm conservation of orchids. Preparation of a flowering calendar of the grown orchid species. Vegetative propagation of the orchids where ever possible. Field tour 1 in 4th Quarter
4.	**Wood rotting fungi of Valmiki National Park** Dr. M. Hembrom, Botanist	2018 – 2021	**Micromorphological characterization:** Micromorphological characterizations from those fruiting bodies will be undertaken. Morpho-taxonomic comparison will be made from 150 specimens to check the conspecificity or identify the species in different parts of globe. Molecular phylogenetic relationship: One or two more target genes will be isolated and phylogenetic estimations/inferences with the sequence data will be drawn/prepared through Maximum Likelihood (ML) analysis from available sets of specimens as per the requirement.
5.	**GIS phyto-mapping & digitization of shrubs and trees in AJC Bose Indian Botanic Garden** Dr. Kanad Das, Scientist-E Dr. C. M. Sabhapathy, Botanist Dr. B. K. Singh, Botanical Assistant	On going	Bringing out the Mobile application of the so far recorded data accessible to the interested person. Tagging along with recording the coordinates for the Division 9,10,11,12,13,16,23 and 24 (*ca* 2000 trees). Labelling with scientific names for Iconic plants. Re-examining the tags of the trees in the Divisions of 1, 2, 3, 4, 5, 6, 7, 8, 14, 15, 17, 18, 19, 20, 21 & 22 and recording the coordinates along with Labelling with scientific names for Iconic Plants. Updating the data in

			Mobile application.		

Nature of Tour	Q1	Q2	Q3	Q4	Total
Field Tours/ ex situ conservation tour	-	-	-	1	1

ANDAMAN & NICOBAR REGIONAL CENTRE, PORT BLAIR

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
5.	***Ex-situ* conservation of RET species (Bamboos, Palms, Zingibers, endemic tree species) of Andaman & Nicobar Islands at Dhanikhari Exp. Garden cum Arboretum and raise nursery.** (No. of species to be multiplied 30 species, each with minimum 500 seedlings) Dr. Chandan Singh Purohit, Scientist-C Dr. Vivek C. P., Botanical Assistant	2019 – 2022	Q1.Literature survey, herbarium consultation, multiplication and maintenance of previous collection. Q2.Literature survey, herbarium consultation, multiplication and maintenance of previous collection. Q3.Multiplication and maintenance of previous collection. One field tour to South Andaman for live plant collection. Q4.Multiplication and maintenance of previous collection. One field tour to Middle Andaman for live plant collection. **Total Field tours : 2**
6.	**Revision of the family Musaceae in Andaman and Nicobar Islands along with population assessment.** Dr. Lal Ji Singh, Scientist-E Mr. Gautam Anuj Ekka, Sr. Pres. Assistant *New Project*	2020 – 2022	Q1. Literature survey and consultation of herbarium. Q3. One field tour to be undertaken to Middle Andaman. Q4. One field tour to be undertaken to Little Andaman. **Total field tour: 02**
7.	**Revision of the Lichen family Pyrenulaceae in India** Dr. T.A.M. Jagadesh Ram, Scientist-D	2017 – 2022	Morphological, anatomical, chemical characterization and identification of earlier collections.
8.	**Phenological survey of tree Species of Dhanikhari Experimental Garden-cum-Arboretum, (DEGCA), Nayashahar.** Dr. Lal Ji Singh, Scientist E Sri B. C. Dey, Botanical Assistant	On going	Recording of flowering and fruiting of tree species of Dhanikhari Experimental Garden cum Arboretum (DEGCA), Nayashahar, South Andaman.

Nature of Tour	Q1	Q2	Q3	Q4	Total
Field Tours/ *ex situ* conservation tour	0	0	2	2	**4**
Herbarium Consultation Tour	0	0	0	0	0

ARUNACHAL PRADESH REGIONAL CENTRE, ITANAGAR

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
9.	**Materials for the Flora of Arunachal Pradesh, vol. 4** **Team leader** Dr. Umeshkumar L. Tiwari, Scientist- C **Member** Dr. Manas R. Debta , Scientist-C	2019-2021	Q1: To prepare a checklist for addition to flora of Arunachal Pradesh. Q2: Same as quarter 1 and description of the listed taxa. Q3: Description of the listed taxa. Q4: Description of the listed taxa.

10.	**Enumeration of RET specimens of Arunachal Pradesh** Dr. Krishna Chowlu, Scientist-C *New Project*	2020-2022	Q1: To study the literature available in ARUN & SFRI, Itanagar. Q2: To study the literature available in ARUN & SFRI, Itanagar. Inventorisation and documentation of earlier collections. Study of herbarium materials of ARUN & SFRI, Itanagar. Q3: To study the literature available in ARUN & SFRI, Itanagar. Inventorisation and documentation of earlier collections. Q4: To study the literature available in ARUN & SFRI, Itanagar. Inventorisation and documentation of earlier collections. Study of herbarium materials of ARUN & ASSAM, Itanagar. To interact with the local people and to know the uses of the RET plants.
11.	**Floristic studies in selected High Altitude Wetlands (HAWs) and its environs representing 5 districts of Arunachal Pradesh** Dr. M. R. Debta, Scientist-C *New Project*	2020 – 2023	Q1. Literature survey of such areas. Q2. Literature survey, investigation on major wetlands in the study area and preparation of Checklist. Q3. One Herbarium consultation tour to ASSAM, Shillong; literature survey; investigation on major wetlands in the study area and preparation of Checklist. Q4. Analysis of accumulation of information and finalisation of Checklist based on secondary data.

Nature of Tour	Q1	Q2	Q3	Q4	Total
Field Tours/ ex situ conservation tour	0	0	0	0	0
Herbarium Consultation Tour	0	0	1	0	1

ARID ZONE REGIONAL CENTRE, JODHPUR

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2019 – 20
12	***Ex-situ* conservation of RET and economically important species of the Arid region in the experimental Garden of AZRC and documentation of phonological data on flowering and fruiting** ShriVinod Maina, Scientist-E Dr. Sanjay Mishra, Scientist-C Dr. M. K. Singhadiya, Botanist, Dr. P. Hari Krishna, Bot. Asstt. & Sri Ravi Prasad, Bot. Asstt. **(On going)**	2020 – 2021	l0 Spp. Plant saplings of RET and economically important species will be collected during various tours for *Ex-situ* conservation in the Experimental Garden of AZRC and documentation of phenological data on flowering & fruiting

CENTRAL BOTANICAL LABORATORY, HOWRAH

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
13.	**Ethnobotanical study of some tribal populated districts of Bihar.** **<u>Team I</u>** Dr. Monika Mishra, Botanical Assistant Dr. P. A. Dhole, Botanical Assistant **<u>Team II</u>** Dr. K. Althaf Kabeer, Scientist -E Sri A. C. Halder, Botanist Sri R. Saravanan, Botanist	2018 – 2021	The project is to be compiled with all information collected so far and final manuscript to be submitted by March,2021.
14.	**Study of Micro-Algae and monitoring of water quality of Sadir Lake of AJCB IBG** Dr. (Mrs.) Pratibha Gupta, Scientist-E	2019 – 2020 *(Extended upto 2021)*	Samples to be collected from the lake to study the periodicity, succession, distribution and monitoring of micro-algae. Finalisation and submission of final report.

