Advancement of healthcare at local levels using traditional knowledge in sync with modern database and analysis' *(Pilot-project to develop a local medicinal plants herbal pharmacopeia on an ICT platform)*

November
2015

Project Implementation:
Institute of Trans-Disciplinary Health Science and Technology (TDU)

&

Karnataka State Remote Sensing Applications Centre (KSRSAC), Bangalore

&

Swami Vivekananda Youth Movement (SVYM), H D Kote

Karnataka Jnana Aayoga

(Karnataka Knowledge Commission)

Government of Karnataka

MESSAGE

Healthcare systems require tremendous innovation – to make the impact that is needed in society. While modern medicine systems are pre-dominantly practiced, traditional medicine is an important system of health practice in India. Traditional health systems are based on sum total of the knowledge, skills, and practices based on the theories, beliefs, and experiences indigenous to Indian cultures, whether recorded or not, used in the maintenance of health as well as in the prevention, diagnosis, improvement or treatment of physical and mental illness.

During the last decade, use of traditional medicine has expanded and has gained popularity. With the tremendous expansion in the use of traditional medicine worldwide, safety and efficacy as well as quality control of herbal medicines and traditional procedure-based therapies have become important concerns for both health authorities and the public. Good standards and appropriate methods for evaluating traditional medicines are required. The challenge now is to ensure that traditional medicine is used properly and to determine how research and evaluation of traditional medicine should be carried out.

In Karnataka, the ability to maximally utilize and integrate our extremely rich knowledge base related to traditional medicine practices and benefit many of the associated medicinal plants in the state depends upon how well the knowledge is documented and standardized, apart from how healthcare workers are made aware of the best practices. The knowledge of medicinal plants and traditional practices must also gear up to safeguard medicinal plants which are disappearing from the local ecosystem due to lack of knowledge of their usefulness and conservation methods. Karnataka has rich wealth of medicinal plants and creation of a GIS enabled herbal pharmacopeia would become a tremendous knowledge resource or inventory of medicinal plants. Data of medicinal plants on a GIS platform and bring advanced ICT tools and Data Analytics to integrate technology, traditional knowledge, conservation and revitalization of effective community practices which in turn enable health security and promote environmental education.

I am happy that KJA has considered this pilot project for developing the standards, practices and systems for inventory, sustenance of medicinal plants and use satellite images and GIS for a database. The pilot project would build capacity within the community to create, manage, expand and disseminate traditional knowledge of plant resources. KJA has had detailed discussion on the project which has been reviewed by experts.

KJA believes that this is a very unique and innovative project for implementation – first, as a pilot in HD Kote taluk and later for other areas with the involvement of Government of Karnataka departments – particularly Health and family Welfare department. The pioneering project would enable many firsts for the State both in terms of conservation and health security for its people – become first state to pioneer such initiative in one of the backward taluka; development of medicinal plant knowledge base, documentation of local community knowledge and practices and integration of knowledge into education, healthcare and biodiversity.

I am sure that this recommendation of KJA for will go a long way in furthering education, healthcare, environment and capacity building and also bring awareness to various segments of society. I thank the Members of KJA, Health & Family Welfare department, AYUSH department for their active support and guidance in shaping this recommendation. I would like to express my special thanks to Mr. Darshan Shankar, Vice-Chancellor, Institute of Trans-Disciplinary Health Sciences and Technology (TDU) and his team for bringing this idea and providing constant inputs in the preparation of the Project Report.

On behalf of the KJA, I am extremely pleased to present this recommendation to Government of Karnataka for successful implementation.

November 18, 2015   **(K. Kasturirangan)**
                                                                                                              Chairman

FOREWORD

Karnataka Jnana Aayoga (KJA) is a unique 'platform' established by Government of Karnataka (GoK) as a body of experts and professionals in various fields who, together, bring a wealth of knowledge and expertise through new ideation, undertake extensive brain-storming and wide consultations on important and relevant issues for the state's development. Tasks of KJA are mainly "ideation" or 'proof-of/concept' or "policy perspectives" – all of which get 'anchored' with one or more departments of GoK - so that executive implementation can get effectively coordinated by relevant departments of GoK.

One major initiative that KJA has taken up is an ideation in using traditional medicine and health knowledge for local level healthcare systems MARRIED with modern technological systems – thereby bringing more efficacy to the traditional knowledge and benefit at local level. KJA has considered the TDU proposal on 'A proof of concept project to develop a replicable knowledge resource for one taluka in Karnataka (H.D. Kote) in the form of geospatial database of populations, distribution of local medicinal plants and a taluka specific herbal pharmacopeia, on an ICT platform'. Presently, this is a pilot project that uses modern GIS enabled database of medicinal plants and integrate with traditional community health knowledge and practices – thereby generating a medicinal plants pharmacopeia for primary healthcare and best practices for local healthcare providers. KJA has got the proposal reviewed by national-level experts – who have all been unanimous on this unique and innovative project that can make an impact at local level health-care solutions. The potentials for such integration of traditional health with modern technological systems is tremendous – it can be very significant to the health sector as it involves creating, dissemination and application of knowledge of medicinal plant resources in the state.

The pilot-project is proposed by Institute of Trans-disciplinary Health Sciences and Technology (TDU), Bangalore in partnership with Swami Vivekananda Youth Movement (SVYM), H. D. Kote and Karnataka State Remote Sensing Applications Centre (KSRSAC), Bangalore for one taluka to establish all the practices and systems and evaluation that will show the efficacy of the project.

KJA has had detailed discussions with Health and Family Welfare Department and Ayush Department of GoK – to whom this recommendation is made for project anchoring and implementation. The departments can structure the project implementation and also establish monitoring systems for pilot project. The outcome of the project can make a positive impact on local health care programmes based on traditional medicine and health solutions –potentially contributing to health of the people of the state.

I would like to express my gratitude and thanks to Mr. Darshan Shankar – the key driver for this ideation and pilot and also TDU partners for the project for closely working with KJA for past months in shaping this pilot. I would also thank to Sri. Atul Kumar Tiwari, Principal Secretary, Health and Family Welfare, Government of Karnataka and Sri. Vijaykumar Gogi, Director, Dept. of AYUSH for being involved with KJA in working out the project implementation strategies.

On behalf of the Members of KJA, it is a matter of great pleasure that the project recommendation is being submitted to Government of Karnataka and hopes that implementation steps will be taken up soon.

November 18, 2015   **(Mukund Kadursrinivas Rao)**
Member-Secretary
Karnataka Jnana Aayoga (KJA)
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GRATEFUL THANKS TO

In preparation of this proposal and KJA recommendation on Development of GIS enabled Database of Medicinal Plants of H D Kote, KJA is extremely grateful to:

- Members of KJA for their intense participation and guidance in developing this concept.

- Dr. P. S. Roy, Dr. Sanjappa, Dr. Renu Swarup and Dr. Ganeshaiah – experts who were invited by KJA to review the TDU proposal and provide suggestions for shaping the recommendation of KJA.

- Dr Kaushik Mukherjee, Chief Secretary, GoK for valuable guidance and suggestions

- Mr Bharat Lal Meena, Additional Chief Secretary, HED, GOK for all support and extremely valuable inputs.

- Mr Atul Kumar Tiwari, Principal Secretary, Department of Health and Family Welfare for kind support and valuable suggestions

- Sri. P. S. Vastrad, Commissioner, Department of Health and Family Welfare for his unstinted support

- Ms. Sowjanya, Mission Director, National Health Mission, GoK for her co-operation

- Shri Vijaykumar Gogi, Director, Dept. of AYUSH, GOK and his team for enthusiastic support and useful guidance

- Thanks also to Sri. Darshan Shankar, Vice-Chancellor, TDU and his entire team who were the key persons who conceptualized and designed the project in its totality and patiently associated with KJA to walk-through a series of discussions/consultations for submitting this final proposal.

- KJA Secretariat for overall coordination

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KJA RECOMMENDATION

The Government of Karnataka (GoK) reconstituted Karnataka Jnana Aayoga (KJA) in December 2013 under the Chairmanship of Dr. K. Kasturirangan. The main aims and objectives of KJA are to recommend action for institution building, policy innovation and excellence in the field of education, health, S & T, industry, entrepreneurship, research and innovation, traditional knowledge, agriculture, e-governance, rural development and any other relevant areas.

KJA is mainly a recommendatory body – a body of experts and professionals in various fields who, together, bring a wealth of knowledge and expertise. KJA Members bring new ideation; undertake extensive brain-storming and wide consultations on important and relevant issues for the state's development. KJA activities/tasks start from an "ideation/concept" and result in specific approved KJA tasks/activities/projects and ultimately into recommendations of KJA to GoK. KJA does not take up any operational large-scale implementation projects (except to proof-of-concept) and any such activity is best anchored/taken up by GOK Departments. Generally, ideation/concepts for KJA activities come from 3 sources - Member ideation OR GOK (departments) need for knowledge inputs OR any institutional knowledge ideation OR citizen input or Public Good initiatives.

TDU PROPOSAL

Institute of Trans-Disciplinary Health Science and Technology (TDU), Bengaluru is an innovation oriented institution founded by the Foundation for Revitalization of Local Health Traditions (FRLHT) Trust. Its main tasks are in research, education and translation/outreach/application of knowledge for societal change in the areas of Indian traditional health sciences, Biomedicine, Life sciences, Social sciences, Environmental studies, Design & Architecture, Performing and Fine arts, Engineering and Management.

In September, 2014, KJA received a proposal from TDU on *"Develop a replicable knowledge resource for one taluka in Karnataka (H.D.Kote) in the form of Geospatial Database of populations, distribution of Local Medicinal Plants and a Taluka specific Herbal Pharmacopeia, on an ICT platform".* This proposal sought to demonstrate an innovative health security strategy, to empower households and community in the HD Kote taluka – by inventorizing, using GIS technology, the medicinal plants available in the taluka, to educate

households to effectively manage at least the top three primary healthcare conditions prevalent in the taluka and educate students, teachers and the community on their immediate life scape and environment.

