PROSPECTUS

Central Department of Botany
Tribhuvan University

Foreword

Central Department of Botany, Tribhuvan University is a pioneer institution in the country for promoting research and academic courses in plant science to produce high level human resource. The post graduate teaching in botany in Nepal started from 1965 at Tri-Chandra College and then moved to Kirtipur in November 1967 (Mangsir 13, 2024 B.S.), it is upgraded as Central Department in 1987 to strengthen research in plant science. Annually, the Department graduates about 35 post graduate plant scientists with specialization in Plant Systematics and Biodiversity, Ecology and Resource Management, Plant Pathology and Applied Mycology and Plant Biotechnology.

Aiming to understand biodiversity conservation and development theory, to develop an advanced knowledge on biodiversity, development policy and management of biological resources, the Central Department of Botany (CDB) has started a Master Level program on Biodiversity and Environmental Management (BEM) since 2008. In addition, the department runs a very successful Ph.D. program from where 43 scholars have been already awarded and more than 20 scholars are presently involved in Ph.D. research. The department also has a research based culture with several collaborating research projects funded by national and international organization. Almost all faculties' members have their Ph.D. degree.

The department annually publishesa journal of plant science (*Botanica Orientalis*) and a newsletter (*Vanaspati*) in addition to occasional research books to disseminate research findings and its academic activities. The department also organizes national and international conferences, seminars and workshops and colleagues regularly publish research papers in different reputed peer reviewed journals. Students are supporting the Department for the betterment of the academic environment through Botanical Students Association (BOSS). The main challenges of the Department is space constraints due to heavy damage and destroyed of main building by the earthquake of 2015, however, a limited new infrastructure has been created and a two stores new building is planned. Tribhuvan University has approved the plan of

new building and hope the Department will be recovered space problem soon.

We admire the contribution of our former and present faculties, TU authorities, collaborating partners, non-teaching staffs and students to establish a lead Department in Tribhuvan University. We look forward for their continuous cooperation and collaboration for making this department as a center for academic excellence. I express my sincere thanks to all colleagues, especially to Prof. Dr. Sangeeta Rajbhandary, Prof. Dr. Ram Kailash Prasad Yadav, Prof. Dr. Bijaya Pant and Dr. Suresh Kumar Ghimire for their continuous contribution for compiling and editing the Prospectus.

Prof. Dr. Mohan Siwakoti
Head
Central Department of Botany
Date: October, 2017

Contents

Compiled and edited: Sangeeta Rajbhandary, Ram Kailash Prasad Yadav, Bijaya Pant and Suresh Kumar Ghimire

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INTRODUCTION

Biology is a natural science concerned with the study of life and living organisms, including their structure, function, growth, evolution, distribution, and taxonomy. Biology has many sub-disciplines and has deep history that can be linked to the invention of agriculture at the very dawn of civilization and even earlier. As such it is a very vague and broad field, rich with culture and tradition that encompasses many threads of observational, empirical and theoretical research and spans scales from single molecules to continents. Up to the end of 20th century and onwards, the biological science has fully developed and many disciplines had emerged. Even in Nepal biological science is fully matured as its study had started before 70 years and hundreds of biologists are emerging each year from various academic institutions, primarily affiliated to Tribhuvan University.

Plants are vital components of all Earth's ecosystems, providing food and habitat to all organisms. Moreover, plants control the composition of the earth's atmosphere, and prevent the spread of deserts and polluted areas. Over 450,000 plant species are known on Earth. In Nepal, where over 6,500 higher plants and over 4,500 lower plant species are recorded. Many more plants await discovery, especially among lower plant species. Nepal is a country rich in plant resources and botanists have an important role to play in the study, management and conservation of these precious natural resources, as well as in contributing to the national development. As the primary institution of higher education in botany, the Central Department of Botany (CDB) has played an important role for over four decades, producing the necessary highly skilled personnel and experts in Botany.

TRIBHUVAN UNIVERSITY

Tribhuvan University (TU) was established on July 14, 1959 and is the oldest and the largest university in Nepal. There are five technical institutes and four general faculties. The university offers Bachelor's, Master's, M. Phil's and Ph.D. degree in different disciplines at its technical institutes and faculties. There are 39 central departments and 4 research centers in TU and 1084 affiliated colleges throughout the country.

Prime Minister of Nepal is the Chancellor of Tribhuvan University, while Minister of Education is the Pro-Chancellor. Vice Chancellor, the principal executive of the university, is assisted by Rector in academic programs and

Registrar in financial management and general administration. Mainly the Government of Nepal finances Tribhuvan University, a non-profit autonomous institution.

CENTRAL DEPARTMENT OF BOTANY

Botany as a subject was introduced in Nepal for the first time in 1947 with the introduction of biology at Intermediate of Science level at Tri-Chandra College in Kathmandu. It was upgraded to Bachelor level in 1950 and to post-graduate level in 1965. The initial post-graduate classes at Tri-Chandra College had eight students. The Department moved to Kirtipur in November 1967 (13 Mangsir 2024 BS) and was upgraded to the Central Department of Botany (CDB) in 1987 for M.Sc. and Ph.D. level studies, and to strengthen research on plant science. CDB is responsible for all academic programs of botany within TU. As the primary institution of higher education in botany, CDB has played an important role for five decades, producing the skilled personnel and experts in botany. CDB has also undertaken fundamental and applied research exploring Nepal's plant wealth and establishing intricate relations between plants, people and environment.

ACADEMIC PROGRAMS

1. M. Sc. in Botany

The M.Sc. program is of four semesters, each of six months duration with final examination at the end of each semester. The Department enrolls 35 students in the first semester. Students with B.Sc. Botany or equivalent degrees from recognized universities can apply for admission, which is based on entrance examination (100%). The Department has already produced about 2500 M.Sc. botany graduates. The two-year M.Sc. course encompasses both coursework and research. Every student has to write dissertation in the fourth semester.

***Course outline*:**

M.Sc. Botany encompasses both coursework and research (in the form of dissertation). The first and second semesters involve mainly coursework (both theory), laboratory work (practical) and basic field work. The third semester involves a component of research methodology, and dissertation proposal writing and seminar presentation for the preliminary research

preparation in addition to the special coursework (both theory, and lab and field work). The fourth semester is entirely devoted to dissertation work. In the fourth semester, students will have the opportunity to contribute to existing fields of research. The complete course accounts for 62 credit hours and 1550 aggregate marks.

Semester I (Credit hrs.17, FM 425; Theory + Practical)

The courses include: Diversity and Evolution of (i) Microbes and Fungi, (ii) Non-vascular Plants (Algae and Bryophytes), (iii) Vascular Plants I (Pteridophytes and Gymnosperms); and (iv) Vascular Plants II (Angiosperms). In addition, a course on Field Work and Seminar is offered to each student to learn techniques of specimen collection, preservation and curation.

Semester II (Credit hrs 19, FM 475: Theory + Practical)

The courses include: (i) Ecology, (ii) Cytology and Genetics, (iii) Plant Physiology, (iv) Plant Systematics, and (v) a course on Field Work where the students learn about techniques of ecological sampling, vegetation and floristic study and giving seminar presentation.