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
15.	**Algal Flora of Purbasthali Wetland, Bardhaman, West Bengal** Dr. R.K. Gupta, Scientist-E *New Project*	2020–2023	Q1 & Q2: Study the relevant literature and review of literature and preparation of tentative checklist; consultation of herbarium of microalgae and macro algae at CAL. Q3: One field tour to Purbasthali Wetland and limnological data to be recorded for all the collection site. Q4: Study the collected sample under Nikon microscope with image facility for taxonomic description along with photomicrography. Diatoms sample will be study under SEM, and taxonomic description along with photomicrography. **Total Field tour: 1**
16.	**Angiosperm flora of Neora Valley National Park, Darjeeling, West Bengal.** (Area 159 Sq. Km.) Dr. Vinay Ranjan, Scientist-E Dr. Gopal Krishna, Bot. Assistant Dr. Anant Kumar, Bot. Assistant	2016 – 2021	Q1-Q3: Identification and description of earlier collections Q4: Finalization and submission of manuscript.
17.	**Bryo-flora of Jharkhand.** Dr. D. Singh, Scientist-D	2018 – 2022	Q1 & Q2: 70–80 spp. will be identified and documented after through micromorphological characterization as camera lucida illustrations, microphotography and SEM study of previously collected specimens. Q3: Identification and one herbarium/SEM study tour to NRC, Dehradun. Q4. Identification and one field tour to Dalma Wildlife Sanctuary, Jharkhand. (*c.* 200 km^2). **Total Field Tour : 1 and HCT : 1**
18.	**Revision of the genus *Gastrochilus* (Orchidaceae) in India.** Dr. Avishek Bhattacharjee, Scientist-C	2018 – 2021 *(Extended upto March 2022)*	Q1-Q4: Preparation of description, photo-plates of different taxa under the genus from already collected specimens and/or consulted herbarium specimens, authentic literature; recording of label-data from herbarium specimens of CAL or specimen-images taken during previous tours to prepare 'Specimens examined'; study of types deposited at different herbaria throughout the world either by online consultation of virtual herbaria or the specimen-images taken during the previous tours to ascertain identity and solve nomenclature related problems; publication of the findings.
19.	**Liverworts and Hornworts Flora of Darjeeling District, West Bengal.** Dr. Monalisa Dey, Scientist - C	2016 – 2021	Q1: Identification, illustration, microphotography of previously collected specimens. Q2: Continuation of study, identification, illustration, microphotography and description of previously collected specimens. Q3: Continuation of study, identification, illustration, microphotography and description of previously collected specimens. Wherever necessary, type/authentic specimens will be procured on loan from other herbaria for study. Q4: Continuation of study, identification, illustration, microphotography and description of previously collected specimens. Preparation of an identification key of the identified and described species.
20.	**Editing of Flora of Bihar Vol. 1 (Ranunculaceae-Mimosaceae)** Dr. Vinay Ranjan, Scientist-E, Dr. Kumar Avinash Bharati,	2020–2021	Submission of edited manuscript by December, 2020.

	Scientist- C and Dr. Anand Kumar, Botanist *New Project*		
21.	**Editing of Flora of Jharkhand Vol. 1 (Ranunculaceae-Mimosaceae)** Dr. Vinay Ranjan, Scientist-E, Dr. Kumar Avinash Bharati, Scientist-C and Dr. Anand Kumar, Botanist *New Project*	2020–2021	Submission of edited manuscript by December, 2020.

Nature of Tour	Q1	Q2	Q3	Q4	Total
Field Tours/ *ex situ* conservation tour	0	0	1	1	2
Herbarium Consultation Tour	0	0	1	0	1

CENTRAL REGIONAL CENTRE, ALLAHABAD

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
22.	**SEM studies of the species belonging to family Acanthaceae and Solanaceae available at BSA, BSI Herbarium Allahabad** Dr. Nitisha Srivastava, Botanical Assistant	2018 -2021	To examine seeds and epidermal features of 30 species (10 species each in Q2, Q3 and Q4 quarter belonging to the family Acanthaceae and Solanaceae available in BSA. Finalisation and submission of final report.
23.	**Ex-situ conservation of RET and economically important species in the experimental garden of BSI CRC , Allahabad.** Dr. A. N. Shukla, Scientis- C Dr. Arti Garg, Scientist E & HoO *New Project*	ongoing	Introduction of 10 RET species
24	**Morphological and cytological studies of selected plants from CRC garden, Allahabad. (50 species).** Dr. Ashutosh Kumar Verma, Scientist-C *New Project*	2020-2021	Study of morphological characteristics of at least 50 species from BSA garden.

DECCAN REGIONAL CENTRE, HYDERABAD

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
25.	**Flora of Manjeera Wild Life Sanctuary, Telangana. (Area: 20 km^2)** Dr. L. Rasingam, Scientist-D	2017 – 2022	Q1. Identification and inventorisation of specimens collected in earlier tours. Q2. Identification and inventorisation of specimens collected in earlier tours. Q3. One field tour to the unexplored areas of the sanctuary. Identification of collected specimens. Q4. One field tour to the unexplored areas of the sanctuary. Identification of collected specimens. **Total Field tours : 02**
26.	**Grasses of Telangana State, India** Mr. S. Nagaraju, Botanical Assistant	2017 – 2022	Q1 & Q2. Identification and inventorisation of specimens collected in earlier tours. Q3. One field tour. Q4. Identification and inventorisation of specimens collected in earlier tours **Total Field tour : 1**

27.	**Flora of Kinnerasani Wild life Sanctuary, Telangana (Area: 635.40 km^2)** Dr. J. Swamy, Botanical Assistant	2017 – 2022	Q1. Identification and inventorisation of specimens collected in earlier tours. Q2. Identification of documentation of specimens. Q3. One field tours to the unexplored areas of the sanctuary. Identification of collected specimens. Q4. One field tour to the unexplored areas of the sanctuary. Identification of collected specimens. **Total Field Tours : 2**
28	**Revamping of BSID herbarium, updation, incorporation & digitization.** Dr. M. Sankara Rao, Scientist - C & Mr. Ravikiran, Bot. Asst. *New Project*	2020 - 2021	Herbarium updating, incorporation & digitization.

Nature of Tour	Q1	Q2	Q3	Q4	Total
Field Tours/ *ex situ* conservation tour	0	1	3	1	5
Herbarium Consultation Tour	0	0	0	0	0

EASTERN REGIONAL CENTRE, SHILLONG

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
29.	**Flora of Nagaland (Vol. 1 & Vol. 2).** Dr. N. Odyuo, Scientist – E Dr. D.K. Roy, Botanist Dr. David Lalsama Baite, Scientist – C (under guidance of Dr. A. A. Mao) Vol. I: Ranunculaceae to Asteraceae (Approx. 1500 taxa) by March 2020. Vol. II & III: Campanulaceae to Ceratophyllaceae and Hydrocharitaceae to Poaceae (Approx. 1500 taxa) by March, 2021.	2016 – 2021	Q1. Identification and documentation of collected specimens. Q2. Identification and documentation of collected specimens. Q3. Identification and documentation of collected specimens. Q4. One field tour **Total Field tour : 1**
30.	**Herbaceous Flora of Meghalaya** Dr. Chhaya Deori, Scientist-E *New Project*	2020 – 2021	Editing of manuscript of Herbaceous flora of Meghalaya, Vol. 1, which has already been reviewed. The final manuscript to be submitted by March, 2021.
31.	**Micropropagation of EET Plants of North East India in ERC, Shillong.** Dr. Deepu Vijayan, Scientist - C	On going	To standardize the protocol, mass multiplication, of EET Plants of Northeast India namely *Eriodes barbata* (Lindl.) Rolfe, *Pholidota katakiana* Phukan & *Micropera rostrata* (Roxb.) N.P. Balakr. The *in vitro* raised cultures of *Cymbidium tigrinum* and *Armodorum senapatianum* are being maintained and regular subculturing and hardening of lab to land plants will be continued.
32.	***Ex-situ* conservation & multiplication of endemic, rare, threatened and economically important plants of NE India at Experimental Botanic Garden, BSI, ERC, Barapani** Mr. B.B.T. Tham, Botanist and Shri L.R. Meitei, Bot. Asstt.	On going	Analysis of the phenological data already collected from EBG, Barapani. Introduction of at least 10 Threatened plant species. Raising of seedling of Threatened and wild economic plants. Local field tours in 2nd, 3rd & 4th Quarters to different districts of Meghalaya for collection of live RET species.