KJA EVALUATION OF TDU PROPOSAL

To start with, KJA-Technical Committee (KJA-TC), in its 2nd meeting held on January 6, 2015, discussed and agreed that the proposal is unique and innovative which will enable knowledge generation on medicinal plants. It was suggested that an expert review of the project be undertaken to evaluate and to assess the proposal from different technical and managerial angle and also to get the assessment of GoK Departments *(Minutes of KJA-TC at Annexure I)*.

KJA invited 4 national experts to evaluate and assess the proposal from different technical and managerial angle and also to get the assessment of GOK departments. The Review Committee included:

- Dr. Partha Sarathi Roy, Geospatial Chair Professor, Centre for Earth & Space Sciences, University of Hyderabad
- Dr. M. Sanjappa, Rtd. Director, Botanical Survey of India
- Dr. K. N. Ganeshaiah, Professor and Head, Environmental Sciences and School of Ecology and Conservation, University of Agricultural Sciences, Bengaluru
- Dr RenuSwarup, Sr Adviser, Department of Biotechnology, New Delhi

The Expert Review Committee had 2 meetings on January 27, 2015 *(Annexure II)* and May 13, 2015 *(Annexure III)*. The Experts provided valuable inputs and suggestions by which TDU revised and shaped. Based on these recommendations this version of the proposal was submitted by TDU to KJA in its 3rd meeting held on January 31, 2015 *(Annexure IV)*.

The Experts Review report and the final proposal was again considered in the 3rd KJA-TC meeting held on June 18, 2015 (*Annexure V*) – this was recommended by KJA-TC to KJA for formal approval.

KJA, in its 4th Meeting of KJA held on July 4, 2015, discussed the proposal and formally has endorsed/approved the proposal from TDU and suggested that Dept. of Health and Family

Welfare and AYUSH Department could anchor the implementation of the KJA recommendation *(Annexure VI)*.

A meeting of Chairman, KJA with Principal Secretary of Health and Family Welfare Services, Government of Karnataka and Director, AYUSH was organised on July 24, 2015 to discuss the KJA Recommendation for the TDU project and to arrive at modalities for the project implementation through an anchoring of the project sponsorship by HFW Department *(Annexure VII)*. A set of suggestions/inputs were provided by HFW Department and Ayush in the meeting and it suggested that TDU would submit a revised/modified proposal based on this final discussion. It was also suggested by Principal Secretary, HFW that the project may be formally submitted by KJA as a formal recommendation to GoK– mainly, to HFW Department Ayush of GoK – which then can be taken up for implementation.

KJA RECOMMENDATION

KJA appreciates and notes that the TDU proposed idea of a pharmacopeia database and GIS of medicinal plants is unique and innovative – and would be implemented for first time in India. Karnataka has rich wealth of medicinal plants and a database of such pharmacopeia GIS would be a knowledge-base and also help possible industry activities and of such plants – further putting all such locations and data on a GIS platform will being in the geographical context and allow seamless integration into Karnataka-GIS, which is being implemented by GoK. The project would contribute to the advancement of healthcare at local levels using traditional knowledge in sync with modern database and analysis.

This is a pilot-project for one taluka in the state – it has conceptualized a holistic design with use of satellite images at detailed granularity, detailed sampling methods and grids to be used for medicinal plant inventory and survey, documentation of sampling, image-base as an important reference scheme, Karnataka-GIS standards to be adopted, health survey and data collection, organization of databases and analytics, key applications are to be developed etc and details of schedule, budget, linking with GOK department etc have been identified. KJA also notes that the success of the pilot-project, after review and evaluation, can have potential to expand and cover the whole state.

KJA also notes that the outcome of the project has both social and commercial ramifications. The traditional knowledge and herbal medicinal practices needs to be conserved on a base of technology and scientific sustenance – thereby protecting the cultural and traditional knowledge in this health arena. The project can also be of commercial value in developing medicinal plants production and extracts – that can fuel a stronger development of herbal medicine industry. KJA suggests that these factors needs to be addressed appropriately through governmental interventions, separately – even as this project must be supported and implemented, as proposed by TDU.

The cost of the project is INR 2.34crores and is to be implemented in 24 months.

KJA formally recommends to Government of Karnataka – through Department of Health and Family Welfare for considering this TDU pilot-proposal and provide sponsorship and administrative support for the implementation of this project by TDU. Based on the outcome of the pilot and its evaluation for value and benefits, KJA also envisages GoK to may appropriately decide on a state-level programme, as appropriate.

INTRODUCTION

Rural communities traditionally managed primary healthcare conditions first at the household level and what could not be solved in the home was taken to the community based healer. If at both these levels a solution was not found, institutional help was sought from primary, secondary or tertiary healthcare services. The first two tiers of the health system viz., the household and the community are slowly disappearing.

There are several reasons for the destruction of the first two tiers. Firstly, absence of public investment in health education, targeted at households and the community. Secondly, reduced governmental support for knowledge transfer of traditional practices and thirdly disappearance of resources (medicinal plants) in the local ecosystem.

The proposal seeks to firstly demonstrate an ICT and GIS technology enabled strategy, to systematically document populations, distribution, life forms and harvested parts of local medicinal plant resources and community health practices. Secondly to add value to the health practices by evaluating them in the light of Ayurveda knowledge system and thirdly to create a multi-disciplinary knowledge products like GIS enabled database with maps on taluka specific medicinal plants with layers of information for households, regulators and governments, a taluka specific herbal pharmacopeia, TOT modules on home remedies and primary health care for 30 conditions, e-modules on environmental education on botany, ecology, populations and distribution of medicinal plants, that can be used by households, institutional healthcare providers, schools and colleges, forest department and agencies like KSRSAC and others departments of government of Karnataka and government of India in public interest. To ensure project efficiency, integration and scalability, the proposal intends to leverage on ICT and GIS technologies to effectively monitor, educate, analyze and report data across all processes.

> *The proposal proposes a two pronged approach to achieve our objectives. The first is to inventories, using GIS layers the medicinal plants available in the taluka and second is to educate households to effectively manage thirty primary healthcare conditions prevalent in the taluka.*

Regarding environmental education this project aims to educate students, teachers and the community on their immediate life scape and environment. This is in line with the recommendation of the Indian National Science Academy which in a life scape project that was launched several years ago, observed that while biology text books for students in Indian schools and colleges, educated them about global biological resources, there was no content on their immediate life scape and environment.

OBJECTIVES

➕ *Related to Knowledge Generation*

- To devleop GIS enabled database of medicinal plants of HD Kote on species, distribution, population status, ecology (micro habitats, associations), parts used and local uses based on appropriate grid size and stratification

- To conduct base line survey on household health expenditure, incidence of the diseases, community health knowledge and practices

- To develop a taluka level pharmacopeia for Primary Healthcare conditions, designed for healthcare providers, based on local plant resources and tradtional community health practices, revaliadred by Ayurveda knowledge System

➕ *Related to Community Applications*

- To develop Training of Trainers (ToT) modules for health care providers to train households on home remedies for selected primary healthcare conditions

- To develop Training of Trainers (ToT) module for high school teachers on botany, environment educaiton and medicinal plants

- To develop e-modules on environmental educaiton and primary heatlh care herbal solutions for selected 30 conditions in Kannada and English for health care providers

- To conduct training programs and disseminate the knowledge through community radio broadcasting and programs for raising awareness in the taluka on primary health conditions, medicinal plants and environment

DELIVERABLES

1. Baseline health survey reports on household health expenditure and incidence of primary health conditions

2. Medicinal plant survey report that captures species, harvested parts, life forms, population estimates, distribution and ecology based on appropriate grid size and stratification

3. Generation of 1:10,000 land use cover maps of HD Kote taluka using remote sensing by KSRSAC

4. Taluka level pharmacopeia for primary healthcare conditions, designed for healthcare providers, based on local plant resources and traditional community health practices, revalidated by Ayurveda knowledge system

5. GIS enabled database on medicinal plants of HD Kote based on survey report outlined in point 2 above

6. Web-hosting of data by KSRSAC, IBIN and other Government and civil society networks using standard interoperable protocols

7. Training of Trainers (ToT) modules on environmental education covering botany, ecology, populations and distributions of medicinal plants of H d Kote

8. Training of Trainers (ToT) modules for health care providers to train households on home remedies for selected primary healthcare conditions

9. End line health survey to record the impact of training programs conducted for health care providers and households

10. Community radio broadcasting channels activated for raising awareness in the taluka on health and environment

11. Notes on guidelines for sustainable harvest, threatened species, species in commercial trade and differential layers of information for public use, regulated use and only for government use

METHODOLOGY FOR BOTANICAL SURVEY AND GIS DATABASE, INTER-OPERABILITY WITH OTHER SPATIAL PLATFORMS

➕ *Selection of H D Kote for the project*

The proposal study area HD Kote has been selected because of its rich forest cover and the concentration of tribal populations. It is harboring more than 500 medicinal plants and a contiguous forest patches like Nagarahole National Park or Rajiv Gandhi National Park, Bandipur National Park, Nugu WLS, Berambadi State forest, Karigala Forest, Kalbetta forest, Kakanakote forest. The High Level Working Group has recognized H D Kote as the Ecologically Sensitive Areas (ESA) since it is the only taluka in Mysore district which comes under the Western Ghat landscape. These forests are home to tribal groups like Jenu Kuruba, Betta Kuruba, Soliga, Yerava and Paniyar. Active presence of the well known, competent grass root level NGO namely Swami Vivekananda Youth Movement (SVYM) who have been working in the taluka with the communities for more than two decades will be facilitating the implementation of this innovative project.

