

Memorandum of Understanding
between
**Government of Nepal, Ministry of Forests and Soil Conservation,
Department of Plant Resources**
and
Showa Pharmaceutical University, Japan
for
**Exploration of novel drugs from natural products of
Himalayan areas in Nepal**

Background:

The Department of Plant Resources (DPR), Government of Nepal, Ministry of Forests and Soil Conservation (MoFSC), and the Showa Pharmaceutical University, Japan recognise that:

- Nepal and Japan have a long tradition of Plant research in Nepal, dating back to 1950 when Professor H. Kanai and his team made the first natural history collections from Nepal.
- DPR and many other institutions related to plant science in Japan have undertaken successful collaborative field research expeditions in Nepal since then.
- DPR and University of Tokyo, Japan have been actively collaborating on the *Flora of Nepal* since 1999 under an international MoU by the Royal Nepal Academy of Science and Technology, RONAST (now Nepal Academy of Science and Technology, NAST), the University of Tokyo, Japan, the Natural History Museum (London), UK and RBGE and a national MoU signed in 17/7/2058 B.S. by the Ministry of Forest and Soil Conservation (MoFSC), Tribhuvan University (TU) and RONAST (present NAST).
- The need for the study on plants of Nepal is highlighted many times in the Government of Nepal's *National Biodiversity Strategy 2002* (NBS) of Nepal Govt. Where the fundamental knowledge gap of missing plant biodiversity data is often cited as major obstacle to effective conservation.
- The national and international importance of *Flora of Nepal* is specifically mentioned in the NBS (2.3.3.1), and forms a major component of a Priority Implementation Project in the *National Biodiversity Strategy Implementation Plan 2006-2010* (NBSIP, Project CS1: Institutionalization of Biodiversity Conservation in Nepal).
- The involvement of Japan, especially the University of Tokyo in writing the *Flora of Nepal* is endorsed by the NBS and NBSIP, and Japan has also made a long-term commitment to the *Flora of Nepal*.
- Japan has a long track record of collaborating with DPR and proven sincerity in partnership on joint fieldwork and research, training on capacity building, and other supporting activities. A joint symposium on the conservation of Himalayan Medicinal Resources had been organized in 2000 in order to find out a way for joint collaboration of Japanese Research Institutions with Department of Plant Resources.
- Although there are many herbarium specimens housed in Herbaria, they do not fully represent all the plants of Nepal and so is incomplete reference collection. Further field research is needed as many Nepalese species (especially endemic species which are only known from collection) are poorly known with an incomplete knowledge of morphological variation and geographic distribution within Nepal. The chemical screening and analysis of Nepalese plants have also to be done for the variation

of primary constituents in accordance to the geographical and seasonal variation for their efficacy in treating diseases.

- In 1980s, Toyama Medical and Pharmaceutical University, Toyama, Japan had made number of visits to Nepal under the leadership of Prof. Tsuneo Namba for the study of medicinal plants and Amchi, traditional medicines system in some hilly and mountainous districts of Nepal in collaboration with Department of Medicinal Plants (presently DPR).

Proposed collaborative research:

With the objective of scientific collaboration, exploration and phyto-chemical research for the plant science in Nepal the following Articles outline the activities of Department of Plant Resources (DPR) and Showa Pharmaceutical University (SPU), Japan.

Nepal and Japan are signatories to the 1992 Convention on Biological Diversity (CBD) and so the following Articles make reference to and follow the CBD's *Bonn Guidelines on Access to Genetic Resources and Fair and Equitable Sharing of Benefits Arising out of their Utilization* (2002, UNEP/CBD/COP/6/20) and the *Nagoya Protocol on Access to Genetic Resources and Benefit Sharing* (2010, www.cbd.int/cop10/doc). The Articles also follow the pre-CBD *Manila Declaration* concerning the ethical utilization of Asian biological resources (1992, <http://nimura.tripod.com/manila.htm>).

The MoU is signed based on the decision taken on 21st July, 2014 at Secretary Level of Ministry of Forests and Soil Conservation and agree to carry out joint research works under following articles.

Article 1. Timescale:

This MoU is valid for **three years** from the date of signing and can be expanded and/or extended with due process.

Article 2. Scope of Co-operation:

The activities of the cooperation under this MoU shall include:

- 2.1 Research on the taxonomy, classification, distribution, phytochemical screening and chemical analysis of the plants of Nepal with the aim of synthesizing these data which not only help identify plants and the chemical constituents of plants but also help to write the *Flora of Nepal* and other joint publications.
- 2.2 Capacity building in the above mentioned subject areas for staff of DPR especially those working at the Natural Products Research Laboratories and National Herbarium of Nepal.
- 2.3 Collection, study, sharing and conservation of duplicates of preserved herbarium specimens of the Nepalese flora, and the chemicals extracted and analysed therein.
- 2.4 Exchange of visits by DPR and SPU senior officials for identifying the broader prospects of research on natural products with focus on flora of Nepal.