33	**Botanical illustration, art, flower painting and "plant portraits" of selected EET plants of India.** L. Ibemhal Chanu, Botanist *New Project*	2020-2021	Preparation of Botanical illustrations of 9 EET taxa: 1. *Aristolochia saccata* Wall. 2. *Aristolochia platanifolia* (Klotzsch) Duch. 3. *Armodorum senapatianum* Phukan & A. A. Mao 4. *Ilex khasiana* Purkay. 5. *Cymbidium tigrinum* C.S.P. Parish ex Hook. 6. *Ceropegia ansariana* (unpublished) 7. *Vanda coerulea* Griff. ex Lindl. 8. *Paphiopedilum fairrieanum* (Lindl.) Stein 9. *Nepenthes khasiana* Hook.f.

Nature of Tour	**Q1**	**Q2**	**Q3**	**Q4**	**Total**
Field Tours/ ex situ conservation tour	0	1	1	2	4
Herbarium Consultation Tour	0	0	0	0	0

HIGH ALTITUDE WESTERN HIMALAYAN REGIONAL CENTRE, SHILLONG

Sl. No.	**Name of The Project**	**Period**	**Quantifiable deliverables for 2020 – 21**
34.	**Floristic diversity of Dr. Y.S. Parmar University Campus, Nauni, Solan, Himachal Pradesh.** Dr. Kumar Ambrish, Scientist-E and Dr. K.S. Dogra, Scientist-D *New Project*	2020 – 2021	Q1. Listing of plant species from literature. Q2 & Q3. Collection of plant species from the campus and digital photography. Q4. Finalisation and submission of manuscript.

NORTHERN REGIONAL CENTRE, DEHRADUN

Sl. No.	**Name of The Project**	**Period**	
35.	**Taxonomic revision of genus Taraxacum in India.** Mr. Sameer Patil, Botanist Mr. Sachin Sharma, Botanical Assistant Dr. S.K. Singh, Scientist 'E' *New Project*	2020 – 2023	Literature review. Herbarium consultation. SEM study of 80 taxa.
36.	In vitro mass multiplication and propagation and rehabilitation in natural habitat of useful and threatened species of the North-West Himalaya 1. *Malaxis acuminata* D.Don. (Orchidaceae) 2. *Dendrobium crepidatum* Lindl. & Paxton (Orchidaceae) 3. *Delphinium denudatum* Wall. Ex Hook.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.	2020 – 2023	Consultation of literature related to targeted species. Collection of explants/seeds and assessment of threats on targeted species in the wild. Assessment of seed germination and seed viability of the targeted species. In vitro propagation and standardization of micropropagation protocols for the selected species. Dr. Bhavana Joshi will also be work in Herbarium as and when required and as directed by Scientist In-charge.

	Dr. Giriraj Singh Panwar, Scientist-D and Dr. Bhavana Joshi, Botanist *New Project*		
37.	**Cytological studies in some selected chromosomally lesser-known/unknown plants and Liverworts from Botanic Garden of BSI, NRC, Dehradun and adjoining areas.** Dr. Puneet Kumar, Scientist - C & Dr. S.K. Singh, Scientist - E *New Project*	2020 – 2021	Q1. Literature survey, collection of reference and listing of species for cytological studies. Q2. Collection on plant material and cytological studies. Identification of the cytologically studied plant voucher specimens. Q3. Collection on plant material and cytological studies. Identification of the cytologically studied plant voucher specimens. Q4. Collection on plant material and cytological studies. Identification of the cytologically studied plant voucher specimens. Compilation of final report.
38.	**Ethnobotanical study of Tharu and Bhoxa tribe** **of Uttarakhand, India.** Dr. Harish Singh, Scientist-E *New Project*	2020 – 2023	Q1. Literature survey from Library of different institutes/ university. Q2. One field tour to Dehradun district among Mehra-Bhoxa and rural people. Processing of herbarium specimens, identification, documentation and compilation of data. Hunting of additional ethnobotanical literature. Q3. One field tour to Udham Singh Nagar district among Bhoxa and rural people. Processing of herbarium specimens, identification, documentation and compilation of data collected in previous quarter. Hunting of additional ethnobotanical literature. Q4. Processing of herbarium specimens, identification, documentation and compilation of data collected in previous quarter.
39.	**Scanning Electron Microscope (SEM) Study of Achenes of the genus *Ranunculus* L. *and Thalictrum Tourn.* ex L. in N-W Himalaya.** Dr. Purushottam Kumar Deroliya, Botanical Assistant & Dr. S.K. Singh, Scientist – E *New Project*	2020 – 2021	Q1. Consultation of BSD herbarium and literature relevant to the study area. Q2. SEM study of 10 species and analysis of microphotographs and other relevant data. Q3. SEM study of 10 species and analysis of microphotographs and other relevant data. Q4. SEM study of 7 species and analysis of microphotographs and other relevant data. Finalization and submission of report.
40.	**Ex-situ conservation of endemic threatened and economic plant species in the associated garden of NRC and documentation of monthly data on flowering and fruiting** Dr. S. K. Singh, Scientist-E Dr. B.S. Kholia, Scientist-E Sri P.K. Deroliya, Botanical Assistant Shri Sachin Sharma**,** Botanical Assistant	On going	The existing endemic threatened and economic plant species present in the associated garden of NRC will be conserved. At least 10 species will be added to the garden under ex-situ programme.

SOUTHERN REGIONAL CENTRE, COIMBATORE

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21

41.	**Flora of Kanniyakumari Wildlife Sanctuary, Tamil Nadu (Area: 402.39 sq. km).** Dr. Sujana. K. A., Scientist-D* *(Earlier Dr. J. H. Franklin) Shri. Rakesh G Vadhyar, Bot. Asstt.	2016 – 2021	Q1. Identification and documentation of specimens. Q2. One field survey to Kanyakumari WLS area tentatively in first week of September 2020. Identification and documentation of specimens collected. Q3. One field survey to Kanyakumari WLS area tentatively in first week of Octorber 2020. Identification and documentation of specimens collected. Analysis of data. Q4. Preparation, finalization and submission of Project Completion Report. **Total Field tours : 1**
42.	**Assessment of Plant diversity in Cauvery North Wildlife Sanctuary, Tamil Nadu (Area: 504.33 sq. km.)** Dr. R. Manikandan, Scientist E Smt. Mehala Devi, R., Bot. Asst.	2017 – 2021	Q1: Identification of collected specimens Q2: Writing description of identified species. Q3: One one Herbarium consultation tour (RHT) to be conducted to be conducted. Q4: Final project report to be completed and submitted. **Total Field tour : 1**
43.	**Marine Macro Algal flora of India** Dr. M. Palanisamy, Scientist E Dr. S.K. Yadav, Botanist* (*BSI, Hqtrs., Kolkata)	2019 – 2022	Description writing of 150 taxa of green and brown seaweeds by Dr. M. Palanisamy. Description writing of 100 taxa of Red seaweeds by Dr. S. K. Yadav.
44.	***Ex-situ* conservation of endemic endangered and threatened plants of the region and recording of phenology of species in the NOEG, Yercaud** Dr. S. Kaliamoorthy, Scientist-E Dr. T. S. Saravanan, Bot. Assistant	2020 – 2021	Multiplication and maintenance of existing collections. **Q3:** Field visit to Wayanad District, Kerala **Q4:** Field visit to Wayanad District, Kerala **Total Field tours :2**
45.	***Ex-situ* conservation of Endemic tree species of the region in NOEG, Yercaud** Dr. M.Y. Kamble, Scientist-D Shri. B. S. Elango, Bot. Assistant	2020 – 2021	Multiplication and maintenance of existing collections. Q2: Documentation of phenology. Q3: One field tour Conservation-cum-Herbarium consultation tour to Agasthyamalai Biosphere Reserve and TBGT Herbarium, JNBGRI, Palode, Thiruvananthapuram, Kerala. Q4: Documentation of phenology. **Total Field tours : 1 and Herbarium Consultation Tours : 1**
46.	**Flora of Kerala** Vol. 3 by Dr. C. Murugan Vol. 4 by Dr. K. Sujana Vol 5 Vol. 6 by Dr. M. Murugesan *New Project*	2020 – 2022	Compilation of manuscript of flora of Kerala Volume 3, 4, 5 under the supervision of Dr. M.U. Sharief. For Volume 3, Dr. C. Murugan, for Vol. 4, Dr. K. Sujana, Scientist D, and for Volume 6 Dr. M. Murugesan.