> *It has been listed as one of the backward talukas in Karnataka according to the Nanjundappa Committee report, Government of Karnataka.*

➕ *Botanical Survey & GIS Database*

Design and development of the plot sampling/Gridding with the data provided by KSRSAC at 1;10,000 scale. As per the prevailing standards for assessing the forest plant resources a sampling intensity of 0.01% will be employed after feasible stratification based on high resolution basic maps generated and provided by KSRSAC. Sample plots of 0.1 ha each will be located and laid out to assess the population of tree species. In each of these 0.1ha sized plots, two subplots of 3m x 3m will be laid to assess the population levels of shrubs and climbers and another four subplots of 1m x 1m to assess the population levels of herbaceous flora. It is visualized that approximately 150 plots may be required for HD kote, of which 90 plots will be surveyed and documented in the first year and 60 plots in the second year by a 3 member botanical team with 2 field assistants.

Data on a) presence, b) distribution pattern, c) scale of abundance of medicinal plants used by local community as well as the codified Indian Systems of Medicine (Ayurveda, Siddha and Unani) will be collected through Participatory Rapid Appraisal (PRA) including transect walk, followed by botanical survey. The botanical team of TDU will undertake botanical surveys in the selected sub-districts through perambulation and sampled plots to assess the presence and scale of abundance of the medicinal plant resources.

Precise locations of each sample plot will be marked on the base map and the population data, recorded at each site, will be utilized for generating maps depicting pattern of presence and abundance of prioritized medicinal plant species, using GIS technology.

An innovative application of GIS technology is envisaged under this project for mapping distribution and distribution pattern including abundance / rarity of prioritized medicinal plants occurring in the Taluka. TDU has been making use of this approach for identifying specific potential locations for undertaking conservation measures for the threatened wild medicine plant resources.

The geo-referenced database of medicinal plant resources of the taluka will be uploaded on the web to make this data available and accessible to the diverse users including households, folk practitioners as well the school students.

🞣 *Geospatial Database and the GIS enabled Pharmacopeia*

- Designing the schema and the geospatial database based on the KGIS standards by both TDU and KSRSAC

- Training of the programmers in open source GIS technology and building their capacity to develop the geospatial database and websites

- Detailed literature review from secondary sources (flora's journals and published literature)

- Incorporation of the Botanical survey data from plot samples into the database as the data inflows

- Incorporation of the pharmacopeia data and linking it to the database and the local vernacular languages.

- The 'Many to Many' relational schema will be developed to facilitate the linking of a particular medicinal plant available in a particular taluka to the different drug formulae involving that particular species.

- Translation of the GIS enabled database and pharmacopeia in vernacular language.

- Finally an interface will be provided to document and retrieve information in regional language in electronic media for the pharmacopeia.

🔸 *Inclusion of the different types of spatial layers provided by the KSRSAC, such as:*

- Using the higher images (like Cartosat or Digital Globe) and compatible to better than 1:10k scales of information representation

- K-GIS Spatial framework will be utilized for sampling/gridding, and also usage of precision GPS

- KSRSAC will be updating the KSRSAC database by using 5-8 meters resolution satellite images from Resource - sat/LISS4.

- Administrative boundaries – State, District, Taluka, Gram Panchayat, Villages, Streets, up to survey numbers, PHC's and CHC'S, Census data on 2001 and 2011 which will be useful for the baseline surveys (disease incidence), Land use Land cover, Forest types layers with 7 subtypes for HD Kote for medicinal plant resource survey

- Use of BIOCLIM variables and NDVI will also be used with open source softwares like DIVA GIS for generating maps.

Data collected in Botanical survey will be tabulated and entered in the database. This will have three tables for each quadrant for Trees, Shrubs and Herbs. Precise latitude and longitude values would be provided for each quadrant by means of the precision GPS, which

will enable us to place each record on the map. For trees individual numbers with girth and height measurements would give idea of their maturity too. Once data for several quadrants spatial distribution trend maps could be generated using the precise locations and the species level data for each quadrant. Since the sampling follows stratified design, extrapolation of distributions and population estimates can be done. Overlaying some of the selected layers as required will be superimposed with the data and would lead to generation of maps. The software used for mapping will be DIVA GIS and QGIS.

The database will have Application Programming Interface (API) to establish communication with websites like India Biodiversity Information Network (IBIN) and India Biodiversity Portal (IBP) etc. The data will be exchanged using suitable data exchange formats like XML or JSON. The GIS data will be made available through Web Mapping Service (WMS) which will enable us to serve geo-referenced map images over internet, that are generated by a map server using data from a GIS database. This will enable the project database to become part of national repository and would be available to wider research audience.

- *Methodology for Training of the teachers and the students on environment education got 50 schools and 200 teachers of H D Kote*

  - The education modules will be developed by the resource persons of TDU and the SVYM: Modules will be developed on 1. Medicinal plant identification, 2. School level GIS education and uploading the images with GPS records into the IBP.

  - The training staffs (team of 5) of SVYM who are going to execute this training will be trained by the TDU resource team in documenting medicinal plants and uploading it to the India Biodiversity Portal. Followed by a refresher course to the trainers every 6 months for 3 years.

  - The Trained staff of SVYM will execute this Training program for the teachers and students by organizing workshops and inviting resource persons as needed. The scheduling, liasoning with the departments, monitoring and hand-holding shall be undertaken by the project team. These programs will be implemented at clusters and block level with the permission and co-operation from the Education Department.

- The database generated will be installed in all the computers of the 50 schools of H D Kote

- The students will be encouraged in identifying plants and uploading them on the India Biodiversity Portal.

- The medicinal plant information tagged with co-ordinates will be available on a geospatial l platform like IBP, which is visualized to be an interesting feature contributed by the children.

- As part of awareness activities SVYM will be conducting quiz competition and other events in schools, training sessions for students, promotion of school gardens, training sessions for teachers, SDMCs , SHGs and other stakeholders. Community radio sessions, exhibitions in fairs and other platforms, and major events like biodiversity day, environment day shall be celebrated.

- Recognizing the efforts of the stakeholder shall be conducted by SVYM. Best performing schools, teachers, students and other stake holders will be recognized and awarded. Their efforts will be uploaded on the IBP for sharing, learning and replication purpose

Training of Students, Teachers and Staff of Education department:

- **Target groups**

  o Approx. 50 high schools – 8th , 9th and 10th Standard
  o Students, teachers and officers of education department at the block and cluster level

- **Training module for the students and teachers**

  o Total of about 6 hours.

  o Topics covered – Understanding biodiversity; local plant resources; basic geography, student level GIS education, mapping and awareness to geospatial technology to upload it on the India Biodiversity Portal. Protecting and promoting our environment.

  o To be transacted in 3 sessions of 2 hours each, for each class. Expected number of sessions

- For students – 150 classes, 6 hours in all divided into 3 sessions, a total of 900 hours (450 sessions), over the period of one academic year (approx. 200 working days)

- For teachers – 50 sessions for the schools, total of 300 hours (150 sessions)

Exact modalities and schedules to be worked out in consultation with the Department of Education and the schools

- **Approximate number of beneficiaries reached:**

  o Teachers: 100

  o Children: 1000 (high school children)

  o Population reached indirectly: 200000 (Includes families of children)

- *Strategy for validation and promotion of local health practices*

  Folk practices will be validated based on Ayurveda pharmacology (Dravyaguna Shastra). Only such practices will be promoted that pertain to primary health care. Thus all the formulations for primary health care based on local resources will in effect be Ayurvedic formulations with references from the Ayurveda Materia Medica. This will ensure conformity with regulations.

HEALTH SURVEY

🞢 Baseline Survey

A cross-sectional baseline health survey will be conducted in 200 households in HD Kote taluka using semi-structured questionnaire including qualitative and quantitative research methods. The purpose of this survey is as follows:

- **Household Survey:** To identify common health illness in the community and to assess the household health expenditure

- **Documentation and Assessment**: Systematic collection and rapid assessment of local health traditional knowledge from healers, knowledgeable women

Household Survey: Survey process will begin with developing the tool i.e. semi-structured questionnaire by TDU. After the final questionnaire is ready it will be translated to Kannada. Pilot testing of the tool will be done, and suitable changes made. A team trained in the proper application of the questionnaires would then undertake the household survey. The sample would be a representative of the whole taluka which could be approximately 200 households. Data will be analyzed and report shall be generated.

Documentation and Assessment: Local traditional healers, dais, knowledgeable women from project area will be identified and interviewed them with a structured questionnaire by Ayurvedic physician. The experiences on diagnosis of health condition and treatment followed to cure or prevent health conditions will be documented. Traditional knowledge on selected 30 primary health conditions will be documented from traditional healers. A tentative list of 30 primary health conditions is attached as *Annexure VIII.*

The documented traditional remedies will be entered into a database and desk research/literature review will be conducted using Ayurvedic classical texts. Literature review will comprises of specific references for documented plant species or practices from Ayurveda and modern pharmacological studies. Ayurveda texts and published research papers on modern pharmacology will be used to search for direct references on particular plant species for their use in specific health condition. If there is no direct reference for specific use of the plant species, indirect references (Ayurvedic logic/property) will be

searched from Ayurveda classical texts [rasa (taste), guna (quality), veerya (potency), vipaka (post digestive effect), dosha/dhathu-karma (action on dosha/dhathu)] and karma (activities) for each plant species.

Rapid assessment of local health traditions (RALHT), an innovative methodology developed by TDU will be followed to prioritize the traditional health practices for the purpose of promotion. RALHT is a participatory process through a workshop where traditional healthcare practices will be assessed using a method of dialogue and consensus, wherein local healers, physicians, ethnobotanical researchers, community members, local NGO partners and modern pharmacological experts will take part. Assessment workshops facilitate the process of prioritization and selection of practices/formulation for further promotion.

⬥ *Development of Taluka level Pharmacopeia for Primary Healthcare Conditions*

Based on the traditional healer's knowledge, local plant resources availability (obtained through botanical survey) and Ayurveda knowledge system, a taluka level pharmacopeia will be developed by TDU. This will be useful for health care providers. This task involves linking of Indian Systems of Medicines (ISM) like Ayurveda and Folk usage data with the species of the Taluka with respect to its clinical usages as documented in classical texts of Ayurveda, Siddha, Unani in English and regional language. Linking of resource knowledge and Traditional knowledge will primarily address the safety and efficacy issues, and visualized to create awareness, promote green health for enhancing health security and self – reliance of rural & Urban households. The 'Many to Many' relational schema will be developed to facilitate the linking of a particular medicinal plant available in a particular taluka to the different drug formulae involving that particular species and retrieve the information in regional languages in electronic media. *Annexure IX* shows the template of taluka level pharmacopeia.