Semester III (Credit hrs 18, FM 450: Theory + Practical)

Three categories of courses are offered in this semester: compulsory, special and applied. The compulsory course include (i) Research Methodology and Biological Data Analysis (theory and lab work), and (ii) Dissertation Proposal and Seminar; both are mandatory for each student. There are four special papers each including two courses. Students have the choice of selecting any one of the special paper out of four:

(i) Ecology (functional plant ecology, and landscape and global change ecology);(ii) Plant Systematics (applied systematics, and biodiversity and biogeography); (iii) Plant Biotechnology and genetic engineering (plant biotechnology, genetic engineering); and (iv) Applied Mycology and Plant Pathology (applied mycology and advanced plant pathology).

The applied paper includes four courses of which student will have a choice of selecting any one out of four: (i) Natural Resources Management, (ii) Plant Conservation Biology, (iii) Molecular Biology in Plant Science, and (iv) Food Security and Food Safety.

Semester IV (Credit hrs 8, FM 200: Theory + Practical)

The courses include case study/seminar and dissertation work.

Excursion

There shall be at least one botanical excursion for I and II semesters. It pertains to different botanical regions of the country. Botanical excursion is highly essential for studying the vegetation in its natural state and flora. The students submit their excursion reports during the annual practical examination.

2. M.Sc. in Biodiversity and Environmental Management

The M. Sc. program in Biodiversity and Environmental Management (BEM) was started in 2008 with financial support from Norway (NOMA program) and academic support from Kunming Institute of Botany (China), Kumaun University, and Jawaharlal Nehru University (India) as a regional degree program. The program ended in 2013. Since 2014, the CDB has continued this program after necessary changes in its course structure with internal financial resources. This is a four semester program; the first semester covers basic conceptual courses while the second and third semesters cover advanced courses. The final semester covers research methodology and the dissertation work.

The basic criterion for admission is Bachelors degree in biological sciences such as botany, zoology, microbiology, biotechnology, environmental science, forestry, agriculture, natural resource management etc. The M. Sc. program consists of a dynamic combination of course work, research training and dissertation writing. The course is applied and management oriented. Experts also invited from other department, government officers, NGO, INGOs ang individuals as visiting faculty for teaching and research.

Course Outline:

M.Sc. in Biodiversity and Environmental Management (BEM) encompasses both coursework and research (in the form of thesis). The first, second and third semesters involve mainly core coursework (both theory, practical and basic field work). In addition, in the third semester, students are also provided with a component of fundamentals of research design and dissertation planning. The fourth semester involves dissertation work and a course on methods of biological data analysis. In the fourth semester, students will have the opportunity to take part in the existing fields of research. The complete course accounts for 60 total credit hours and 1500 aggregate marks.

Semester I (Credit hrs 17: Theory + Practical)

The courses include: Diversity and Evolution of Living Organisms, Population, Community and Ecosystem Ecology, Biodiversity and Biogeography, Mountain Ecology and Term Paper/Seminar I.

Semester II (Credit hrs 17: Theory + Practical)

The courses include: Conservation Biology, Natural Resource Management, Environmental Change and Management, Remote Sensing and GIS and Term Paper/Seminar II.

Semester III (Credit hrs 14: Theory + Practical)

The courses include: Agro-ecology, Environmental Biotechnology, Environmental Assessment and Monitoring, Microbes and Soil Health, Research Design and Dissertation Planning.

Semester IV (Credit hrs 12: Theory + Practical)

The courses include: Methods of Biological Data Analysis and Dissertation.

Excursion

There shall be at least one field excursion for I and II semesters. It pertains to different ecological regions of the country. Field excursion is highly essential for learning field research methods and studying the environmental status and conservation efforts in its natural state and management regimes. The students submit their excursion reports during the annual practical examination.

Ph. D. Program

The Central Department of Botany is actively engaged in the Ph.D. research besides its regular teaching and research programs for the Master Degree in Botany and BEM. Ph.D. at the department covers a range of topics such as classical taxonomy through evolutionary developmental genetics, phylogenetics, floristics, vegetation ecology, microbial ecology, invasion ecology, agroforestry, ecophysiology, ethnobotany, ethnoecology, resource conservation, tissue culture, cytogenetics, mycology, phytochemistry, etc. A total of 43 Ph.D. awards have been conferred since Ph.D. program started in this department with specialization in ecology, plant systematics, pathology, cytology and genetics. Currently, 23 students are actively carrying their research. The Ph.D. awarded students have returned to lectureships or research positions in their own institutions and fresher's have joined new jobs in different institutions. Ph.D. scholars have visited and conducted their research in world's reputed research laboratories and herbaria overseas. Previously a Ph.D. research laboratory was established and funded by University Grant Commission (UGC), Nepal.

Application for Ph.D. enrollment will be announced by the Dean office, Institute of Science and Technology. The program is based on research and some coursework carried out under the supervision of departmental faculty members. If necessary, there can be co-supervisors from faculty/scientists from the same or other institutions in Nepal or abroad. The Central Department Research Committee (CDRC) looks after the activities related to Ph.D. program at the department.

Golden Jubilee

The Central Department of Botany, Tribhuvan University, has been continuously engaged in the promotion of plant science through various

academic and research activities since 1965. Being the institution of higher education in Plant Science has been playing a pivotal role in producing qualified human resources, dissemination of botanical knowledge and generating new information through research. The department has produced several nationally and internationally recognized plant scientists in their respective fields.

Department celebrated its ***Golden Jubilee*** on March 11, 2016 (Falgun 28, 2072) by felicitating senior retired colleagues and personal's who has given their contribution for the betterment of the department. In that occasion a ***Golden Jubilee Monument*** was unveiled to mark its 50 years. Five publications "*Frontiers of Botany*", "*Catalogue of the Nepalese Flowering Plants Preserved in the Tribhuvan University Central Herbarium (TUCH) Part 1: Monocotyledons*", "*Souvenir*", "*Botanica Orientalis: Journal of Plant Science*' and "*Vanaspati Newsletter*" were released.

Faculty members

Dr. Mohan Siwakoti: Professor and Head of Department. Prof. Siwakoti obtained his M.Sc. degree in Botany from Tribhuvan University in 1982, and Ph.D. degree in Plant Systematics from T.M. Bhagalpur University, India in 1995. His major fields of interest are systematics and ethnobotany, wetland biodiversity and alien invasive plant species. He has research experience in over one and a half dozen research projects funded by national and international organizations. He was a scholar for a training programme under Darwin Initiative Project for "Flora of Nepal" in Nepal and Royal Botanic Garden Edinburgh, UK (2003-2006). He has supervised two Ph.D. theses and there are three ongoing Ph.D students and over a dozen and half M.Sc. students. He has published one book, five edited books and about five dozen papers in national and international journals/publications.

Email: mohansiwakoti@live.com, m.siwakoti@cdbtu.edu.np

Dr. Mohan Prasad Panthi: Professor. Prof. Panthi obtained his M.Sc. degree from Tribhuvan University in 1983, and Ph.D. in Plant Diversity from Tribhuvan University, Nepal in 2002 under the Sandwich Program Funded by NUFU, Norway. His major field of interest are plant taxonomy, ethnobotany and biodiversity.