WESTERN REGIONAL CENTRE, PUNE

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
47.	**Flora of Lakshadweep Islands – Manuscript finalization and updation.** Dr. Priyanka Ingle, Scientist-C	July 2020 – March 2021	Q1: Updation of Mss, taxonomic parts Q2: Preparation of Keys Q3: Finalization of introductory parts and checking of Mss. Q4: Finalization and submission of the report.

48.	**Phyto-Database of Konkan (Maharashtra).** Dr. Prashant K. Pusalkar, Scientist-E	2020-2023	Q1: Literature Compilation Q2: Data compilation of Phyto-Diversity of Konkan Q2: Data compilation of Phyto-Diversity of Konkan Q4: Data compilation of Endemic and Threatened species, Threats to Phyto-Diversity, and threatened habitats in Konkan One Field Tour to Konkan **Total Field tour : 1**
49.	**Checklist of the Flowering Plants of Goa** Dr. C.R. Jadhav, Botanist & Dr. Prashant K. Pusalkar, Scientist-E	2020-2021	Q1. Literature compilation of Goa Flora Q2. Compilation of Checklist of Flowering Plants of Goa through literature and herbarium records Q3. Compilation of Checklist of Flowering Plants of Goa through literature and herbarium records Q4. Finalization of Checklist and submission of the report. One Tour to Goa for field photographs and Goa University Herbarium consultation **Total Field tour : 1, Herb. Tour: 1 (Q4) and Consultation tour : 1**
50.	**Bambusicolous Fungi of** **Goa.** Dr. Rashmi Dubey, Scientist-E	2020-2024	Q1: Collection of literature from different sources.(Books/ web) Q2: Collection of literature from different sources (Books/ web) Q3: 1. Herbarium and library consultation tour to Agarkar Research Institute Pune; 2. Herbarium and library consultation to University of Pune, Pune; 3. Collection of literature. Q4: 1. One Field tour to Bhagwan Mahaveer WLS Goa and its adjoining areas for collection samples of bambusicolous fungi; 2. Isolation, identification and preservation of fungi samples collected in the tour; 3. Scanning Electron Microscopic studiesof importantfungal species. **Field Tour : 1 and Herb Consult tours: 2 (Local Pune)**
51.	*Ex-situ* Conservation of Phytodiversity of Western Ghats, Konkan and adjoining areas in the Botanic Garden of BSI, Pune i) Introduction and exsitu Conservation of Endemic, Conservation-dependent, Medicinal & Economic plants in WRC, Botanic Garden (C.R. Jadhav, Botanist & B.P. Kadam, Bot. Asstt.) ii) Collection and introduction of plants in WRC garden for enrichment of 'Speciation Spectrum – Genus diversification' section of WRC Botanic Garden (Prashant K. Pusalkar, Scientist-E & B.P. Kadam, Bot. Asstt.) iii) Introduction and exsitu Conservation of Orchids in WRC, Botanic Garden (J.S. Jalal, Scientist-E) (iv) Establishment of Aquatic Section through introduction and conservation of Aquatic flora	2020-2021	**6 local tours (Pune) for live plants collection**

	(J. Jayanthi, Scientist-E & Madhuri Pawar, Bot. Asstt.) v) Introduction and exsitu Conservation of Bulbous & Rhizomatous plants for developing 'Bulbous section', wild ornamentals and collection and introduction of Aroids for enriching Aroidarium'' in WRC, Botanic Garden (Priyanka Ingle, Scientist-C & Madhuri Pawar, Bot. Asstt.) (vi) Introduction and exsitu Conservation of climbers for establishment of 'Climber Conservatory' in Mundhwa Garden, BSI, Pune (D.L. Shirodkar, Botanist)		

Nature of Tour	Q1	Q2	Q3	Q4	Total
Field Tours/ ex situ conservation tour	1			1+1	
Herbarium Consultation Tour			2	1	

INDUSTRIAL SECTION INDIA MUSEUM, KOLKATA

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
52.	**Collection of algae specimens deposited at ISIM** Dr. K. Pagag, Botanist, Dr. S. Dutta and Dr M. Bhaumik, Scientist- E *New Project*	2020 – 2021	Catalague of around 2000 marine algae available in Industrial Section, Indian Museum. Q3 1000 sheets to be documented. Q4 1000 sheets to be documented.
53.	**Documentation of exhibits and materials of Botanical Gallery in Industrial Section, Indian Museum.** Dr. S. Dutta, Dr. K. Pagag, Botanist and Dr M. Bhaumik, Scientist -E *New Project*	2020 – 2022	Catalague of exhibits and materials of Botanical Gallery in Industrial Section, Indian Museum.

PLANT CHEMISTRY DIVISION, HEAD QUARTERS

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2019 – 20
54.	**Anti-nutritional Properties (oxalate, phytate, saponin and tannin content), Genotoxicity, DNA damage Preventive Activity, HPLC Studies for Vitamin and Phenolic Content of Wild Edible Plant of NE India** Dr. Tapan Seal, Scientist-D	2018 – 2022	45 Wild Edible Plants of NE India to be studied. One field tour in Q4 to be undertaken to N.E. India for collection of wild edible plants (subject to Covid situation and requirement of plant materials). **Total Field tour : 1**

Nature of Tour	Q1	Q2	Q3	Q4	Total
Field Tours/ ex situ conservation tour	0	0	0	1	1

PUBLICATION DIVISION, HEADQUARTERS

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020-21
55.	**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	2018 – 2022	Q1. Processing and identification of Herbarium specimens collected earlier Q2. Description of 75 plant species to be completed. Q3. Description of 75 plant species to be completed. Q4. Processing, identification and inventorisation of collected specimens.

TECHNICAL DIVISION, HEADQUARTERS

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2019-20
56.	**Marine Macro Algal Flora of West Bengal Coast, India.** Dr. S. K. Yadav, Botanist Sri Kaju Majumdar, Pres. Asstt.	2019 – 2022	Q1. Literature survey, Identification and description writing of collected specimens. Q2. Literature survey, Identification and description writing of collected specimens. Q3. Literature survey, identification and description writing of collected specimens. Study of algal herbarium specimens at ISIM / CNH. Q4. Literature survey and study of algal herbarium specimens at ISIM / CNH.

ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA ON PTERIDOPHYTES FLORA OF INDIA (2020 – 21)
(Vols. I, II, & III)

Sl. No.	Name of The Project	Period	Quantifiable deliverables for 2020 – 21
1.	**Pteridophytic flora of India.** 110 spp. Dr. A.Benniamin, Scientist-E, WRC,Pune Dr. Jesubalan, Bot.Asst will assist Dr. A.Benniamin.	2020-2021	Q1. Study Review of literature and consultation of Herbarium. Q2. Study Review of literature and consultation of Herbarium. Q3. Study Review of literature and one herbarium Consultation tour to Nationalised herbarium. Q4. Study Review of literature and 1herbarium Consultation tour to Nationalised Herbarium (ANRC,Portplair)
2.	**Pteridophytic flora of India.** 130 spp. Dr B.S.Kholia, Scientist-E, NRC, Dehradun Dr. Sachin Sharma will assist Dr. B.S. Kholia	2020-2021	Q1. Study Review of literature and consultation of herbarium Q2. Study Review of literature and consultation of herbarium Q3. Study Review of literature consultation of herbarium Q4. Study Review of literature consultation of herbarium.