⬥ *Development of ToT Modules on Home Remedies for Primary Health Conditions*

- Thirty training modules having information on local health care practices for documented 30 primary health conditions will be developed using a specific template (*Annexure X*). Each module comprises of one primary health condition, its diagnosis, assessed traditional remedies with botanical resources which are locally available. Ten modules

having information on 10 primary health conditions will be developed every year by TDU.

- Orientation to trainers of SVYM on home remedies using training modules 30 primary health conditions. ToT modules on home remedies will be used to orient the project staff of SVYM (10 modules per year for 3 years)

- The training modules will be pilot tested at the community level in HD Kote with the help of SVYM.

🔻 *Promotion of Traditional Health Knowledge through Training Programs*

The strategy of the health program in this proposal is to promote local health traditional knowledge for elected primary health conditions through continuous direct training programs to the community people (200 households), medical, paramedical health providers and broadcasting the traditional health information through community radio.

The grass root health workers such as ASHAs, Anganwadi workers, ANMs, community health workers and medical officers shall be trained on promoting these practices. Apart from healthcare personnel, folk healers and school teachers shall also be educated.

🔻 *Protection of Traditional Knowledge*

Traditional knowledge of communities will not be incorporated into the databases and pharmacopeia, but will reside in People's Biodiversity Registers in the custody of Biodiversity Management Committee's/local BMC's. Precise distribution information pertaining to the threatened wild medicinal plant species will be shared only with the State forest Departments and Government of Karnataka.

🔻 *Process of Training Program*

- Planning the training schedule

- Permission from Health dept., Education dept., and Social Welfare dept. to conduct trainings.

- Trainings shall be conducted at the SVYM headquarters located at Vivekananda Memorial Hospital in Sargur separate training sessions shall be conducted to each target group on use of home remedies for 30 primary health conditions in 3 years

- Organizing workshops for medical and paramedical health providers - Inviting resource persons for TOT workshops as needed, scheduling, Liaoning with departments, monitoring and hand-holding

Approximate number of beneficiaries reached:

- Health department personnel

- 250 ASHA, ANM, Anganwadi workers from 5 PHC area

- Population reached indirectly: approx 50,000

- Community radio broadcasting channels activated for raising awareness in the taluka on health and environment, 60 programs in a year for 3 years

✚ *Certification of Community Health Workers by TDU*

The program visualizes training of the grass root health workers such as ASHA's, Anganwadi workers, ANM's, community health workers, medical officers in the reliable uses of medicinal plants for primary healthcare. The TDU certification will explicitly mention that the trainees are being certified as "community health workers". This clarity will be necessary so that no claims of being certified as legal practitioners are made by the trainees.

✚ *End line Survey*

End line survey will be conducted among 200 households, medical and paramedical health providers to understand the impact of the ToT training and household level training programs using a semi-structured questionnaire. Impact of training will be measured using following measurements:

Awareness about 30 primary health conditions (Sign, symptoms, differential diagnosis), use of local plant resources and home remedies based on TRU (Transmission-Retention-Utilization) principles

🔸 *Development of a Policy Framework for Integrative Health Care*

Chairman KJA suggested that the department of health collaborate with TDU to develop a futuristic policy framework for Integrative Health Care. The context of this recommendation is the pluralistic health seeking behavior evident in rural and urban India wherein citizens no longer depend on one a single system of medicine for all their health care needs. The NHM is also designed to involve all system of medicine, but in the absence of a coherent policy on IHC, the operationalization has faced obstacles.

WORK PLAN AND TIMELINES

Sl. No.	Output	Activities	Year 1		Year 2	
		Table – 1: Work Plan and Timelines				
1	Baseline health survey: - Reports on household health expenditure, incidence of primary health conditions and documentation of traditional community health practices **(Financial support will be provided by TDU project resource)**	1. Design of survey protocol and pilot testing	*			
		2. Execution of survey through PRAs and stratified sampling of villages, healers & 200 households	*			
		3. Data Analysis and report preparation of baseline health survey	*			
2	End line health survey: To record the impact of training program - Awareness about 30 primary health (sing, symptoms, differential diagnosis) based on TRU (Transmission-Retention-Utilization) principles	1. Design of end line survey protocol and pilot testing			*	
		2. Execution of end line survey of 200 households			*	
		3. Data analysis and report preparation of end line health survey				*
3	Sampling based on stratification i.e. land use classes with KGIS framework	1. Procurement of latest satellite images for designing the gird sapling based on land use classification. Around $ 16 per square kilometer. Custom charges extra (30% of total cost of image) x 1600 square kilometer	*			
		2. Developing Grid and Stratified Sampling. Design of survey at 1:10000 scale (TDU + KSRSAC cost of time)	*			
		3. Generation of 1:10,000 Land Cover maps of HD Kote taluka using remote sensing imagery from Quickbird, Cartosat	*			
4	Preliminary medicinal plant survey in one season (Summer) **(Financial support will be provided by TDU project resource)**	Execution of preliminary plant survey. Data analysis and report preparation.	*			

	Extensive medicinal Plant survey report that captures species, harvested parts, life forms, population estimates, distribution and ecology based on appropriate grid size and stratification.	Execution of survey. Data analysis and report preparation. 90 plots in 3 man weeks involving 4 botanists and 2 field assistants in the Year 1. Remaining 60 plots sampled & studied in the 2nd year.	*	*	*	
5	Taluka level Pharmacopeia for Primary Healthcare conditions, designed for healthcare providers, based on local plant resources and traditional community health practices, revalidated by Ayurveda knowledge system.	Developing pharmacopeia on local plant resources (available in one season-summer) from 20 Ayurveda texts and pharmacological references (Financial support will be provided by TDU project resource)		*		
		Developing pharmacopeia on local plant resources (available in all season- apart from summer) from 20 Ayurveda texts and pharmacological references		*		
		Linking of resource knowledge and traditional knowledge.		*		
	Other outputs recommended by the KJA-expert committee	Compilation of prescriptions from Ayurveda texts regarding time of day, season, habitat and other prescriptions and also guidelines from modern literature		*		
6a	Pilot version of GIS enabled Database on Medicinal plants of HD Kote based on survey report outlined in point 2 above	Database design (KGIS standards) and module preparation	*			
		Extensive literature survey and analysis from secondary sources and supporting the development of the database	*			
		Short listing threatened species based on IUCN, CAMP reports and published literature		*		
		Identification of species of HD Kote in all India trade			*	
		Preparing guidelines on public use, regulated use and only for government use based on explicit criteria applied to species of HD Kote				*

		Notes on guidelines for: sustainable harvest, threatened species, species in commercial trade and differential layers of information for public use, regulated use and only for government use.				*
		Translation of data to Local language		*		
		Importing botanical survey data, Pharmacopeia data. Integrating spatial layers, periodic updation of the database based on the inflow.	*	*	*	*
7	Final version of GIS enabled database	Development, updation, maintenance of the geospatial database		*	*	*
		Generation of maps (abundance and richness)			*	
		Final version at the end of 36 months				*
8	Web-hosting of data by KSRSAC, IBIN and other Government and civil society networks using standard interoperable protocols	Design and development of the website			*	*
		Hosting of database on TDU website for the project				*
		Hosting on KSRSAC website				*
		Develop interoperability module and make data available to IBIN and similar initiatives			*	
9	ToT modules on environmental education covering botany, ecology, populations and distribution of medicinal plants of HD Kote	Designing template for environmental education	*			
		Preparing 2 modules - 1. Identifying and Documenting medicinal plants of HD Kote. 2 GIS and mapping which covers geography, GIS, GPS, and uploading into the India Biodiversity Portal. As resource persons for the refresher courses	*			
		Pilot testing of module	*			
		Organizing workshops per year for school teachers Inviting resource persons for TOT workshops as needed,	*	*	*	*

		scheduling, liasoning with depts., monitoring and hand-holding, procuring training material				
		Organizing workshops per year for high school students. Inviting resource persons for TOT workshops as needed, scheduling, liasoning with depts., monitoring and handholding and providing training materials.	*	*	*	*
10	TOT modules on home remedies and primary health care solutions	Preparing training modules on 30 primary health conditions using standard templates for health education (See appendix 1 & 3 for list of primary health care conditions and template covered) (10 conditions per year for 3 years)	*			
		Orientation to trainers of SVYM on home remedies using training module for 30 primary health conditions	*			
		Pilot testing of modules	*			
		a) Organizing TOT workshops for medical and paramedical health providers - Inviting resource persons for TOT workshops as needed, scheduling, liasoning with departments, monitoring and handholding b) Training of 200 households on use of home remedies for 30 primary health conditions in 3 years	*	*	*	*

BUDGET SUMMARY

No.	Budget Items	Year 1	Year 2	Total
REVISED BUDGET SUMMARY				
1.	Personal Cost	10400000	6595000	16995000
1.	Consumables	528450	278450	806900
2.	Travel Cost	332500	332500	665000
3.	Staff Training Cost	100000	0	100000
4.	Awareness events and broadcasting activities	660000	660000	1320000
5.	Equipment	3427500	187500	3615000
Total of all the components (from Sl. No. 1 to 14		**15448450**	**8053450**	**23501900**
Financial support provided by TDU project resource				2215000
Total project cost				**21286900**
Institutional Overheads (IOH – 10%)				2128690
Total cost with IOH				**23415590**