He has research experience in research projects funded by national and international organizations and published about two dozen papers in national and international journals. Prof. Panthi has published popular articles in daily papers and different publications. He has 35 years long experience in teaching and administration in different Institutions under Tribhuvan University. Besides teaching he is interested in social services and actively involved with Rotary International as well as worked as founder member of five academic Institutions (School and Campuses) in Nepal. Email: pantheemp@gmail.com

Dr. Sangeeta Rajbhandary: Professor. Prof. Rajbhandary obtained her M.Sc. degree in Botany from Tribhuvan University in 1991, and Ph.D. degree in Plant systematics and Phylogenetics from Tribhuvan University, Nepal in 2010. She has completed her Post – Doctorate from Royal Botanic Garden Edinburgh, UK in 2014. Her major fields of interests are plant taxonomy, biodiversity, systematics, ethnobotany, medicinal plants, ferns and fern-allies and molecular taxonomy. Prof. Rajbhandary is the Member of Research Committee, Institute of Science and Technology, Tribhuvan University and Coordinator of Biodiversity and Environmental Management Program at the department.

Prof. Rajbhandary has research experience in several projects funded by national and international organizations. She has worked as a Darwin Scholar (1998) at The Natural History Museum, London and a Darwin Scholar (2003-2006) under Darwin Initiative Project for "Flora of Nepal Project" in Nepal and Royal Botanic Garden Edinburgh, UK, and as a Darwin Fellow at Royal Botanic Garden Edinburgh, UK (2013-2014). She has supervised 31 M.Sc. theses, and currently supervising two Ph.D. and seven M.Sc. students. She has published one book, nine edited books and 70 papers in national and international journals/publications and 13 reports. Email: imogine3@gmail.com

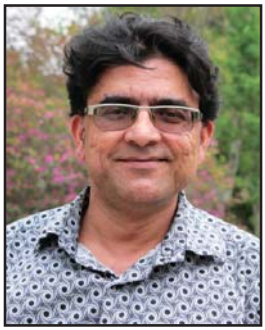
Dr. Ram Kailash Prasad Yadav: Professor. Prof. Yadav obtained his M.Sc. degree in Botany from Tribhuvan University in 1991 and Ph.D. degree in Ecology (plant microbe interaction) from Aristotle University of Thessaloniki, Greece in 2005. His major fields of interest are vegetation analysis, phyllosphere/ rhizosphere microbial colonization, plant secondary metabolites, agroecology/ agroforestry/ nutrient dynamics and biomass fuel. Prof. Yadav is member of the Climate Change Council, Government of Nepal.

Prof. Yadav has research experience in various projects funded by national and international organizations. He has worked as a Visiting Scholar at the

Center for Agricultural Resources Research, Institute of Genetics and Developmental Biology, Chinese Academy of Sciences (CAS), China (April-September, 2014; Nov.-April, 2016). He has supervised over a dozen and half M.Sc. theses and currently supervising three Ph.D. students; one Ph.D. student in China. He has published two books, eight reports and over three dozen papers in national and international journals/publications. Email: rkp.yadav@cdbtu.edu.np

Dr. Bijaya Pant: Professor. Prof. Pant obtained her M.Sc. degree in Botany from Tribhuvan University in 1991, and Ph.D. degree in Biotechnology from Hiroshima University, Japan in 1997. Her major fields of interest are plant tissue culture, development of micro-propagation technologies, synthetic seed and metabolite production in culture for their commercial utilization.

Prof. Pant is engaged in different aspects of medicinal orchid research, their germplasm conservation, mass propagation, transfer them from lab to land, and investigating anticancer properties of various medicinal orchids. Prof. Pant has research experience in various projects funded by national and international organizations and has completed six research projects as a principal investigator. She has supervised 53 M.Sc. dissertations and one Ph.D. student. She is currently supervising three Ph.D. students. She has published more than 70 papers in national and international journals/publications and authored three books. Email: bijayapant@gmail.com



Dr. Suresh Kumar Ghimire: Reader. Dr. Ghimire obtained his M.Sc. degree in Botany from Tribhuvan University, Nepal in 1992, and Ph.D. degree in Evolutionary Biology and Ecology from Université Montpellier II, Montpellier, France in 2005. His major fields of interest are applied ethnobotany/ethnoecology, plant systematics, plant population and community ecology, and conservation biology of rare, threatened and useful plants.

He has research experience in about 20 projects funded by national and international organizations. Currently, he has been involved in the long-

term projects (2013-recent) related to the monitoring of climate change impacts on alpine vegetation in five different regions of Nepal, applying GLORIA methodology, and in collaboration with scientists from Missouri Botanical Garden, USA and ICIMOD and RECAST/TU, Nepal. He has also been involved in a long-term research project (2014-2018) "Transiting to Green Growth – Natural Resources in Nepal" focusing on harvesting sustainability of high-value medicinal plants with funding from Danida Fellowship Centre, Denmark and in collaboration with Copenhagen University, Denmark. He is the member of IUCN SSC Medicinal Plants Specialist Group (MPSG). He has supervised 41 M.Sc. theses and is currently supervising 3 M.Sc. and 2 Ph.D. students. He has published over 50 papers in national and international journals/publications, and also authored 4 books and 30 research reports. Email: sureshkghimire@yahoo.com, sk.ghimire.cdbtu@gmail.com.

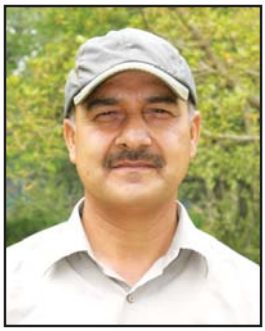
Dr. Chitra Bahadur Baniya: Reader. Dr. Baniya obtained his M.Sc. degree in Botany from Tribhuvan University in 1994, M. Phil. and Ph.D. in Quantitative Ecology and Biodiversity from Department of Biology, Bergen University, Norway in 2010. His major fields of interest are community ecology, gradient analysis, and statistical analysis through R. He has been involving in several research projects funded by national and international organizations. Dr. Baniya has supervised over a dozen M.Sc. Theses, supervising 1 Ph. D. and co-supervising 4 Ph.D. theses. He has published over two dozen papers in national and international journals/ publications. Email: cb.baniya@cdbtu.edu.np. cbbaniya@gmail.com

Dr. Deepak Raj Pant: Reader. Dr. Pant obtained his M.Sc. degree in Botany from Tribhuvan University in 1993, and Ph.D. degree in Botany from Central Department of Botany, Tribhuvan University, Nepal in 2010 under the Sandwich Program Funded by German Academic Exchange Service (DAAD). His major fields of interest are plant physiology, molecular biology, genetic engineering and phytochemistry of medicinal plants.

Dr. Pant has research experience in projects funded by national and international organizations. He has published about a dozen papers in national and international journals/publications. He has supervised 16 M.Sc. theses and currently supervising 6 M.Sc. theses. Email: drpant_agbot@yahoo.com

Dr. Sanjay Kumar Jha: Reader. Dr. Jha obtained his M.Sc. degree in Botany from Tribhuvan University in 1994 and Ph.D. degree from DDU Gorakhpur University, (UP) India in 2013. His major fields of interest are fungal taxonomy (diversity of macrofungi), mushroom cultivation and management of plant diseases, ethno-mycology, microbial application (biological nitrogen fixation and bio-pesticides).