Article 3. Research and Intellectual Property Rights:

The Parties agree that:

- 3.1. Any material or results of the collaboration shall be for non-commercial research purposes only.
- 3.2. Scientific results of this collaborative research should be reported in publications with joint authorship or due acknowledgement of contributions.
- 3.3. All publications and promotional materials arising from collaborative activities under this MoU shall properly acknowledge the contributions of all parties.

Article 4. Capacity Building:

The Parties recognise the great importance of the preserved plant reference collections in the National Herbarium KATH and the phyto-chemicals in Natural Products Research Laboratories and instruments section within DPR and the staff working on these collections. The Parties will work together to:

- 4.1 Engage in the gathering of new herbarium specimens to enhance the national reference collections at KATH Herbarium.
- 4.2 Engage in screening and phyto-chemical analysis in Nepal and Japan from the collected plant specimens.
- 4.3 Seek funds and engage in building capacity for researchers of DPR in plant collecting, plant identification, herbarium curation and all subjects related to phyto-chemical screening and analysis of the important molecules observed there in (qualitative and quantitative study) and also pharmacological screening of plant specimens.
- 4.4 Train researchers of DPR involved in this team in collecting, handling of plant samples and phyto-chemical and pharmacological screening and analysis in Nepal and Japan.
- 4.5 Necessary communication to be maintained regarding the technical matters between the research counterparts of DPR and SPU during the study period.
- 4.6 Seek funds for strengthening infrastructure of National Herbarium and Plant Laboratory and Natural Products Research Laboratories under DPR.

Article 5. Field and Laboratory Research with sharing Herbarium Specimens and chemicals:

Continue an active program of field research, and phyto-chemical study, and also for training Nepalese research counterparts in upgrading their skills.

- 5.1 Plant materials collected during joint fieldwork will include triplicate sets for partner institutes.
- 5.2 The top set of all material gathered, including type material, will be deposited at National Herbarium, and the phyto-chemical screening results at Natural Products Research Laboratories.
- 5.3 Phyto-chemical screening of collected samples will be done in the Natural Products Research Laboratory of DPR as far as possible. For advanced chemical screening and study a set of sample will be carried to Showa Pharmaceutical University, Japan.
- 5.4 Three researchers of DPR will be involved in this program in collection of plant specimens, handling and chemical studies of collected specimens in Nepal and Japan.
- 5.5 DPR is responsible for arranging the necessary permissions from the Government of Nepal to undertake the joint fieldwork.
- 5.6 All expenses incurred during the field research, lab works and also visit to Japan for researchers of DPR involved in this program will be borne by Showa Pharmaceutical University Japan as per the regulation of Showa Pharmaceutical University, Japan.
- 5.7 DPR (NHPL and NPRL) will be responsible for meeting the necessary logistics for the study of the collected samples in the country.

Article 6. Team members:

Following members will be involved from Showa Pharmaceutical University, Japan:

1. Dr. Susumu ITOH, Prof. of Showa Pharmaceutical University (Biochemistry)
2. Dr. Akihito TAKANO, Prof. of Showa Pharmaceutical University (Pharmacognosy)

3. Dr. Takahisa NAKANE, Associate Prof. Showa Pharmaceutical University (Phytochemistry)

And following members will be involved from DPR.

1. Kumari Jyoti Joshi, Senior Research Officer, National Products Research Laboratory, Thapathali
2. Paras Mani Yadav, Assist Research Officer, National Products Research Laboratory, Thapathali
3. Dhana raj Kadel, Assist Research Officer, National Herbarium & Plant laboratory, Godawari

Article 7. Locations of field visits for researches:

Plant collection will be carried out in the following areas:

First trip in 2014: Maipokhari and adjoining areas of Ilam district

Second trip in 2015: Mustang and Annapurna conservation Area

Third trip in 2016: To be decided later

Article 8. Guideline:

This collaborative research work will be guided by the "**Research Guidelines of Plant Resources-2013**" of Government of Nepal.

Signed on the behalf of
Government of Nepal

Signed on the behalf of the Showa
Pharmaceutical University Tokyo, Japan

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Yam Bahadur Thapa
Director General
Department of Plant Resources,
Thapathali, Kathmandu, Nepal

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Dr. Susumu Itoh
Professor
Showa Pharmaceutical University
Tokyo, Japan

Date: August 13,2014

Date: August 13,2014