DETAILED BREAK UP WITH EACH ACTIVITY CALCULATED @ MAN-DAYS FOLLOWS

Detailed Budget break up

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
1	**Baseline health survey:** - Reports on household health expenditure, incidence of primary health conditions and documentation of traditional community health practices **(Financial support will be provided by TDU project resource)**	1. Design of survey protocol and pilot testing	20 days x 5000	30	3000	**90000**
		2. Execution of survey through PRAs and stratified sampling of villages, healers & 200 households	70days x 5000	120	3000	**360000**
		3. Data Analysis and report preparation of baseline health survey	20 days x 2500	20	2500	**50000**
2	**End line health survey:** To record the impact of training program - Awareness about 30 primary health (sing, symptoms, differential diagnosis) based on TRU (Transmission-Retention-Utilization) principles	1. Design of end line survey protocol and pilot testing	50 days x 2500	50	2500	**125000**
		2. Execution of end line survey of 200 households	50 days x 2500	50	2500	**125000**
		3. Data analysis and report preparation of end line health survey	30 days x 2500	30	2500	**75000**
3	**Travel cost**	Travel cost (2 persons x 5 visits x Rs. 5000/- per visit)	2 persons	10	5000	**50000**
		Total component cost				**875000**
		Financial support provided by TDU project resource				**500000**
		Total component cost required fromGoK				**375000**

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
	Procurement of latest satellite images for designing the grid sapling based on land use classification	Around $16 per Sq. km. Custom charges extra (30% of total cost of image).x 1600 sq. km.		1300	1600	2080000
3	Sampling based on stratification i.e. land use classes with KGIS framework	Developing Grid and Stratified Sampling. Design of survey at 1:10000 scale . (TDU +KSRSAC cost of time)	20 daysx3000x2	40	3000	120000
		Generation of 1:10,000 Land Cover maps of HD Kote taluka using remote sensing imagery from Quickbird, Cartosat	40 days x 3000	40	3000	120000
Total component cost						**2320000**

Note:

As suggested by the Expert committee the cost of 20.8 lacs for the purchase of imageries may be reviewed by KSRSAC and avoid any duplication viz-a-viz in the KGIS Budget allocation for KSRSAC.

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
4a	Medicinal Plant Survey report that captures species, harvested parts, life forms, population estimates, distribution and ecology based on appropriate grid size and stratification	Develop and pilot test of preliminary filed survey tools from HD Kote Taluka on local medicinal plants, local health traditions – TDU, including Orientation, PRA, Botanical Survey **(Financial supprot provided by TDU project resource)**		20	5000	100000
		Preliminary medicinal plant survey in one season (Summer) including training of field investigators including costs towards travel, lodgining, boarding etc. **(Financial supprot provided by TDU project resource)**		35	5000	175000
		Botanical survey report **(Financial supprot provided by TDU project resource)**		50	3500	175000

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
4b	Medicinal Plant Survey report that captures species, harvested parts, life forms, population estimates, distribution and ecology based on appropriate grid size and stratification	Execution of survey. Data analysis and reprot preparation. 90 plots in 3 man weeks involving 4 botanists and 2 filed assistants in the year 1. Remaining 60 plots sampled and studies in the 2nd year Staff – cost Execution of Survey. Data analysis and report preparation.	150 days x 3000 (90 days – 1st year 60 days – 2nd year)	150	3000	450000
		Travel cost & Accommodation (4 Botanical experts @ 3000/-) 2 Filed Assistants @ 300/-)	150 days x 3300	150	3300	495000
		Laptop		1	75000	75000
		Software (windows /office)		1	15000	15000
Total Component Cost						1485000
Financial support provided by TDU project resource						450000
Total component cost required from GoK						1035000

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
5	Taluka level Pharmacopeia for Primary Healthcare conditions, designed for healthcare providers, based on local plant resources and traditional community health practices, revalidated by Ayurveda knowledge system.	Developing pharmacopeia on local plant resources (available in one season-summer) from 20 Ayurveda texts and pharmacological references **(Financial support provided by TDU project resource)**	35 days	35	5000	175000
		Developing pharmacopeia on local plant resources (available in all season-apart from summer) from 20 Ayurveda texts and pharmacological references	120 days x 2000	120	2000	240000
		Linking of resource knowledge and traditional knowledge	90 days x 3000	90	3000	270000
	Other outputs recommended by the expert committee.	Compilation of prescriptions from Ayurveda texts regarding time of day, season, habitat and other prescriptions and also guidelines from modern literature	60 days x 1500	60	1500	90000
Total Component Cost						**775000**
Financial support provided by TDU project resource						**175000**
Total component cost required from GoK						**600000**

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
6	**Pilot version** Database design (KGIS standards) and module preparation		20 daysx2x2500	40	2500	100000
	Extensive literature survey and analysis from secondary sources and supporting the development of the database		120 days x 2000 (JRF-Botany)	120	2000	240000
	Other outputs recommended by the expert committee to be part of the database					
	Short listing threatened species based on IUCN, CAMP reports and published literature					
	Identification of species of HD Kote in all India Trade					
	Preparing guidelines on public use, regulated use and only for government use based on explicit criteria applied to species of HD Kote		120 days x 2000 (SRF Botany)	120	2000	240000
	Notes on guidelines for: sustainable harvest, threatened species, species in commercial trade and differential layers of information for public use, regulated use and only for government use.					
	Local language interface		60 days x 1000	60	1000	60000
	Pilot version completed at the end of 12 months. Importing botanical survey data, Pharmacopeia data. Integrating spatial layers, periodic updation of the database based on the inflow.		2yrs x 180 days x 1500 (One Programmer)	360	1500	540000
	Final version of GIS enabled database at the end of 24 months. Development, updation, maintenance of the geospatial database		2yrs x 150 days x 2500 (GIS team leader)	300	2500	750000
	Generation of maps (abundance and richness)					

Equipment's for GIS Database	Server	1		300000		300000
	Workstations	2		125000		250000
	Laptop and accessories	1		75000		75000
	Network Backup & Data Storage	1		50000		50000
	GPS	2		35000		70000
	ISP Costs	24 months		37500		75000
	Software	3		15000		45000
	IT Annual Maintenance	24 months		7500		180000
Total component required						**2975000**

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
7	Web-hosting of data by KSRSAC, IBIN and other Government and civil society networks using standard interperable protocals	Design and development of the website	2 yrs x 180 days x 1500	360	1500	540000
		Hosting of database on TDU website for the project				
		Hosting on KSRSAC website				
		Develop interoperability module and make data available to IBIN and simila initiatives	2yrs x 150 days x 2500	300	2500	750000
	Equipment	Web hosting		24	5000	120000
Total component required from GoK						**1410000**

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
8	TOT modules on environmental education covering botany, ecology, populations and distribution of medicinal plants of HD Kote	Designing template for environmental education	45 x 3000 (Pr Director, Env/Medical Officer)	45	3000	135000
		Preparing 2 e-modules 1. identifying and Documenting medicinal plants of H D Kote 2. GIS and mapping which covers geography, GIS, GPS and uploading into the India biodiversity Portal	40 days x 2500	40	2500	100000
		Pilot testing of module	10 days x 5 blocks x 1000	50	1000	50000
		Organizing workshops per year for school teachers inviting resource persons for TOT workshops as needed, scheduling, liasoning with depts., monitoring and hand-holding, procuring training material	450 days (workshop -300 days training plus 150 days organising time x 1500 x 2 yrs)	900	1500	1350000
		Organizing workshops per year for high school students. Inviting resource persons for ToT workshops as needed, scheduling, liasoning with depts, monitoring and hand-holding and providing training materials	450 days (workshop - 300 days training plus 150 days organising time x 1000 x 2yrs)	900	1000	900000
Total component required from GoK						**2535000**

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
9	TOT modules on home remedies and primary health care solutions	Preparing training modules on 30 primary health conditions using standard templates for health education (see appendix for template and list of primary health care conditions covered) (15 conditions per year for 2 years)	360 days x 2500 (180 days/year)	360	2500	900000
		Orientation to trainers of SVYM on home remedies using training module for 30 primary health conditions	30 days	30	2500	75000
		Pilot testing of modules	30 days	30	2500	75000
		a. Organizing ToT workshops for medical and paramedical health providers – Inviting resources persons for ToT workshops as needed, scheduling, liasoning with depts, monitoring and hand-holding b. Training of 200 households on use of home remedies for 30 primary health conditions in 2 years	300 days of traning plus organizing time x 2500 x 2 yrs.	600	2500	1500000
	Equipments	Handheld devices for demonstration&education		10	8000	80000
		Multimedia projector		1	35000	35000
		Laptop, accessories and printer		1	150000	150000
		Camera and recorders		1	15000	15000
Total component required from GoK						**2830000**

Sl. No.	Outputs	Activities	Man days to complete activity/task	Man days	Unit Cost	Costing to complete task
10	Project Co-ordination	Project Director – overall project monitoring and management	135 days x 3000 x 2 yrs	270	3000	810000
		Co-ordinator for Botanical & GIS related outputs, preparation & submission of the periodic biannual progress report, coordinating with the in house team leaders and the collaborators for the execution and output of the project	150 days x 3000 x 2yrs	300	3000	900000
		Co-ordinator for health related survey, trainings and outputs. Preparation of health related outputs and periodic report preparation.Coordinating with the in house team leaders and collaborators for the execution and output of the project	150 days x 3000 x 2yrs	300	3000	900000
		Project Manager – Overall visioning, project management, M and E, higher level coordination	300 days x 1500 x 2yrs	600	1500	900000
		Ayurveda physician-tech support for content Dvt. ToTs, supervision	300 days x 1500 x 2yrs	600	1500	900000
		Training coordinator- schedules, coordination for sessions, HR support	300 days x 750 x 2yrs	600	750	450000
	(Financial supprot provided by TDU project resource)	Human Resource Cost for field level training, coordination of field implementation and reporting and others				1090000
Total component cost						**5950000**
Financial support provided by TDU project resources						**1090000**
Total component cost required from GoK						**4860000**