Dr. Jha has supervised 10 M.Sc. theses and currently supervising four M.Sc. students and published over a two dozen papers in national and international journals/publications. He is involved in national and international research projects. Email: j.sanjay99@yahoo.com



Dr. Krishna Pant: Reader. He obtained M.Sc and PhD degrees in Botany in the years 1996 and 2011 respectively from Tribhuvan University. His major fields of interest are in vitro conservation of plants, phytochemistry, plant biotechnology and studies on neglected edible and medicinal plants of Nepal. He has supervised five M. Sc. Agriculture theses as a major supervisor and six as a member of the advisory committee. He has evaluated and monitored different research projects as a Deputy Director of the Directorate of Research/ IAAS, TU for two years. He has published five research articles in different national and international journals. Email: krishna.k.pant@gmail.com

Dr. Anjana Devkota: Reader. Dr. Devkota obtained her M.Sc. degree in Botany from Tribhuvan University in 1998, and completed her Ph.D. in Ecology at the Central Department of Botany, Tribhuvan University, Nepal in 2011. Her major fields of interest are plant eco-physiology, vegetation analysis, conservation biology (medicinal plants) and plant ecology. She

has been involved in several research projects funded by national and international organizations.

Dr. Devkota has supervised two dozen M.Sc. theses and currently supervising two Ph.D. and three M.Sc. students and published over 40 papers in national and international journals/publications. Email: devkotaa@gmail.com

Dr. Bharat Babu Shrestha: Reader. Dr. Shrestha obtained his M.Sc degree in Botany from Tribhuvan University in 1999 and Ph.D. degree in Ecology from the Central Department of Botany, Tribhuvan University, Nepal in 2010. His major fields of research interests are biological invasion, forest ecology, and plant adaptation along environmental gradients (plant ecophysiology).

Dr. Shrestha has successfully completed 12 research projects funded by national and international organizations. Currently, he has been involved in researches on biological invasion funded by International Foundation for Science (Sweden), USAID IPM Innovation Lab (USA), and Darwin Initiative (UK). He has supervised 30 and co-supervised 15 M.Sc. theses of botany and environmental science. Currently, six M.Sc. and one PhD student are working with Dr. Shrestha for their thesis/dissertations. He has published nearly 50 research and review papers, and co-edited three conference proceedings. Email: shresthabb@gmail.com.

Dr. Giri Prasad Joshi: Lecturer. Dr. Joshi obtained his M.Sc. degree in Botany from Tribhuvan University in 1995, and Ph.D. degree in Molecular Cytogenetics from Kyoto University, Japan in 2012. He has one year post doctorate research experience in Kyoto University, Japan (2012-2013). His major fields of interest are molecular cytogenetics (GISH/FISH), plant breeding, plant chromosome engineering and development of deletion lines of

wild relatives of wheat by using gametocidal system, cytological mapping, and population genetics.

Dr. Joshi has research experience in projects funded by national and international organizations. He has supervised 8 M.Sc. theses and currently supervising eight M.Sc. theses. He has published one book and about a dozen papers in national and international journals/publications. Email: giripjoshi@gmail.com

Dr. Hari Prasad Aryal: Lecturer. Dr. Aryal obtained his M.Sc. degree in Botany from Post Graduate Campus, Biratnagar, Tribhuvan University in 1994, and Ph.D. degree in Applied Mycology and Plant Pathology from Central Department of Botany Tribhuvan University, Nepal in 2015. His major fields of interest are systematic of termitophilous fungi, mushrooms culture, ethnomycology, medicinal fungi, and fungal secondary metabolites. Dr. Aryal is currently supervising two M.Sc. theses. He has research experience in three research projects funded by Go'N, TU, and UGC, Nepal. He has published 30 papers in national and international journals/ publications. Email:hahariprasadaryal06@gmail.com

Dr. Lal Bahadur Thapa Magar: Lecturer. Mr. Thapa obtained his M.Sc. degree in Botany in 2002 and PhD in Biology (specialization: plant invasion mechanisms) from Prince of Songkla University, Thailand in 2016. His major fields of interest are plant invasion mechanism, plant growth and development, plant-soil-microbial interaction, stress physiology, climate change and indigenous knowledge.

Dr. Thapa has experience as principle investigator in research projects funded by national and international organizations. He has published about a dozen papers in national and international journals/publications. His current research involves finding solutions of plant invasiveness, allelopathy and herbivore stress on invasive vs native species, climate change impacts and drought-disease interaction in selected crop plants. Email: lal_thapa25@yahoo.com

Dr. Shreeti Pradhan: Lecturer. Dr. Pradhan obtained her M.Sc. degree in Botany from Tribhuvan University in 2005 and Ph.D. degree in Plant Biotechnology from Central Department of Botany, Tribhuvan University, Nepal in 2017. Her major fields of interest are in vitro culture techniques, synthetic seed production and their commercial utilization, ex-situ conservation and genetic characterization of rare, threatened and endangered plants, especially orchids.

Dr. Pradhan has research experience in projects funded by national and international organizations and published two dozen of research papers in the national and international journals/publications. She has supervised 4 M.Sc. theses. Email: shreeti_prd@yahoo.com

Dr. Narayan Prasad Ghimire: Lecturer. Dr. Ghimire obtained his M.Sc. degree in Botany from Tribhuvan University in 2005 and Ph.D. degree from Tribhuvan University (TU) in 2014. His major fields of interest are Aquatic diversity, mountain ecosystem, limnology, water quality management model, solid waste management practice, FFI (fluvial functioning Index). Dr. Ghimire has research experience in projects funded by national and international organizations. Dr. Ghimire has published more than 20 papers in national and international journals/ publications. Email: nghimire077@gmail.com

Mr. Mukti Ram Paudel: Lecturer. Mr. Paudel obtained his M.Sc. degree in Botany from Central Department of Botany, Tribhuvan University in 2010. Currently, he is doing Ph.D. research in Plant Biotechnology at the Central Department of Botany, Tribhuvan University. His major fields of interest are; plant tissue culture, isolation of secondary metabolites, chemical profiling, biological activities (antioxidant, antimicrobial and anticancer) of

secondary metabolites. Mr. Paudel has research experience in various projects funded by national and international organizations. He has published 8 papers in national and international journals/publications and also authored a book. Email: m.paudel47@gmail.com

Dr. Chandra Prasad Pokhrel: Teaching Assistant. Dr. Pokhrel obtained his M.Sc. degree in Botany from Tribhuvan University in 1991, and Ph.D. degree in Agricultural Science from Kyushu University, Fukuoka, Japan in 2007. His major fields of interest are cultivation of edible, medicinal and insect mushrooms, soil biology of different agro-ecosystems, agro-biodiversity, food security, compost making and climate change. Dr Pokhrel is Associate Academician at NAST and a member of the Climate Change Council, Government of Nepal.