3.	**Pteridophytic flora of India.** 90 spp. Dr. V. K. Rawat, Scientist-E, APRC, Itanagar	2020-2021	Q1. Data collection, compilation & preparation draft Mss(15 spp.) Q2. Data collection, compilation & preparation draft Mss(15 spp.) Q3. Data collection, compilation & preparation draft Mss(25 spp.) Q4. Data collection, compilation & Preparation of Mss(25 spp.)
4.	**Pteridophytic flora of India** 75 spp. Dr. Brijesh Kumar, Botanist, CRC, Allahabad Dr. Pushpesh Joshi will assist Dr.Brijesh Kumar	2020-2021	Q1. Data collection, compilation & preparation draft Mss. (15 spp.) Q2. Data collection, compilation & preparation draft Mss. (15 spp.) Q3. Data collection, compilation & preparation draft Mss.(23 spp.) Q4. Data collection, compilation & preparation draft Mss.(22 spp.)

Annexure 2

ANNUAL RESEARCH PROGRAMMES 2021-22

AJC BOSE INDIAN BOTANIC GARDEN, HOWRAH

Sr. No.	Name of the Project	Period	Quantifiable deliverables for 2021–22
1.	**Caterpillar fungi in Himalaya: Morpho-taxonomy, Molecular phylogeny, Chemical & nutraceutical properties** Dr. Kanad Das, Scientist-E Dr. M. Hembrom, Botanist Sri Arvind Parihar, Bot. Asstt	2019 – 2021 *Extension for one year (upto March 2022) due to COVID-19 pandemic situation*	**Q1:** Literature Survey and documentation. **Q2:** Literature Survey and documentation. **Q3:** Two field tours: One field trip to Himachal Pradesh and another to Arunachal Pradesh. **Q4:** Morphological characterization and phylogenetic estimation will be made from the samples.
2.	**Bryo-flora of Jharkhand.** Dr. D. Singh, Scientist-D	2018 – 2022	**Q1:** Literature Survey, documentation and identification from previous collections. **Q2:** Identification: 60–70 specimens will be identified and the micromorphology will be characterized through camera lucida illustrations, microphotography and SEM study of previously collected specimens. **Q3:** Two Field tours: One herbarium/SEM study tour to NRC, Dehradun and one field tour to Dalma Wildlife Sanctuary, Jharkhand (c. 200 sq. km). **Q4:** One field tour to Gautam Budha and Parasnath Wildlife Sancturies (c. 300 sq. km) and submission of Manuscript.
3.	**Maintenance and development of Mangrove / Mangrove Associates in AJC Bose Indian Botanic Garden, Howrah** Dr. S.P. Panda, Scientist-C Dr. B.K. Singh, Bot. Asst. Sri Rahul Deb Barman, Bot. Asst.	**Ongoing**	**Q1-Q4:** The existing mangrove section along the river Hooghly to be maintained. Few new species to be replaced /introduced, if necessary. The mortality rate of the mangrove species to be recorded.
4.	**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.te 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.
5.	**Curatorial work in the Garden and**	**Ongoing**	**Q1:** Development of an Orchidarium in

	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		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
ANDAMAN & NICOBAR REGIONAL CENTRE, PORT BLAIR			
6.	**Revision of the family Musaceae in Andaman and Nicobar Islands along with population assessment.** Dr. Lal Ji Singh, Scientist-E Mr. Gautam Anuj Ekka, Sr. Pres. Assistant	2020 – 2022	**Q1:** Literature survey and consultation of herbarium. **Q2:** Literature survey and consultation of herbarium. **Q3:** One field tour to be undertaken to South Andaman Islands and compilation and finalization of report. **Q4:** Compilation and submission of final report.
7.	**Conservation Assessment, ENM studies including GIS mapping of Endemic trees of Andaman & Nicobar Islands (at least 50 trees 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. *New Project*	2021-2023	**Q1:** Literature survey and documentation. **Q2:** Literature survey and documentation. **Q3:** One Field tour to Middle Andaman and processing & identification of Herbarium specimens collected in the previous tour **Q4:** One field tour to Little Andaman
8.	**Curatorial work at Botanic Garden:** (Multiplication and nursery development of Bamboos, Palms, Zingibers, endemic tree species) of Andaman & Nicobar Islands at Dhanikhari Exp. Garden cum Arboretum and raise nursery**.** Dr. Chandan Singh Purohit, Scientist-C Dr. Vivek C. P., Botanical Assistant	2019 – 2022	**Q1 – Q4:** Development and maintenance of nursery of 30 species with minimum 500 seedlings each species. Recording of flowering and fruiting and mortality rate of tree species of Dhanikhari Experimental Garden cum Arboretum (DEGCA), Nayashahar, South Andaman.
ARUNACHAL PRADESH REGIONAL CENTRE, ITANAGAR			
9.	**Enumeration of EET specimens of Arunachal Pradesh** Dr. Krishna Chowlu, Scientist-C	2020-2022	**Q1:** To study the literature available in ARUN & SFRI, Itanagar. **Q2:** To study the literature available in ARUN & SFRI, Itanagar.

			Inventorisation and documentation of earlier collections. Study of herbarium materials of ARUN & SFRI, Itanagar. **Q3:** One field tour to Anjaw, Lohit and Namsai districts of Arunachal Pradesh **Q4:** To study the literature available in ARUN & SFRI, Itanagar. Inventorisation and documentation of earlier collections. Study of herbarium materials of ARUN & ASSAM, Itanagar.
10.	**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:** Literature survey, investigation on major wetlands in the study area and preparation of Checklist. **Q3:** One Herbarium consultation tour to ASSAM, Shillong; literature survey; investigation on major wetlands in the study area and preparation of Checklist. **Q4:** Analysis of all information and finalization of Checklist based on secondary data.
11.	**Curatorial work at Botanic Garden of ERC, Itanagar** Dr Ranjit Daimary, Botanist	**Ongoing**	**Q1-Q4:** Maintenance of economically important, endemic and threatened plants of Arunachal Pradesh at Botanical Garden, BSI, APRC, Itanagar. He will prepare the list of live plants that are found in the garden and submit the report .
ARID ZONE REGIONAL CENTRE, JODHPUR			
12.	**Flora of Mount Abu Wildlife Sanctuary, Rajasthan (2021-23)** Dr. Sanjay Mishra, Sci-C & Dr. S. L Meena, Scientist-E *New Project*	2021-2023	**Q1:** Literature collection & Regional herbarium consultation. **Q2:** Literature collection & Regional herbarium consultation **Q3:** One field tour. Identification and documentation of collected plants. **Q4:** One field tour and collection of Plant species
13.	**Curatorial work at Botanic Garden of AZRC, Jodhpur** Dr. S.L. Meena Dr. Sanjay Mishra, Scientist-C	**Ongoing**	**Q1 – Q4:** Maintenance and conservation economically important Endemic and threatened species of the Arid region in the experimental Garden of AZRC.
14.	**Curatorial work at Herbarium and digitization of herbarium specimens** Dr. M. K. Singhadiya, Botanist &	**Ongoing**	**Q1 – Q4:** Preparation of metadata of herbarium specimens of BSJO.