	Other Budget Items		Year 1	Year 2	Total
		Office cabinets	150000	0	150000
		Herbarium Items (Tray, Rectified spirit,Blotters, Herbarium sheets, Fevicol,herbarium Field Press,mounting boards and other processing and maintaining materials)	50000	0	50000
	Consumables	Botanical Survey tools and equipment's(Jungle shoes, Sleeping bags, Rain coats, Umbrella, Diggers, Cutter, Pick axe, Knifeand other fie dequipments)	50000	0	50000
		Stationeries	20000	20000	40000
		Collaborators meetings and reviews (once in 6 months & internalreviews)	30000	30000	60000
		Periodic meetings and reviews, furniture'sand fixtures,stationaries for SVYM	228450	228450	456900
		Total of consumables	528450	278450	806900
	Total component required from GoK				**806900**
12	Travel and contigency		60000	60000	120000
	Total component required from GoK				**120000**
13	Staff Training	Staff Training for geospatial database and websites	100000	0	100000
	Total component required from GoK				**100000**
14	Awareness events	Community radio Broadcasting channels activated for raising awareness in the taluka on health and environment, per program cost 9750 * 60 programs in a year	585000	585000	1170000
		Promotional Events like Environment Day, Biodiversity Day, etc - per event cost 15000 and 5 events in a year	75000	75000	150000
		Total	660000	660000	1320000
	Total component required from GoK				**1320000**

ROLES AND RESPONSIBLITIES OF PARTNERS

Institure of Trans-Disciplinary Health Science and Technology (TDU)	Swami Vivekananda Youth Movement (SVYM), H D Kote	Karnataka State Remote Sensing Applications Centre (KSRSAC), Bangalore
• Overall coordination of the project design of baseline/end line survey formats • Medicinal Plants survey GIS enabled database • Creation and web hosing modules design • Environment education and primary health education and promotion • Preparation of notes on species which are threatened species commercial trade • Regulated use of data sharing based on differential layers of information for public use and government use	• Coordination of field level.community level ativities • Conducting baseline and endline • Pilot testing ToT moduls in the selected project area • Organizing ToT workshops for medical and paramedical health providers • Providers Training of hosueholds on use of home remedies for 30 primary • Broadcasting the traditional health information through community radio and organizing awareness event in the taluka • Local assistance in medicinal plants survey • Training of the teachers and the school children of 50 high schools of H D Kote	• Providing higher images (like Cartosat or Digital Clobe) 1:10k scales for plot sampling • Share spatial layers with TDU • Designing the scheme for geospatial database and provide the K-GIS spatial framework • Jointly host the medicinal plant database of H D Kote on KSRSAC website and TDU website

Tentative List of Primary Health Conditions

(Selection is based on baseline survey)

1. Non-specific fever
2. Cold
3. Cough
4. Joints pain
5. Indigestion
6. Constipation
7. Diarrhea
8. Scabies
9. Headache
10. Memory enhancement
11. Adolescent anemia
12. For non-specific respiratory conditions
13. For enhancing metabolism
14. Intestinal worms
15. Conjunctivitis
16. Mouth ulcers
17. Wound healing
18. Jaundice
19. Burns
20. Diabetes
21. Acidity
22. Toothache
23. Stomachache
24. Backache
25. Garbhasthapana (Protection of foetus)
26. Pregnancy Anemia (during antenatal period, can also be used by adolescent girls
27. Garbhashaya Shuddhi (post delivery cleansing of uterus to prevent infection)
28. Menstrual irregularities (including dysmenorrhea)
29. Leucorrhoea
30. Galactagogue (to increase breast milk)

Template on Pharmacopeia with Formulations and Propoerties

Template for Development of Training Module on

Local Health Practices for 30 Primary Health Conditions

Part – I: Training Module

1. Goals and objectives of the training modules

2. Goal

3. Core learning objectives

4. Description of modules

5. Content classification into theory and practical

6. Structure of the session

7. Evaluation methods

- Length of the session (in hrs)
- Method
- Materials required
- Tool

Part – II: Primary Health Condition

1. Description of health condition

2. Signs and symptoms

3. Diagnostic features

4. Stages/Types

5. When to go to doctor

Part – III: Local Health Remeady

1. Name of the plant

2. Synonyms

3. Vernacular names

4. Parts used

5. Quantity

6. Any purification method

7. Method of preparation

8. Form of medicine

9. Dosage

10. Anupana (vehicle)

11. Pathya/Apathya

12. Limitations

ANNEXURES

Extracts of the discussion of 2nd Meeting of KJA – Technical Committee

A Replicable Knowledge Resource for One Taluk in Karnataka (H.D.Kote) (In the form of Geospatial Database of Local Medicinal Plants and Taluk Specific Herbal Pharmacopeia on an ICT Platform) - submitted by Institute of Trans-Disciplinary Health Science and Technology (TDU) in partnership with Karnataka State Remote Sensing Applications Centre (KSRSAC) and Swami Vivekananda Youth Movement (SVYM). Dr. Darshan Shankar and Dr. Ved made a presentation and mentioned that the proposal seeks to demonstrate an innovative health security strategy, to empower households and community in the HD Kote taluka. The proposal proposed a two pronged approach to achieve our objectives - to inventory, using GIS layers the medicinal plants available in the taluka and to educate households to effectively manage at least the top three primary healthcare conditions prevalent in the taluka. The project is expected to be complete in 36 months in 3 phases and total Budget over 3 years: INR 4.53 Crores. The following observations were made by KJA-TC:

- Department of Forest, Biodiversity Board, NGOs and Agricultural University have undertaken similar activities and suggested that a consultation meeting must be had with them to avoid duplication and integration of those efforts. He also suggested documenting folklore and tribal medicinal traditions along with classical knowledge be included. It would be interesting to link inventory to conservation/harvesting. The project can survey medicinal plants output in the area for the use of forest department.

- The information/database needs to be in local language; database must be linked up to conservation of medicinal plants by providing information on 'how much' and 'what to' harvest and the database must include locally useful plants.

- Consider crowd-sourcing and to take the support of techies for IT component.

- The need to develop child friendly module for introducing in the school offered support to develop child friendly modules.

- The idea of a medicinal plants inventory is worthy of pursuit, the proposal seems to spread into lots of ancillary areas (like health strategy/surveys; demographics; education etc) and focus could be on medicinal plants GIS and conservation. This would also bring down costs – needs to be proportionate for small area. How such a project can be up-scoped to cover whole state also needs to be addressed – by linking with GOK departments.

Prof. Sadagopan and MJA-TC Members agreed that the proposal is worthy of further pursuit and is a systematic way of creating the pharmacopeia database. It is unique and innovative and will enable knowledge on medicinal plants. KJA-TC suggested that an expert review of the proposal be conducted including Forests Dept, health Dept, KBB and others and help in scoping the focus of proposal. After this expert review, KJA can consider the proposal and recommend for further action.

(Action: Expert Review of TDU proposal and taking up further at KJA)

Karnataka Jnana Aayoga
(Karnataka Knowledge Commission)
Government of Karnataka

KJA Expert Review Meeting for Medicinal Pharmacopeia GIS study – Proposal from TDU

Date: January 27, 2015
Venue: Room No. 422, IV Floor, Vikasa Soudha, Bengaluru
Time: 11.00 AM

Experts:

1. Dr. Partha Sarathi Roy, Geospatial Chair Professor, Centre for Earth & Space Sciences, University of Hyderabad (in Chair)
2. Dr. M. Sanjappa, Rtd. Director, Botanical Survey of India
3. Dr. K. N. Ganeshaiah, Professor and Head, Environmental Sciences and School of Ecology and Conservation, University of Agricultural Sciences, Bengaluru
4. Dr Renu Swarup, Sr Adviser, Department of Biotechnology, New Delhi (thru written comments)
5. Dr. Mukund Rao, Member-Secretary, KJA
6. Sri. Brijesh Kumar, Chief Conservator of Forests, Govt. of Karnataka (on behalf of Additional Chief Secretary, Dept. of Forests, Ecology and Environment, GoK)
7. Mr. Nanjundappa, Deputy Secretary, Dept. of Forests, GoK
8. Dr. M. Chandrashekar, Deputy Director (AYUSH), Karnataka Biodiversity Board (on behalf of Chairman, Karnataka Biodiversity Board)

TDU/KSRSAC/SVYM Team:

9. Dr. Darshan Shankar, Vice-Chancellor, TDU
10. Dr. D. K. Ved, Advisor and Emeritus Professor, TDU
11. Dr. (Flt Lt) M. A. Balasubramanya, Chief Executive Officer, SVYM
12. Dr. B. N. Prakash, TDU
13. Mr. Arun Seetharam, TDU
14. Dr. K. Ravikumar, Asst. Director, TDU
15. Dr. Vijay Barve, SPO, TDU
16. Ms. Sathya Sangeetha, TDU
17. Sri. Suresh B. V., Sr. Project Scientist, Karnataka State Remote Sensing and Applications Centre

KJA Secretariat:

18. Ms. Jayashri, Research Associate, KJA

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1. Dr. Mukund Rao welcomed the Experts and other participants from Institute of Trans-disciplinary Health Sciences and Technology (TDU) Team for the meeting and mentioned that Karnataka Jnana Aayoga (KJA) is a body of professionals that are addressing knowledge

and innovative ideation in different fields which will help GOK to implement knowledge-based governance. KJA only takes up proof-of-concept projects BUT the operational implementation of any ideation has to be done thru GOK departments – thus, KJA closely works with all GOK Departments.

2. Dr Rao mentioned that KJA had received a proposal from TDU, in December, 2014, to develop a replicable knowledge resource for one taluka in Karnataka (HD Kote) in the form of Geospatial Database of Local Medicinal Plants and a Taluka Specific Herbal Pharmacopeia. He mentioned that the KJA, in its Technical Committee, has formally discussed and it has been recommended that an Expert review of the project be undertaken – to evaluate and assess the proposal from different technical and managerial angle and also to get the assessment of GOK departments. Based on the expert review, KJA would take a final/formal decision on the project. He mentioned that KJA had invited Dr.Renu Swarup, Dr. P. S. Roy; Dr. Sanjappa and Dr Ganeshaiah – eminent experts and Mr Brijesh Kumar, Mr Nanjundappa and Dr Chandrashekhar – from GOK Forest/Environment department, KBB to form the Expert Committee.