Dr. Pokhrel has research experience in several projects funded by national and international organizations. He has supervised a dozen M.Sc. theses. He has published over three dozen papers in national and international journals/publications. Email: chandraprkh@yahoo.com

Former Faculty members

Prof. Brahni Dutta Pandey (Head of Department, 1965-1973); Prof. Dr. Dibya Deo Bhatt (Head of Department, 1973-1978); Prof. Dr. Dayananda Bajracharya (Head of Department, 1978-1985, 1987, 1994-1998); Prof. Dr. Amrit Raj Shakya (Head of Department, 1985-1987); Ms. Janak Devi Manandhar (Head of Department, 1987-1993); Prof. Sanu Devi Joshi (Head of Department, 1982-1983, 1998-2002); Prof. Dr. Govinda Prasad Sharma Ghimire (Head of Department, 1993-1994); Prof. Dr. Krishna Kumar Shrestha (Head of Department, 2008-2012); Prof. Dr. Pramod Kumar Jha (Head of Department, 2003-2008; 2012-2016); Prof. Dr. Dilli Devi Shakya; Prof. Dr. Shyam Ratna Sakya; Prof. Dr. Vimal Narayan Prasad Gupta; Prof. Dr. Braja Nandan Prasad; Prof. Dr. Hari Dutta Lekhak; Dr. Kamal Krishna Joshi; Dr. Sabitri Shrestha; Prof. Dr. Usha Budathoki; Prof. Dr. Ramdeo Tiwari; Dr. Laxmi Manandhar; Prof. Dr. Ram Prasad Chaudhary.

Other former faculty members

Mrs. Shanti Devi Sharma, Mr. Saraswati Prasad Rimal, Dr. Keshab Raj Rajbhandari, Dr. Jay Prakash Sah, Dr. Bhaju Krishna Tamot, Dr. Gauri Shankar Manandhar, Dr. Shambhu Prasad Sah, Dr. Praresh Lacoul

Administrative staff

Mr. Prakash Krishna Karmacharya (Account Officer), Mr. Min Bahadur Khatri (Section Officer), Mr. Janak Parajuli (Senior Admin. Assistant), Mr. Shailendra Kumar Singh (Lab. Officer), Mr. Bhakta Kumar Pradhan (Senior Typist), Mr. Ganga Thapa (Sr. Lab. Boy), Mr. Vishnu Thapa (Sr. Lab. Boy), Mr. Shiva Pandey (Lab. Assistant), Ms. Radha Sharma (Asst. Store Keeper).

Supporting staff

Mr. Hari Krishna Thapa (Senior, Office Assistant), Mr. Sambhu Ram Bista (Off. Assistant/Plant Collector), Ms. Sobha Maharjan (Office Assistant), Ms. Janaki Basnet (Office Assistant), Ms. Iswori Bista (Gardener), Ms. Laxmi Shrestha (Gardener), Ms. Rukumani Maharjan (Gardener), Mr. Kashi Ram Subedi (Gardener), Mr. Dil Man Pode (Sweeper).

Former Administrative staffs

Mr. Sitaram Upadhaya (former Deputy Administrator), Mr. Purnima Acharya (Account Officer), Mr. Shukra Lal Shrestha (Deputy Finance Controller), Mr. Chandra B Maharjan (Senior Plant Collector, 1965-2007), Gorakh Bahadur Shrestha (Lab. Assistant, 1968-1973), Mr. Krishna B Mali (Senior Gardner), Mr. Jagat B Shrestha (Store Keeper), Mr. Dan B Maharjan (Fieldman), Ms. Krishna Kala (Admistration), Mr. Rajesh Devkota (Accountant), Mr. Ram Babu Khanal (Admistration), Mr. Sudarshan KC (Admistration), Mr. Hari (Office Assistant), Mr. Ganga Maharjan (Admistration) and Mr. Dhanbir Maharjan (Office Assistant).

Botany Subject Committee (2074-2077)

The Dean, IOST/TU constituent the Botany Subject Committee on Ashad 2074 as follows:
Prof. Dr. Mohan Siwakoti (Chairman)
Prof. Dr. Mohan Prasad Panthi (CDB, TU)
Prof. Dr. Mukesh Kumar Chhetri (ASCOL)
Prof. Dr. Sangeeta Rajbhandary (CDB, TU)
Prof. Dr. Ram Kailash Prasad Yadav (CDB, TU)
Prof. Dr. Bijaya Pant (CDB, TU)
Dr. Suresh Kumar Ghimire (CDB, TU)
Dr. Chitra Bahadur Baniya (CDB, TU)
Head, Botany Department (PG Campus, Biratnagar)
Head, Botany Department (SS Campus, Mahendranagar)
Head, Botany Department (Tri-Chandra M Campus, Kath.)
Head, Botany Department (Patan M Campus, Lalitpur)
Head, Botany Department (PN Campus, Pokhara)
Head, Botany Department (Butwal M Campus, Butwal)
Head, Botany Department (Thakur Ram Campus, Birgunj)
Dr. Bishwo Nath Oli (Secretary, Ministry of Population and Environment, GoN)
Dr. Maheshwor Dhakal (Joint Secretary, Ministry of Forest and Soil Conservation, GoN)
Director General (Department of Plant Resources, MoFSC, GoN)
Prof. Dr. Sidhi Bir Karmacharya (Khopa College)
Prof. Dr. Kanta Paudel (ASCOL)

The Standing Committee of Botany Subject Committee Members

Prof. Dr. Mohan Siwakoti (Chairman)
Prof. Dr. Mohan Prasad Panthi (Member)
Prof. Dr. Mukesh Kumar Chettri (Member)
Prof. Dr. Sangeeta Rajbhandary (Member)
Prof. Dr. Ram Kailash Prasad Yadav (Member)

The Central Department Research Committee (CDRC) Members

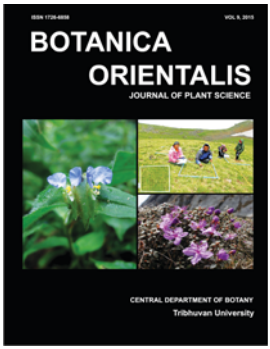
Prof. Dr. Mohan Siwakoti (Chairman)
Prof. Dr. Mukesh Kumar Chettri (Member)
Prof. Dr. Sangeeta Rajbhandary (Member)
Prof. Dr. Bijaya Pant (Member)
Dr. Suresh Kumar Ghimire (Member)

Publications

Vanaspati

The Department publishes a newsletter *Vanaspati* annually. The first issue was published in 1993, in order to disseminate information on the departmental activities both of academic and research fields. In most of the issues it covers the departmental activities, achievements of the faculty members, list of publication of the teachers, as well as list of thesis submitted within a year and also highlights other activities related with plant science in Nepal.

Botanica Orientalis-A journal of plant science



The better world will be the world of Science and Technology i.e. world of success. Without scientific publication the world of science is impossible. The ultimate goal of any investigation will only be achieved unless and until the facts and findings are conveyed to the people for the implementation and further output. Keeping this in mind *Botanica Orientalis*- a journal of plant science was published since 1999. Journal generally publishes research article both from home and abroad along with review articles and short communication. It is a good platform for Ph. D and M. Sc. students, as well as other researchers to publish their research work on plant science. An inevitable consequence of the proliferation of scientific knowledge and research works in the fields of plant science is an outcome in this journal. Journal is regularly published by the Central Department of Botany, Tribhuvan University, Kirtipur, Kathmandu.