	The Head of Office, AZRC Sri Ravi Prasad, Bot. Asstt. and Shri Ramesh Kumar, Bot. Asstt.		**Q1 – Q4:** Identification of at least 1000 unidentified specimen's identification and incorporation in each quarter.
BOTANIC GARDEN OF INDIAN REPUBLIC, NOIDA			
15.	**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 germplasm centre 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 vis a 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.
16.	**Establishment and enrichment of existing Forest Types and Proposed Phyto-biodiversity region (4) of India at BGIR Noida (Zones 1-4) by introduction of plant sps., based on respective forest types and phyto-diversity region.** Dr. Sheo Kumar, Scientist E Ms Priyanka Rana , Botanical Asst.	**Ongoing**	**Q1 – Q4:** All periphery region of BGIR along the Boundary wall and Near Water Body primarily as per the Master Landscape Plan. BGIR is developing only 8 forest types and 8 Phyto- biodiversity region. Establishment of Taxonomic Botanic Garden at BGIR Noida. Preparation of Database of endemic trees, medicinal, fruit and endemic plants planted in BGIR Noida. Plant sps., collections from different parts of the BSI Regional Circles, Botanic Gardens, Forest Dept. to BGIR Noida. Plant labelling in forest arboretum (EPS and Medicinal Plant sections only). Identification, Selection and collection of Trees for Month wise Bloom for entire areas of BGIR Noida.
17.	**Curatorial Practice in Garden and Herbarium** Dr. Sheo Kumar, Scientist E	**Ongoing**	**Q1 – Q4:** Germination and multiplication of existing endemic trees as well as threatened plants, aquatic plants in BGIR Noida to

			enhance the gemrplasm collection in BGIR for reintroduction. Re - Strengthening of Herbarium facilities in BGIR, with a emphasis of Plant specimen collections, processing and digitalization.
18.	**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			
19.	**Study of Micro-Algae and monitoring of water quality of Sadir Lake of AJCB IBG** Dr. (Mrs.) Pratibha Gupta, Scientist-E	2019 – 2020 *(Extended upto 2021)*	**Q1 – Q4:** The final report of the project to be compiled and submitted in March, 2022. Note: No further extension will be given.
20.	**Anti-nutritional properties, genotoxicity, DNA damage preventive activity, HPLC studies for vitamin and phenolics content**. Dr. Tapan Seal, Scientist-D Kausik Chaudhuri and Mrs. Basundhara Pillai, Botanist	2018 – 2022	**Q1 – Q4:** 45 Wild Edible Plants of North East India to be studied. The final report of the project to be compiled and submitted in March, 2022.
CENTRAL NATIONAL HERBARIUM, HOWRAH			
21.	**Algal Flora of Purbasthali Wetland, Bardhaman, West Bengal** Dr. R.K. Gupta, Scientist-E	2020–2023	**Q1:** Literature survey, identification, illustration, microphotography of previously collected specimens. **Q2:** One field tour to Purbasthali wetland and limnological data to be recorded. Diatoms sample will be studied under SEM and Nikon Microscope. **Q3:** Identification and illustration of

			Blue Green Algae. **Q4:** One field tour to Purbasthali wetland and limnological data to be recorded for all the collection site. Identification and illustration of the members of Chlorophyceae.
22.	**Revision of the genus *Gastrochilus* (Orchidaceae) in India.** Dr. Avishek Bhattacharjee, Scientist-C	2018 – 2021 *(Extended upto March 2022)*	**Q1:** Literature survey, documentation and identification of previous collections. **Q2:** Literature survey, documentation and identification of previous collections. **Q3:** Two field-cum-herbarium consultation tours in Eastern Himalaya and N.E. India to collect targeted species and to consult herbarium specimens at ASSAM, Orchid Herbarium Tipi, herbarium of the University of North Bengal. **Q4:** Preparation of description, photo-plates of different taxa under the genus collected specimens and submission of Report.
23.	**Digitization of all the species belonging to the family Balsaminaceae and updation of Family Balsaminaceae in *e-flora* of India** Dr Kumar Avinash Bharati, Scientist-C and Dr Anand Kumar, Botanist *New Project*	2021-2022	**Q1 – Q4:** All the specimens belonging to the family Balsaminaceae deposited at CAL will be digitized. Updation of Family Balsaminaceae in e-flora of India
24.	**Plant diversity in Sacred Grooves of South Bengal** Dr Kumar Avinash Bharati, Scientist-C *New Project*	2021-2023	**Q1 – Q3:** Literature survey and documenation. **Q4:** One field tour to be taken selected sacred grooves of South Bengal.
CENTRAL REGIONAL CENTRE, ALLAHABAD			
25.	**Curatorial work and maintenance of the RET and economically important species in the experimental garden of BSI CRC, Allahabad.** Dr. Arti Garg, Scientist E Dr. Brijesh Kumar, Botanist Dr. A.K. Verma, Sci. C Dr. Saurabh Sachan, Bot. Asstt.	**Ongoing**	**Q1 – Q4:** Regular maintenance of the garden. Introduction of 10 RET species in the garden. Collection and introduction of RET/medicinal plants to different areas of Central India for plant collection. Plants to be collected during routine tours
26.	**Flora of Samaspur Ramsar Site, Raebareli, U.P. (799.4 hectare)** Dr. Arti Garg, Scientist E Dr. Nitisha Srivastava, Bot. Asstt. *New Project*	**2021-2022**	**Q1:** Mapping and literature consultation. **Q2:** One field tour. Identification and documentation of specimens collected. **Q3:** One field tour to the area. Identification and documentation of specimens collected. **Q4:** Finalisation and submission of Report.

27.	**Flora of Kunu National Park, Madhya Pradesh (344 sq km)** Dr. A.K. Verma, Scientist C *New Project*	**2021-2023**	**Q1-Q2:** Literature consultation and mapping. **Q3:** One field tour to the area. Identification of plants collected. **Q4:** One field tour to the area and Identification and documentation of specimens collected.
DECCAN REGIONAL CENTRE, HYDERABAD			
28.	**Flora of Manjeera Wild Life Sanctuary, Telangana. (Area: 20 km^2)** Dr. L. Rasingam, Scientist-D	2017 – 2022	**Q1:** Identification and documentation of earlier collection. **Q2:** Identification and documentation of earlier collection. **Q3:** One field tour. **Q4:** One field tour. Finalisation and submission of manuscript.
29.	**Grasses of Telangana State, India** Dr. S. Nagaraju, Botanical Assistant	2017 – 2022	**Q1:** Identification and inventorisation of specimens collected in earlier tours. **Q2:** Identification and inventorisation of specimens collected in earlier tours. **Q3:** One field tour. **Q4:** Identification and inventorisation of specimens collected in earlier tours. Finalisation and submission of manuscript.
30.	**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)
31.	**Flora of Kinnerasani Wild life Sanctuary, Telangana (Area: 635.40 km^2)** Dr. J. Swamy, Botanical Assistant	2017 – 2022	**Q1:** Identification and inventorisation of specimens collected in earlier tours. **Q2:** Identification of documentation of specimens. **Q3:** One field tours to the unexplored areas of the sanctuary. Identification of collected specimens. **Q4:** One field tour to the unexplored areas of the sanctuary. Identification of collected specimens. Finalisation and submission of manuscript.
EASTERN REGIONAL CENTRE, SHILLONG			
32.	**Flora of Nagaland (Vol. 1 & Vol. 2).** Dr. N. Odyuo, Scientist – E	2016 – 2021 To be	**Q1-Q4:** The manuscript to be submitted in march 2022: Then the rest of the work to be taken as