3. Dr. Roy appreciated the efforts of KJA and observed that the concept of GIS Database of Local Medicinal Plants is extremely important. He mentioned that very limited work on medicinal plants and traditional knowledge has been done in India and there is a great need to undertake such initiatives in the country.

4. Dr. Ved made a detailed presentation of the Project. He mentioned that the proposal is to create of an innovative, replicable, GIS enabled knowledge resource, in one Taluka in Karnataka (H. D. Kote) and seeks to demonstrate community applications for health and environment security from a GIS enabled knowledge resource to be made available as a digital resource to all health centres/health providers, schools, colleges, panchayats and households in HD Kote.

    4.1. The project is spread across three phases: plan to conduct baseline health surveys, medicinal plant resource survey across the taluka involving the communities. The outputs will be developed into a Geospatial database of medicinal plants and a taluka specific herbal pharmacopeia; demonstration of the knowledge base through Training of the Trainers (ToT) programs to health workers like women SHGs, village health volunteers (VHV) to train the households to manage three common primary health care conditions. It will also be demonstrated to other health providers both in the Govt and Non-Govt. Sector in the HD Kote. ToTs will also be organized for school teachers to train the students in environment education, and introduce them t the India Biodiversity portal. Following with this there will be a refresher course periodically every 6 months for the teachers to continue this activity for a 2 year period and an impact analysis will highlight the effectiveness and scalability of the project approach in enabling health security and local bio-resources management.

4.2. The role of TDU is to work on the GIS enabled Medicinal plants Database and Taluka level herbal pharmacopeia through field survey, and literature review in collaboration with KSRSAC and SVYM and development of IT tools like Android App, Geospatial Datasets and collaborative websites and it is also focusing on the overall coordination of the project. As a GIS partner of this project, KSRSAC would provide existing macro level geospatial datasets o forest cover and PHC's in the Taluka, schema for the geospatial datasets and jointly host the geospatial datasets on their datasets and as a delivery partner, SVYM develop long term training program for dissemination of community health and environment education modules both for institutional and community based health providers and for high school teachers in H. D. Kote taluka and execute baseline and end line health surveys to periodically evaluate impact of health and environment education programs. He reiterated that the TDU will undertake GIS enabled field survey to document medicinal plants Local uses and their quantum resource involving volunteers, healers and women SHG's, conduct baseline and end line surveys to document the household health expenditure, incidence of the diseases, community health knowledge, attitude & practices related to drinking water, food, hygiene, nutrition and community actions for protection and growing of medicinal plants, develop a herbal pharmacopeia by linking the local plant resources to the pharmacopeia knowledge derived from Ayurveda medical texts, establish a long term training program for demonstration and dissemination of herbal remedies to institutional and community based health providers in HD Kote and periodic studies to evaluate impact of health and environment education interventions.

4.3. The project is expected to be complete in 36 months with a total budget of INR 4.53 Crores, including TDU institutional overhead of INR 59.11 lakhs.

5. Expert Committee agreed that the project is worthy of undertaking as it is a unique and innovative project. They appreciated TDU for ideating the project and also lauded KJA for conducting such an Expert Review involving external experts and GOK Forest Dept/KBB/KaMPA – so that an inclusive approach is adopted. The Expert Committee appreciated the concept of the project and noted that despite the increasing use of herbal medicines, there is still a significant lack of research data in this field – thus, the project proposal of TDU plays an increasingly important role to fill a gaping research gap in this area. There was detailed discussion on various aspects – sampling methods and grids; granularity, design of GIS and link to K-GIS, capture of traditional knowledge, budget, schedule etc. The following observations were made:

5.1. Mr Brijesh Kumar mentioned that the project to create a GIS of medicinal plants is extremely important and ultimately the project must

get expanded to cover all forest areas and the whole state. He mentioned that while Forest Dept. was not directly addressing medicinal plants, it is well-recognized that medicinal plants have tremendous importance – from natural resources conservation and commercial point of view and thus Forest Dept. would need this information in management of bio-resources in the state. He mentioned that if TDU completes the pilot then Forest Dept. would support and encourage for a state-wide project – which will be unique in the nation.*xpert Review Meeting for Medicinal Pharmacopeia GIS study*

5.2. It was noted that KaMPA had observed to KJA that the cost of project seemed too high and need to b ere-looked. KaMPA had also suggested for mid-term review of the project and also for a parametric analysis of project success – so that when state-wide roll-out is to be done the learning's would be very useful.

5.3. Dr Chandrshekhar mentioned that KBB and KaMPA have done considerable work and thus a consultation between TDU and KaMPA/KBB is important for firming up the proposal.

5.4. Dr Renu Swarup had sent her written comments on the proposal (given in ***Annexure-I to Annexure II***).

5.5. Dr Ganeshaiah expressed satisfaction at the project initiative and suggested that the recommendations made by the committee covers a whole gamut of perspectives which TDU must address. He mentioned that the project can result in an innovative documentation and analysis of traditional knowledge and medicinal pharmacopeia. He expressed happiness that KJA is initiating such research and ultimately must support the project.

5.6. Dr Sanjappa mentioned that the TDU proposal needs to be sharpened to focus on the medicinal plants documentation and also on traditional knowledge documentation. The methodology needs to be strengthened and the recommendations made in the meeting need to be addressed. Dr Sanjappa hoped that the pilot, if supported by KJA, should ultimately be up-scoped into state-wide project and that KJA must continue pursuit for moving from the pilot to state-wide project thru KaMPA or Forest/End Department – by ensuring necessary support of GOK for such innovative projects.

5.7. Dr Roy mentioned that the idea of a pharmacopeia database and GIS of medicinal plants is unique and innovative. Karnataka has rich wealth of medicinal plants and a database of such plants will be a knowledge-base and also help possible industry activities and of such plants – further putting all such locations and data on a GIS platform will being in the

geographical context and allow seamless integration into K-GIS. It is worthy to take this idea forward but the TDU proposal needs to be focused on the GIS of medicinal plants and traditional knowledge – thus the comments made by the experts would help TDU to refine the proposal.

6. Based on the expert discussions and above comments/observations, the following suggestions were made by the Expert Committee on the proposal:

   6.1. The project is very innovative and unique and is first-of-its kind and must be supported and implemented. While initially the project can be a pilot level for 1 taluka as proof-of-concept, the potential for a state-wide implementation is immense and unique. However, in segmented way there has been various botanical, medicinal, literature etc work already done – all of these must be integrated – which is a challenge as this would be attempted first time.

   6.2. The project methodology must be based on a detailed granular GIS derived using higher images (say, Cartosat or DigitalGlobe) and compatible to better than 1:10k scales of information representation. It is important to base this GIS on a standards K-GIS Spatial framework on precision GPS geo-correction and must be co-registered; a section on Image and GIS methodology detailing the resolution of image, GIS content and details etc must be incorporated.

   6.3. There is a need to see that the GIS database is standardized to be inter-operable to IBIN and IBF databases so that it becomes a part of national repository and is available on a wider research network– thus a standardized approach is required. Details of this may also be included in methodology.

   6.4. GIS Apps and other database apps must be clearly defined and detailed – with explanations and details of different modules with illustrations and examples can be given of possible functions. This will make the proposal more clear and robust from user point of view.

   6.5. Survey methodology for medicinal plants must be explained – as this is the crux of the efforts and GIS database. Granularity and grid-size for survey must be designed keeping satellite image details/resolution in mind and also use of precision-GPS instruments.

   6.6. How traditional health knowledge is validated and verified – so as not result in negative effects and back-lash? In modern medicine there are laid down practices for validation/verification/actions (effects, reactions, dos and don'ts etc) – the same must be assured for traditional health knowledge. This has to be assured and details of this may be explained.

   6.7. While the GIS database could be prepared in English, the front-end GIS and user-interface must have local language interface, as possible, so that local people can find much use for the same.

   6.8. Training of local workers is important but details of how training and

awareness campaigns would be done must be explained – as these are efforts and impact cost and time.

6.9.   It would be good to include list of the plants which would form part of the database as a quick-listing and also to address their related traditional value.

6.10.   Protection of the Traditional Knowledge and ensuring that vested commercial exploitation does not happen – this has to be built in – both for access of GIS and also from a GOK control point of view to ensure equity, fairness and protection of local/traditional knowledge. Built-in safeguards for this must be detailed.

6.11.   GIS and Database Access rules and role-based access is important and must be the core mechanism for software and access. While total database can have all parameters, what citizens can access, what GOK officers can access, what TDU will manage, what others can access needs to be regulated. Details of this must be written down clearly.

6.12.   Disclaimers on database and un-validated data must be clearly specified. If some plants there is no pharmacopeia data available, then these must be flagged so that further research and updates can be possible.

6.13.   How repeated data updation cycle is useful for the GIS Pharmacopeia needs to be explained – as this is not a static one-time database.

6.14.   Can the project consider harvesting functions and include yield estimation functionality – this may be explored. This will be extremely valuable for GOK to know potentials of these medicinal plants and products (though this information can be also commercial value which must not get vested exploited).

6.15.   Roles and responsibility of TDU, KSRSAC, SVYM and also of interfaces with KBB/KaMPA and Forest Dept of GOK needs to be clearly detailed. This is crucial to determine project networking and task responsibilities.

6.16.   The project must be monitored by a KJA Expert Committee to monitor progress and suggest any mid-term changes. The committee could include GOK officers, Experts, TDU etc so that regular monitoring is enabled.

6.17.   KBB, KaMPA and Forest Dept. must collectively, with encouragement and support from KJA, also address how such a project can be up-scoped to state-level coverage and what needs to be done for the same – technical, managerial, project details etc. While this is not urgent for pilot project of 1 taluka, but this issue will need addressing in due course of time – with justification of scope for state-project and also possible benefits to state for such a project.

6.18.   TDU would benefit to consult and meet with Biodiversity Board (KBB) and Karnataka Medicinal Plants Authority (KaMPA) before finalizing their proposal – so that the data that is already available is incorporated and also the specific needs of KBB and KaMPA are addressed.