Frontiers of Botany (2016)

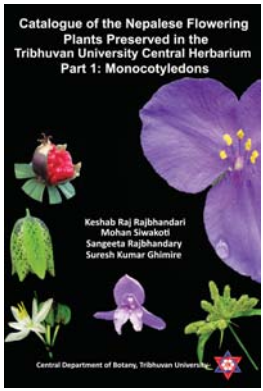
Edited by Jha, P.K., M. Siwakoti, and S. Rajbhandary.

"*Frontiers of Botany*" is an anthology of review or overview of the subject by the Nepalese experts. Purpose of the book is to disseminate knowledge and

highlight botanical activities that Nepalese botanists performed in the five decades. The book gives important information on the History of Botanical explorations, Bryophytes, Fern and Fern allies, Phyllosphere, Global Biodiversity and Taxonomy Initiatives, Plant Biodiversity in Nepal: Conservation and Legal, Invasive alien plant species, Wetland Biodiversity Status and Challenges for Conservation, Tissue Culture, History and Present Status of Chromosome Studies and Botanists of Nepal: an overview. The content of the book, incorporates useful information regarding different field of plant science. It is believed, that the book would be useful as a reference to M.Sc. students, teachers, and researchers.

Catalogue of the Nepalese Flowering Plants Preserved in the Tribhuvan University Central Herbarium* (TUCH) *Part 1: Monocotyledons (2016)

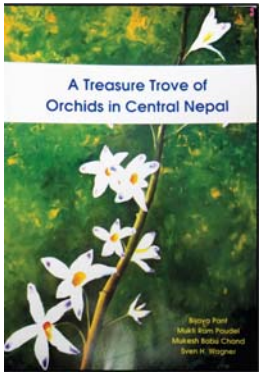
Rajbhandari, K.R., M. Siwakoti, S. Rajbhandary, S.K. Ghimire.



The catalogue of plant specimens is essential not only to see the status of the herbarium development but also for their proper utilization in academic research. It provides baseline information for botanical researches in Nepal and is expected to be useful for preparing Flora of Nepal. The present book includes 388 species of Monocotyledons under 22 families. In this book, plant families are arranged alphabetically. Angiosperm Phylogeny Group III (APGIII) system was followed for the treatment of genera.

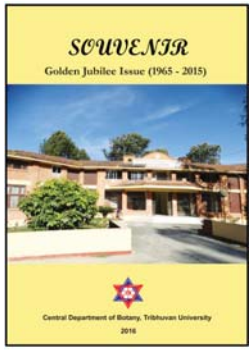
A Treasure Trove of Orchids in Central Nepal **(2016)**

Pant, B., M.R. Paudel, M.B. Chand, S.H. Wagner



Orchids are one of the most beautiful plant species in nature and most popular for local traditional medicine, horticulture and international trade. The book highlights the various dimensions of orchids, such as general introduction, socio-environmental impacts, threats, efforts and methods to conserve the orchid diversity. The book will be useful to researchers, students, naturalists, orchid lovers, policy makers and common people.

***Souvenir* – Golden Jubilee Issue (1963-2015).**



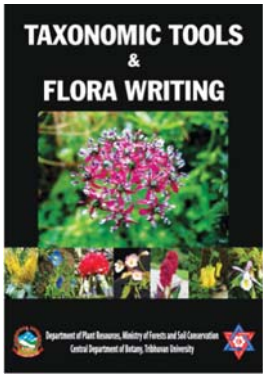
Edited by Siwakoti, M. S. Rajbhandary, G.P. Joshi, C.P. Pokharel

The souvenir includes thirteen articles related with plant science, one poem, and information about Central Department of Botany, its faculty members and administration staff and some memorable photos related with important events of the department.

Taxonomic Tools and Flora Writing (2015)

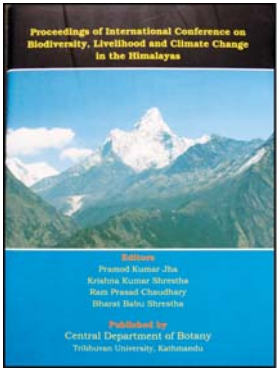
Edited by Siwakoti, M. and S. Rajbhandary

Published by Department of Plant Resources, MoFSC and Central Department of Botany, TU, Kathmandu, Nepal.



This book covers important topics as Ethical issues, Nepal Flora update, Classification, Botanical terminology, Herbarium Preparation and Storage, Plant identification, Nomenclature, Illustration, Checklist preparation and tools of taxonomic revision. The content of the manual demonstrates very clearly the techniques for taxonomic study and Flora writing. In addition, this book is intended to be useful as a reference to M.Sc. students, teachers, researchers, policy and decisions makers and those working on flora and flora writing.

***Proceedings of International Conference on Biodiversity, Livelihood and Climate Change in the Himalayas*.** (2015).



Edited by Jha, P.K., K.K. Shrestha, R.P. Chaudhary and B.B. Shrestha

The proceeding is outcome of the *International Conference on Biodiversity Livelihood of Climate* Change in the Himalayas, organized on December 12-14, 2010. The proceedings have twenty papers related to biodiversity, livelihood, and climate.

1. Research Methods and Practice (2004).
2. Abstract: M.Sc. and Ph.D. Thesis (2006).
3. Annotated Checklist of the Flowering plants of Nepal (2000)
4. Vegetation and Society – Their Interaction in the Himalayas (2002)
5. Local Effects of Global Changes in the Himalayas: Manang, Nepal. (2007)
6. Flora of Nepal: Magnoliaceae to Rosaceae (2011)
7. Proceedings of International Conference on Biodiversity, Livelihood and Climate Change in the Himalayas (2014)

Facilities available

There are six laboratories cum classrooms, a lecture theatre and a seminar hall. The Department has library cum computer room, herbarium and botanical garden. Unlimited internet facility is available for all faculties, students and staffs.

Research laboratories

The Department has basic laboratory facilities for water relations studies, tissue culture, phytochemical analysis, nutrient analysis of soil and plant material, water analysis, molecular systematics, microbiological and mycological research, etc.

Departmental Library

The Departmental library has been a heart of the department has over 1,600 books related to all disciplines of plant science. In addition it holds 64 national and international journals along with 30 Newsletters and Annual reports from home and abroad. It also houses about ca 1000 M.Sc. and 42 PhD theses. There are about 33 Dictionaries and 237 Encyclopedia. The library opens every day (in working days) from 11:00 – 16:00 hrs. Some books and journals in library have been received as gift from the collaborating institutions and individuals.

Computer/Internet facility

The Department has managed unlimited internet facility for the students, researchers, faculties and staffs. A wireless system has been installed to facilitate internet access. An uninterrupted alternate power supply is also made available to run the internet.