	Dr. Chaya Deori, Scientist-E Dr. David Lalsama Baite, Scientist C Dr. S.R. Talukdar, Bot. Assistant (under guidance of Dr. A. A. Mao) Vol. I: Ranunculaceae to Asteraceae (Approx. 1500 taxa) by March 2020. Vol. II & III: Campanulaceae to Ceratophyllaceae and Hydrocharitaceae to Poaceae (Approx. 1500 taxa) by March 2021	submitted by March 2022	separate Project. No extension is allowed.
33.	**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 Eriodes barbata (Lindl.) Rolfe, Pholidota katakiana Phukan and Micropera rostrata (Roxb.) N.P. Balakr. Maintenance of in vitro raised plants of Armodorum senapatianum and Cymbidum tigrinum in plant tissue culture, garden and polyhouse.
34.	**Herbaceous flora of Meghalaya** (volume 2) Dr. Chaya Deori, Scientist-E *New project*	2021-2022	**Q1 – Q4:** Editing and submission of updated manuscript of Herbaceous flora of Meghalaya Vol. 2.
35.	**Flora of Manipur Vol 2** Shri B. B. T. Tham, Botanist Shri. Harminder Singh, Bot. Asst. and Sri L.R. Meitei, Bot. Asst. *New project*	2021-2023	**Q1:** Documentation of Plants from Herbarium **Q2:** Documentation of Plants from Herbarium **Q3:** One Field tour **Q4:** Identification & Documentation.
36.	**Curatorial works and maintenance of the Experimental Botanic Garden, BSI, ERC, Barapani** Mr. B.B.T. Tham, Botanist and 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.
37.	**Curatorial works at Herbarium of SRC, 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.
HIGH ALTITUDE WESTERN HIMALAYAN REGIONAL CENTRE, SHOLAN			
38.	**Floristic diversity of Dr. Y.S. Parmar University Campus, Nauni, Solan, Himachal**	2021 – 2022	**Q1:** Listing of plant species from literature. **Q2:** Collection of plant species from

	Pradesh. Dr. Kumar Ambrish, Scientist-E and Dr. K.S. Dogra, Scientist-D *New Project*		the campus and digital photography. **Q3:** Collection of plant species from the campus and digital photography. **Q4:** Finalization 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 1. *Malaxis acuminata* D.Don. (Orchidaceae) 2. *Dendrobium crepidatum* Lindl. & Paxton (Orchidaceae) 3. *Delphinium denudatum* Wall. Ex Hook.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	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 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 Scientist-in-charge.
40.	**Ethnobotanical study of Tharu and Bhoxa tribe** **of Uttarakhand, India.** Dr. Harish Singh, Scientist-E	2020 – 2023	**Q1:** Identification, documentation of earlier collections. **Q2:** Identification, documentation of earlier collections. **Q3:** One field tour to Udham Singh Nagar district. Collection of ethno-botanical information following the established (2020-2023) procedures. Processing of herbarium specimens, identification, documentation and compilation of data collected in previous quarter depending upon budget allocation. **Q4:** Identification, documentation and compilation of data collected in earlier tours.

41.	**Taxonomic revision of genus *Taraxacum* F.H.Wigg. in India** Dr. Sameer Patil, Botanist & Dr. S.K. Singh, Scientist E	2020 –2023	**Q1:** SEM study of achenes of collected species and obtained from duplicate herbarium. **Q2:** SEM study of achenes of collected species and obtained from duplicate herbarium. **Q3:** One herbarium consultation tour to Forest Research Institute and Punjabi University/Jammu University. **Q4:** One field tour. Documentation of 30 species. One field tour. Documentation of 30 species.
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. *New Project*	2021 –2024	**Q1:** Literature survey and collection of reference and herbarium consultation. **Q2:** Literature survey and collection of reference and herbarium consultation. **Q3:** One Field Tour to Rajaji National Park, collection and identification of specimens. **Q4:** One Field Tour to Rajaji National Park Identification of specimens continued; Description of identified species.
43.	**Backlog clearance of unidentified Herbarium sheets at BSD.** Dr. S.K Singh Scientist E, Subhasmit Bhattacharyya, Bot. Asstt., Poulami Ghosh, Bot. Asst., Latika Sagarwal, Bot. Asstt.	**Ongoing**	**Q1:** Segregation of herbarium sheets. Collecting the field related information whose field books are not available. Data entry of herbarium sheets. Identification of 600 plants. Fumigation & incorporation of identified sheets. **Q2:** Identification of 800 plants fumigation & incorporation of them. **Q3:** Identification of 800 plants fumigation &incorporation of them. **Q4:** Identification of 800 plants & fumigation & incorporation of them. 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. At least 10 species will be added to the garden under ex-situ programme.
45.	**Development of Medicinal Plant Garden** Dr. Harish Singh, Scientist-'E'	2021-2023	**Q1-Q4:** Development of a thematic medicinal plants section of in NRC Experimental garden. Selection of species may be on

	New project		consultation with Scientist In-charge, NRC BSINRC.
SIKKIM HIMALAYAN REGIONAL CENTRE, GANGTOK			
46.	**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 C	**Ongoing**	**Q1 – Q4:** Collection and maintenance of *Rhododendron* L. (Ericaceae) and *Impatiens* Riv ex L. (Balsaminaceae) in Experimental Botanic Gardens, Gangtok.
47.	**Wild edible plants of Sikkim and Darjeeling Himalaya.** Dr. Rajib Gogoi, Scientist E Dr. J. H. Franklin Benjamin, Scientist C *New Project*	2021-2023	**Q1:** Digitization and Herbarium database. **Q2:** Digitization and Herbarium database. **Q3:** Data entry of all literature related to wild edible plants of Sikkim **Q4:** One field tour in Q4 in Sikkim and Darjeeling Himalaya.
SOUTHERN REGIONAL CENTRE, COIMBATORE			
48.	**FLORA OF TAMIL NADU (1-7 Vols.)** **Vol. 1.** Dr. W. Arisdason, Mrs. Ananthalakshmi & Ranunculaceae to Cornaceae (73 Fam.) **[320 genera & 842 spp.]** **Vol. 2.** Dr. K. A. Sujana & Shri Rakesh Fabaceae to Sambucaceae (36 Fam.) **[264 genera & 905 spp.]** **Vol. 3.** Dr. C. Murugan Dr. M. Murugesan & Dr. S. Arumugam Rubiaceae to Gentianaceae (26 Fam.) **[275 genera & 871 spp.]** **Vol. 4.** Dr. V. Sampath Kumar Dr. R. K. Singh & Mrs. Lydia Thomas Menyanthaceae to Lamiaceae (19 Fam.) **[224 genera & 812 spp.]** **Vol 5.** Dr. R. Manikandan Mrs. Mehala Devi, R, Plantaginaceae to Ceratophyllaceae (33 Fam.) **[191 genera & 648 spp.]** **Vol 6.**	2021-2024	Vol. 1. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp. Vol. 2. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp. Vol. 3. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp. Vol. 4. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp. Vol 5. Literature collection, Herbarium

	Dr. M.U. Sharief, Scientist-E Dr. S. S. Hameed, Dr. V. Sampathkumar, Dr. Arisdason & Dr. M. Murugesan Hydrocharitaceae to Eriocaulaceae (39 Fam.) **[210 genera & 567 spp.]** **Vol 7.** Dr. C. Murugan Dr. A. A. Kabeer (CBL/BSI) & Dr. S. Arumugam Cyperaceae & Poaceae (2 Fam.) **[152 genera & 652 spp.]** *New Project*		consultation, floristic survey and documentation of 150 spp. Vol 6. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp. Vol 7. Literature collection, Herbarium consultation, floristic survey and documentation of 150 spp.
49.	**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.
50.	**Flora of Kerala** Vol. 3 by Dr. C. Murugan Vol. 4 by Dr. K. Sujana Vol. 5 by Dr. M.U. Sharief Vol. 6 by Dr. M. Murugesan	2020 – 2022 (No extension will be allowed)	**Q1 – Q4:** Updation and Editing, Compilation and Submission of manuscript of Flora of Kerala.
WESTERN REGIONAL CENTRE, PUNE			