Herbarium

The M. Sc. students and researchers associated with the Department deposit one set of plant specimens in the herbarium. The Department also enriches with the collection of several specimens of non-vascular plants. Central

Department of Botany is a pioneer institute for teaching Botany since it was established in 1965. Based on the approach to develop a good environment in teaching and learning, central herbarium was established at the department. It is registered in *Index Herbariorum* as an acronym of TUCH (Tribhuvan University Central Herbarium) in January 2001. The herbarium, possessing over 22,000 pressed and dried plant specimens of vascular plants and few thousands pteridophytes.

Today, TUCH holds largest number of plant specimens after the National Herbarium (KATH) in Nepal. The collections of different students, teachers and expedition teams and experts from Nepal and foreign countries have been deposited in the herbarium. There are also specimens sent from different herbaria (LE, E, and BM) as gift to TUCH. Similarly, TUCH has sent several duplicate specimens to different herbaria as gift. Different equipments including GPS and field gears have been donated by expedition teams and experts in TUCH which can be used by students and researchers of the department. The main functions of TUCH include plant collection, identification and management.

Botanical Garden

The Botanical Garden of CDB has emphasized the native, rare and endangered species like *Elaeocarpus sphaericus, Ginkgo biloba, Cycas pectinata, Rauvolfia serpentina, Podocarpus neriifolius, Cedrus deodara, Michelia champaca, Dalbergia sissoo, Cinamomomum tamala,*

Choerospondias axillaris, Cassia fistula etc. In these trees we do have number of orchids, some important medicinal plants from tropical to sub-alpine regions were researched for their cultivation and demonstration. Recently the executive Council of Tribhuvan University has authorized the Central Department of Botany to develop the 22 ha Golden Jubilee Garden in the University Campus as TU botanical Garden. CDB, TU has already submitted the action plan.

Botanical Student's Society (BoSS)

Students run a Botanical Student Society (BoSS) under the patronage of Head of Department, to support developmental and academic activities. The BoSS executive committee is formed every year from among the M. Sc. III semester and II semester students. The active participation of students in operating department library, cleaning campaign, organizing welcome/ farewell of their friends, and excursions has been highly appreciated. Every year BoSS organizes different activities depending on the festivals and welfare of the students.

On Going Research Projects

1. **Transiting to green growth in Nepal**

   Objective:Assess the sustainability of harvest of valuable commercial MAP species

   Duration: 2014-2018

   Principal Investigator: Dr. Suresh Kumar Ghimire

   Project Members: Dr. Chitra Bahadur Baniya, Dr. Bharat Babu Shreshta, Prof. Dr. Mohan Siwakoti and Prof. Dr. Pramod Kumar Jha.

   PhD Students: Mukti Ram Paudeyal and Deep Jyoti Chapagain

   Grant support: Danida Fellowship Centre

   Collaborators: Copenhagen University, Denmark, Agriculture and Forestry University, Nepal, Federation of Community Forestry Users, Nepal (FECOFUN) Federation of Community Forestry Users, Nepal (FECOFUN), and Kunming Institute of Botany, China.

2. **Climate change in the high Himalaya: effects on alpine vegetation and ethnobotany (2016-2017).**

   Duration: 2016-2017

   Principal Investigator: Dr. Suresh Kumar Ghimire

Grant support: National Geographic Society USA and Missouri Botanical Garden, USA.

3. Participatory Biodiversity and Climate Changes Assessment for Integrated Pest Management in Chitwan Annapurna Landscape, Nepal.

Objectives: Assess climate change impacts on biological diversity at various elevations of Chitwan Annapuran Landscape and develop an empirical basis for integrated pest management.

Duration: October 2015-September 2019

Co-PI and Nepal Coordinator: Prof. Prof. P.K. Jha

Project Team: Prof. Mohan Siwakoti, Dr. Bharat Babu Shrestha, Dr. Anjana Devkota, Dr, Sanjay Kumar Jha. The project supports one post doc., three Ph.D. and six M.Sc.

Post Doc. Fellow: Dr. Ram Asheshor Mandal.

Ph.D. Students: Mr. Dol Raj Luitel, Ms. Shreejana Maharjan and Ms. Anju Poudel.

Master Students: Ms. B.M. Shrestha, Mr. S. Bhandari, Ms. P. Dangol, Mr. Sagar Khadga.

Grant Support: Feed the Future USAID IPM Innovation Lab., USA

Collaborators: City University of New York, Institute for Global Agriculture and Technology Transfer, USA, Tribhuvan University (Central Department of Botany) and Agriculture and Forestry University.

4. Jaibik Map: Nepal's Biodiversity and Climate Change Tool for the Future

Objectives: To conduct a nationwide study of forest change under climate change scenario and establish a visual representation mammalian species in Nepal

Duration: December 2016–November 2018

Principal Investigator: Prof. P.K. Jha

Project Team: Prof. Mohan Siwakoti, Dr. Chitra Bahadur Baniya

Grant Support: National Academy of Sciences/USAID

Collaborators: IUCN Nepal, US Government supported (or GE-designated): National Academy Sciences; Department of National Parks and Wildlife Conservation, Ministry of Forests and Soil Conservation; Kathmandu Living Lab.

5. **Science-based interventions reversing negative impacts of invasive plants in Nepal**

   Objective: Restoration of native vegetation replacing invasive alien weeds

   Duration: 2016-2019

   Project PI: Dr. Mark Watson

   Project team from the Department: Prof. Dr. Mohan Siwakoti (CoPI) and Dr. Bharat Babu Shrestha (Key contact)

   Student research assistants: Bhawani Nyaupane, Ganesh D Joshi and Rashmi Paudel

   Grant support: Darwin Initiative, UK

   Collaborators: Royal Botanic Garden Edinburgh (UK), Central Department of Botany TU, Department of Plant Resources, Nepal Academy of Science and Technology (NAST), and Forest Action.

6. **Effects of air pollution on roadside vegetation (shrubs) in Kathmandu Valley**

   Duration: 2016-2018

   Research Team Members: Anjana Devkota (Principal investigator), Bharat Babu Shrestha (Co- investigator)

   Research Assistants: Sushila Devi Shrestha and Sumant K Ranjan

   Grant support: University Grants Commission, Nepal

7. **Enhancing degradation of *Eichhornia crassipes* (Mart.) Solms. compost with lignocellulolytic fungi and its potential use as commercial mushrooms substrate**

   Duration: 2016-2018

   Research Team Members: Dr. Sanjay Kumar Jha (Principal Investigator), Dr. Chandra P Pokhrel, Antita Kharbuja and Menuka Gotame

   Grant support: University Grants Commission, Nepal

8. **Macrofungi Diversity and Ethnomycological Study in Palpa District of Nepal**

   Duration: 2016- 2017

   Research Team Members: Dr. Hari Prasad Aryal (Principal Investigator), Mr. Pravin Keshari

   Grant support: University Grants Commission, Nepal

9. **Strengthening Capacities for Implementation of the Nagoya Protocol in Nepal.**

   Objective: A Collaborating Technical Partner with IUCN Nepal to implement some GEF project activities

Duration: 2017-2018.
Coordinator: Prof. Dr. Mohan Siwakoti

10. **Evaluation of Anticancer Properties of Some Medicinal Orchids of Nepal and Mass Scale Propagation of Identified Species.**
Duration: 2017-2018.
Grant support: University Grants Commission, Nepal
Coordinator: Prof. Dr. Bijaya Pant

11. **Antioxidant, Antimicrobial and Antidiabitic Activities of Plant Extract of Selected Species of *Berberis* of Nepal.**
Duration: 2017-2018.
Grant support: Nepal Academy of Science and Technology, Nepal
Coordinator: Dr. Deepak Raj Pant

Recently Accomplished Projects (2014 – 2016)

1. **Studies on macrofungal diversity of Rupandehi District and nutritive value of some dominant edible ones (2014-2015).**
Grant: NAST.
Team Leader: Dr. Sanjaya Kumar Jha

2. **Impact of Parthenium weed on plant species composition and forage productivity of pastures in Nepal (2014-2015).**
Grant: International Foundation for Science (IFS), Sweden.
Team Leader: Dr. Bharat Babu Shrestha

3. **Monitoring the effects of climate change on alpine plant diversity in Kailash Sacred Landscape Area of Nepal (2014-2015).**
Funding: ICIMOD/GIZ.
Team Leader: Dr. Suresh Kumar Ghimire

4. **Assessment of the effects of climate change on distribution of Invasive Alien Plant Species in Nepal (2015-2016).**
Grant: Nepal Academy of Science and Technology/Asian Development Bank.
Team Leader: Prof. Dr. Mohan Siwakoti
Team members: Dr. Bharat Babu Shrestha, Dr. Anjana Devkota, Dr. Uttam Babu Shrestha and Resham Thapaparajuli

5. **Scientific Capacity Development to strengthen informed decision making for improved climate policy formulation and implementation in South Asian Countries (2016-2017).**

Grant: Asia Pacific Network for Global Change Research (APN)

Team members: Prof. Mohan Siwakoti and Prof. P.K Jha (Coordinator)

Other Activities

International Seminar/Conference

1. **International Conference on Biodiversity Climate Change Assessment and Impacts on Livelihood** (January 10-12, 2017).

The International conference was inaugurated by the Right honorable President of Nepal Ms. Bidya Devi Bhandari. The inaugural session was chaired by Honorable Minister of Population and Environment Mr. Jay Dev Joshi and the Vice-Chancellor of Trbhuvan University Prof. Dr. Tirth Raj Khaniya. The Chief Guest for the closing ceremony was Honorable Minister of Education Mr. Dhani Ram Poudel and the session was chaired by Prof. Dr. Mohan Siwakoti, Head of the Central Department of Botany.

About 400 participants, including over 100 participants from abroad actively participated in the conference. The conference was jointly organized by Tribhuvan University, Central Department of Botany; Agriculture and Forestry University, Rampur; City College—CUNY, New York; Institute of Global Agriculture and Technology Transfer (IGATT), USA; IPM Innovation Lab, USA and four ministries of the Government of Nepal, namely Ministry of Population and Environment, Ministry of Science and Technology, Ministry of Agriculture Development, and Ministry of Forest and Soil Conservation.

The conference was supported by European Union; University Grants Commission, Nepal (UGC); International Centre for Integrated Mountain Development (ICIMOD); Nepal Academy of Science and Technology (NAST); World Wildlife Fund Nepal (WWF); International Development Enterprise; National Trust for Nature Conservation; Alternative Energy Promotion Centre; Food and Agriculture Organization of the United Nations; Ministry of Livestock Development, GoN; United Nations Development Program, Nepal; Agriculture Research Council (NARC), Nepal; Department of Plant Resources, Nepal; Adaptation for Small holders in Hilly Areas(ASHA); President Chure-Tarai Madhesh Conservation Development Board, Nepal; Asia Network for Sustainable Agriculture and Bio-resources (ANSAB), Nepal; and Prime Minister Agriculture Modernization Project. United States Agency for International Development (USAID) was the promoter of the conference.

Training and Workshops conducted at the department:

1. Application of Ethnobotany for Conservation and Community Development.
2. Ethnobotanical Research: Laboratory and field methods.
3. Botanical illustration: Drawing and photography.
4. Research methodology.
5. Herbarium Collection, Management and Documentation.
6. Current activities and future perspective of teaching and research in botany.
7. Flora of Nepal training workshop for the Nepalese contributors of volume 10 part I.
8. Workshop for the project "Transiting to Green Growth: Natural Resources in Nepal**.**
9. National Workshop on NTFP/MAPs Sector Action Plan Development.
10. Training workshop on Plant Taxonomy and Herbarium Techniques.
11. National Workshop on Conservation of Medicinal Orchids.
12. Methods for ecological monitoring used by the Global Observation Research Initiative in Alpine Environments (GLORIA).
13. The identification of grasses.
14. Pen and Ink for Taxonomists: Botanical illustration.

Collaborating Institutions

The Department has academic collaboration with several national and international organizations.

National

Ministry of Agriculture Development, GoN
Ministry of Population and Environment, GoN
Ministry of Forest and Soil Conservation, GoN*
Ministry of Science and Technology
Department of Plant Resources, MoFSC*
National Academy of Science & Technology (NAST)*
National Trust for Nature Conservation (NTNC)*
WWF Nepal*
IUCN Nepal*
Dabur Nepal Pvt. Ltd.*

International

Jawaharlal Nehru University, New Delhi, India
Kumaon University, Nainital, India
Kunming Institute of Botany, Kunming, China
Missouri Botanical Garden, St. Louis, USA*
Natural History Museum, London, UK*
Royal Botanical Gardens, Edinburgh, UK*
Society of Himalayan Botany, Japan
Swiss Federal Institute for Forest, Snow and Landscape Research (WSL), Switzerland*
University of Bergen, Norway*
University of Tokyo, Japan
City University, New York, USA
University of Wisconsin, USA
Oregon State University Corvallis, USA
University of Padova, Italy
Copenhagen University, Denmark
Griffith University, Australia
Institute of Botany, Chinese Academy of Sciences, Beijing
International Centre for Integrated Mountain Development (ICIMOD)*

Funding Agencies:

Darwin Initiative, UK
National Geographic Society, USA
The Norwegian Centre for International Cooperation in Higher Education (SiU), Norway
Swiss National Science Foundation, Switzerland
United Nations Environmental Program
University Grant Commission (UGC), Nepal
Nepal Academy of science and Technology (NAST), Nepal
Volkswagen Foundation, Germany
International Foundation for Sciences (IFS), Sweden
National Science Foundation, USA
USAID, IPM Innovation Lab, USA
DANIDA Fellowship Centre, Denmark

Note: *Collaboration in major academic programs and research projects

A. Rara Lake of Rara National Park, located at Mugu District (Sangeeta Rajbhandary)

B. Manang Valley (Chitra Bahadur Baniya)

C. *Juniperus indica* burning as incense in Thulo Safru, Rasuwa District (Sangeeta Rajbhandary)

D. Botanical excursion to Simbhanjyang and Daman 2016 (Sangeeta Rajbhandary)

E. Department taking part in Science exhibition (Sangeeta Rajbhandary)

F. Old and new building of the Department (S Rajbhandary)

G. Prof. Siwakoti handing over souvenir to the artists from Royal Botanic Garden Edinburgh (S Rajbhandary)