51.	**Phyto-Database of Konkan (Maharashtra).** Dr. Prashant K. Pusalkar, Scientist-E	2020-2023	**Q1:** Data compilation of Phyto-Diversity of Konkan – Herbarium and Literature. **Q2:** Data compilation of Phyto-Diversity of Konkan – Herbarium and Literature. **Q3:** One field tour to Konkan, Maharashtra. Phyto-Data basing of selected and unique Phyto-diversity rich habitats and ecosystems. **Q4:** One field tour to Konkan, Maharashtra. Data compilation of Phyto-resources (Wild edibles, wild germplasm, Ethnomedicines, Economic and useful plants, etc.)
52.	**Bambusicolous Fungi of Goa.** Dr. Rashmi Dubey, Scientist-E	2020-2024	**Q1:** Collection of literature from different sources. **Q2:** Collection of literature from different sources. **Q3:** One Field tour to Bhagwan Mahaveer WLS and Mollem National Park (Goa) and their adjoining areas for collection samples of Bambusicolous fungi. One Herbarium Consultation tour to Indian Institute of Science, Bangalore **Q4:** One Field tour to Mahadei WLS, Bondla Wildlife Sanctuary(Goa) and their adjoining areas for collection samples of Bambusicolous fungi
53.	**Curatorial works and maintenance of the Herbarium of BSI, Pune** Dr. A. Benniamin, Scientist E and team	**Ongoing**	**Q1 – Q4:** Preparation of database and incorporation of metadata. Digitization of herbarium specimens. Regular maintenance of herbarium.
54.	**Supplement to the Flora of Maharashtra** Dr. M. Y. Kamble, Scientist E *New Project*	2021-December 2022	**Q1 – Q4:** Compilation of species as supplemented to the existing flora of Maharashtra.
55.	**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
INDUSTRIAL SECTION INDIA MUSEUM, KOLKATA			

56.	**Documentation of exhibits and materials of Botanical Gallery in Industrial Section, Indian Museum.** Dr. S. Dutta, Bot. Asst. Dr. K. Pagag, Botanist and Dr M. Bhaumik, Scientist -E	2020 – 2022	**Q1 – Q4:** Catalogue of exhibits and materials of Botanical Gallery in Industrial Section, Indian Museum.
PUBLICATION DIVISION, HEADQUARTERS			
57.	**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 – 2022 *(Extended up to 2023 due to Covid 19)*	**Q1:** Processing and identification of Herbarium specimens collected earlier. **Q2:** Description of 75 plant species to be completed. **Q3:** One Field tour to study area (subject to Corona pandemic situation). **Q4:** Processing, identification and inventorisation of collected specimens.
58.	**Red listing of Indian endemics as per IUCN criteria: Family Ranunculaceae** Dr. A.N. Shukla, Sci. C., Dr. Debasmita Dutta Pramanick, Sci. C., Dr. D.K. Agrawala, Sci. D, Dr. J.S. Jalal, Sc. E & Dr. S.S. Dash, Sc.-E *New Project*	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.
TECHNICAL DIVISION, HEADQUARTERS			
59.	**Marine Macro Algal Flora of West Bengal Coast, India.** Dr. S. K. Yadav, Botanist Sri Kaju Majumdar, Pres. Asstt.	2019 – 2022	**Q1:** Literature survey, Identification and description writing of collected specimens. **Q2:** Literature survey, Identification and description writing of collected specimens. **Q3:** One field tour. Literature survey, description writing of collected specimens. Study of algal herbarium specimens at ISIM / CNH. **Q4:** Manuscript writing, finalization and submission of final report.
60.	**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.) *New Project*	2021 – 2023	**Q1 – Q4:** Compilation and submission of the manuscript in the form of A Handbook on Plants of Kolkata.
61.	**Wild useful/edible plants of Arunachal Pradesh**	2021 – 2023. .	**Q1:** Preparation of Check list of edible plant of Arunachal Pradesh

	Dr. Umeshkumar L. Tiwari, Scientist-C, Dr. S.S. Dash, Scientist-E; Dr. K. Chowlu, Scientist-C and Dr. Ranjit Daimary, Botanist *New Project*		**Q2:** Literature survey and Documentation of edible plant of Arunachala Pradesh **Q3:** Tour to (Anjaw, Lohit, Namsai, Changlang, Tirap and Longding) **Q4:** Tour to East Kameng, West Kameng, Tawang, Kurung Kumey, Lower Subansiri, Upper Subansiri and Kra Daadi
ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA ON MARINE MACRO ALGAL FLORA OF INDIA (2019 – 22)			
62.	**Marine Macro Algal flora of India** ▪ Dr. M. Palanisamy, Scientist E, CNH, Howrah ▪ Dr. S.K. Yadav, Botanist BSI, Hqtrs., Kolkata	2021-2022	**Q1 – Q4:** Compilation and description writing of Green and Brown Marine Macro Algae (Seaweeds). Dr. M. Palanisamy Compilation and description writing of 150 taxa of Red Marine Macro Algae (Seaweeds). Dr. S.K. Yadav
ANNUAL RESEARCH PROGRAMME OF BOTANICAL SURVEY OF INDIA ON PTERIDOPHYTES FLORA OF INDIA (2020 – 23) (Vols. I, II, & III)			
63.	**Pteridophytic flora of India.** 110 spp. ▪ Dr. A.Benniamin, Scientist-E, WRC,Pune ▪ Dr. Jesubalan, Bot.Asst WRC,Pune	2021-2022	**Q1:** Study Review of Literature and consultation of herbarium **Q2:** One Herbarium consultation tour MH, Coimbatore. **Q3:** One Herbarium consultation tour ANRC, Portplair. **Q4:** One Herbarium consultation tour APRC and ERC Shillong.
	130 spp. ▪ Dr B.S.Kholia, Scientist-E, NRC, Dehradun	2021-2022	**Q1:** Review of literature & description of 20 spp. **Q2:** Review of literature, consultation of DD herbarium and description of 20 spp. **Q3:** Review of literature, consultation of DD herbarium and description of 20 spp. One herbarium cum filed tour to NE India (BSHC, ASSAM, ARUN) (subject to the Pandemic situation) **Q4:** Review of literature, consultation of DD herbarium and description of 20 spp. Note: Dr. Kholia will attend to those species only for which he has proposed in the ARP.
	80 spp. ▪ Dr. V. K. Rawat, Scientist-E, APRC, Itanagar	2021-2022	**Q1:** Data collection, compilation & preparation draft Mss(20 spp.) **Q2:** Data collection, compilation & preparation draft Mss(20 spp.) **Q3:** Data collection, compilation &

			preparation draft Mss(20 spp.) **Q4:** Data collection, compilation & Preparation of Mss(20 spp.)
	80 spp. ▪ Dr. Brijesh Kumar, Botanist, CRC, Allahabad	2021-2022	**Q1:** Data collection, compilation & preparation draft mss. (20 spp.) **Q2:** Data collection, compilation & preparation draft mss. (20 spp.) HCT to BSHC, ARUN, ASSAM and field tour to Sikkim. **Q3:** Data collection, compilation & preparation draft mss. (20 spp.) HCT to BSD, DD, PAN & PUN **Q4:** Data collection, compilation & preparation draft mss. (20 spp.) HCT to CAL herbarium
64.	**Revision of the Lichen family Pyrenulaceae in India** Dr. T.A.M. Jagadesh Ram Scientist-E, BSI, SRC, Coimbatore	2017 – 2022	**Q1:** Herbarium consultation tours to BSI, CNH, Howrah; ERC, Shillong; CRC, Allahabad; NBRI, Lucknow. Specimens will be taken on loan. **Q2:** Loan specimens will be studied morphologically, anatomically and chemically. Identification and preparation of Description. **Q3:** Loan specimens will be studied morphologically, anatomically and chemically. Identification and preparation of Description. **Q4:** Herbarium consultation tours to ARI, Pune. Preparation and submission of Manuscript. Total Herbarium Consultation Tour: 02.

Summary of Annual Research Projects 2021-2022

No. of new projects starting in 2021-22 : 17

No. of previous projects continuing during 2021-22 and beyond : 26

No. of ongoing projects :-21

Total number of projects : 64