6.19. While the pilot focus is in one taluk – HDKote, it would be good if TDU consults and meets with Forest/Env Department and Ayush departments to address how the pilot can be up-scoped into a state-wide activity, at an appropriate time, and how GOK departments can support the same.

6.20. Budget is too high (and that too when just about <2000 sq kms is to be covered) and budget seems to include many items which do not seem direct to project; software like etc are not included; too many people salary involved etc. The budget needs to be realistically re-looked into.

6.21. TDU is an institution of repute and it could be provided an institutional overhead (as per GOK norms or say ~15%) so that such institutions sustain their research momentum and are able to long-term support medicinal plants and traditional knowledge research in the state.

7. In conclusion, Expert Committee suggested that the above suggested/recommended points may be considered by TDU and a revised proposal could be prepared and submitted by TDU

– which can be once again presented/discussed in Expert Committee before a final recommendation is made to KJA.

8. Dr. Mukund Rao thanked the Expert Committee for a very incisive review and providing their expert recommendations. Dr Rao also thanked the Dr Darshan Shankar and TDU team for providing all details. He mentioned that the review has been quite successful as it brought out intense and detailed technical and programmatic implementation aspects – which should be extremely useful to TDU to scope and finalise their proposal to KJA.

9. This record has the approval of Dr PS Roy, Dr Sanjappa and Dr Renu Swarup – Experts who reviewed the proposal.

(Mukund Rao)
Member-Secretary, KJA
January 31, 2015/February 9, 2015

To,

Members of Expert Review Committee

Copies for information to:

o   Chairman, KJA
o   All Members of KJA
o   ACS/Principal Secretary, Forests and Environment, GOK
o   CEO, KaMPA
o   Director, KBB
o   Principal Secretary, Dept of Higher Education

COMMENTS FROM DR RENU SWARUP, SR ADVISER, DEPARTMENT OF BIOTECHNOLOGY

Medicinal Pharmacopeia GIS study – Proposal from TDU

o   This is a good initiative and will help in not only creating awareness regarding the Bio-resource but also help in documenting the local practices specially with regard to traditional medicine.

o   The project is broadly divided in to 3 categories-

o   Preparation of database on herbal pharmacopeia and science education, base line health survey and dissemination of knowledge and a Final survey. The activity related to survey of medicinal plant and preparation of a herbal pharmacopeia along with the education component related to this aspect should be clearly separated from the 2nd component on primary health survey, necessary dissemination of information and knowledge and impact analysis.

o   The project should therefore be divided into two components. These two components are not directly linked. The only factor which can be liked is information on traditional knowledge which could be disseminated in the health survey component and under the training of trainees. This could be an important component.

o   Department of Biotechnology along with Department of Space and UAS Bangalore has created a major database on Indian Biodiversity Information Network (IBIN). This is housed at USA, Bangalore and NRSA, Hyderabad. It would be useful if the information collected can be linked to this database. It would also be advisable if this database is analyzed for information which is available so that overlaps can be avoided.

Karnataka Jnana Aayoga
(Karnataka Knowledge Commission)
Government of Karnataka

KJA Expert Review 2nd Meeting for Medicinal Pharmacopeia GIS study – Proposal from TDU

Date: May 13, 2015; 10.00 AM
Venue: Room No. 422, IV Floor, Vikasa Soudha, Bengaluru

Experts:

1. Dr. Partha Sarathi Roy, Geospatial Chair Professor, Centre for Earth & Space Sciences, University of Hyderabad (in Chair)
2. Dr. M. Sanjappa, Rtd. Director, Botanical Survey of India
3. Dr. Mukund Rao, Member-Secretary, KJA
4. Dr. Gayatri Saberwal, Member, KJA
5. Dr. Thimmaiah, Deputy Director (Agri), Karnataka Biodiversity Board (on behalf of Chairman, Karnataka Biodiversity Board)

TDU/KSRSAC/SVYM Team:

6. Mr. Darshan Shankar, Vice-Chancellor, TDU
7. Dr. D. K. Ved, Advisor and Emeritus Professor, TDU
8. Dr. (Flt Lt) M. A. Balasubramanya, Chief Executive Officer, SVYM
9. Dr. B. N. Prakash, TDU
10. Ms. Sathya Sangeetha, TDU
11. Sri. Suresh B. V., Sr. Project Scientist, KSRSAC
12. Mohammed Saleem I. Shaikh, Sr. Project Scientist, KSRSAC

KJA Secretariat:

13. Ms. Jayashri, Research Associate, KJA

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1.   Dr. Mukund Rao welcomed the Experts and Team of Institute of Trans-disciplinary Health Sciences and Technology (TDU) and others for the meeting. Dr. Rao recalled the 1st review meeting held on January 27, 2015 – where the TDU proposal had been evaluated and assessed from different technical and managerial angle and 21 key inputs/suggestions were provided by the experts. Based on the review, KJA had requested TDU to incorporate suggested/recommended points and requested that a modified proposal could be sent to KJA. Now, KJA had received modified/revised proposal from TDU, in April, 2015. He mentioned that KJA once again initiated the process of obtaining inputs from Expert Committee, so that KJA would take a final/formal decision on the project.

2.   Dr. Ved made a detailed presentation of the modified proposal. He mentioned that the aim of the proposal is to demonstrate community applications for health and

Environment security from a GIS enabled knowledge resource of medicinal plants and traditional values – which would be made available as a digital resource to all health centres /health providers, schools, colleges, panchayats and households in HD Kote. He has also shared the TDU actions on the 21 suggestions which was made in the 1st review meeting held on January 27, 2015

(Annexure-I to Annexure III gives the detailed response submitted by TDU). He mentioned that the revised proposal is intended to initiate following which are related to knowledge generation as well as Community application:

2.1.   To develop GIS enabled database of medicinal plants of HD Kote on species, distribution, population status, ecology (micro habitats, associations), parts used and local uses based on appropriate grid size and stratification

2.2.   To develop a taluka level Pharmacopeia for Primary Healthcare conditions, designed for healthcare providers, based on local plant resources and traditional community health practices, revalidated by Ayurveda knowledge system.

2.3.   To develop Training of Trainers (ToT) modules for health care providers to train households on home remedies for selected primary healthcare conditions.

2.4.   To develop Training of Trainers (ToT) module for high school teachers on botany, environment education and medicinal plants.

2.5.   To develop taluka specific e-modules on environmental education and primary health care herbal solutions for selected 30 conditions in Kannada and English for health care providers.

2.6.   To develop community radio broadcasting programs for raising awareness in the taluka on health and environment

2.7.   The role of TDU is to work on the GIS enabled Medicinal plants Database and Taluka level herbal pharmacopeia through field survey, and literature review in collaboration with KSRSAC and SVYM and development of IT tools like Android App, Geospatial Datasets and collaborative websites and it is also focusing on the overall coordination of the project. It also designing TOT modules design for Environment education and Primary Health education and Promotion, Preparation of Guideline notes on species which are threatened, species in commercial trade and regulated use of data sharing based on differential layers of information for public use and government use.

2.8.   As a GIS partner of this project, KSRSAC would provide higher images (like Cartosat or Digital Globe) 1:10k scales for plot sampling and also share spatial layers with TDU. It will also extend its support in design of the schema for geospatial database and provide the K-GIS spatial framework and jointly host the medicinal plant database of HD Kote.

2.9. As a delivery partner, SVYM develop long term training program for dissemination of community health and environment education modules both for institutional and community based health providers and for high school teachers in H. D. Kote taluka and execute baseline and end line health surveys to periodically evaluate impact of health and environment education programs. It also organizes workshops for medical and paramedical health providers and broadcast the traditional health information through community radio to organize awareness about events in the taluka.

2.10. He also reiterated that the proposal seeks to add additional community based tier to the health system viz., the households and the community supported folk healers. The intention is to deepen the health security of the community and make it less dependent on institutional health services for primary healthcare.

3. Expert Committee once again unanimously appreciated the concept and noted that TDU had incorporated most of the suggestions made by the experts in the previous review committee. Expert Committee noted that the project is extremely innovative and unique and would potentially contribute to the advancement of healthcare at local levels using traditional knowledge in sync with modern database and analysis. There was detailed discussion on various aspects of the project – sampling methods and grids to be used for medicinal plant inventory and survey, documentation of sampling, image-base as an important reference scheme, GIS standards to be used, health survey methods and data collection, organisation of databases and analytics, key applications to be developed, schedule, budget, linking with GOK department etc. The following observations were made:

3.1. KBB has shared its inputs vide letter from Member Secretary, KBB to the Member Secretary of KJA on May 7, 2015. National Medicinal Plants Board has sanctioned 294 lakhs to KBB to undertake survey of medicinal plants forest areas of entire state of Karnataka. KBB has suggested TDU to take up similar project which covers non-forest and cultivated lands of not for only one taluka but for entire state.

3.2. Dr. Thimmaiah, KBB representative gave a brief overview of their proposed efforts to broadly survey medicinal plants in forest area – they are covering whole state's forest area. The effort is to use broad beat-level sampling methods and also use foresters' knowledge for the survey. The aim is to generate state-level information of medicinal plants survey in the form of GIS maps. The efforts may take about 1-2 years. He also mentioned that the KBB proposal does not envisage any applications at local level but is more a state-level assessment.

4. Mr. Darshan Shankar, in response to the inputs given by KBB, mentioned that the KBB effort of survey/inventory of medicinal plants in forest areas would involve macro-efforts especially in sampling units (KBB samples would be larger and more uniform in forest areas while TDU sampling would be small size and cover more variance). Thus, what KBB would provide is a broad survey of medicinal plants and not the intense detailed inventory at local level as planned by TDU. He stressed that TDU proposal scope is much more that KBB scope of just coarse inventory and highlighted that:

4.1. TDU already has an inventory of the medicinal plant of Karnataka State, this inventory cannot be resolved at the level of talukas and thus only provides a broad picture and cannot be used for traditional health practice at local level. TDU would use sampling using 0.1 ha plots and use base map of 1:10000 scale prepared by KSRSAC using satellite imagery will form the basis for stratification and marking of plots.

4.2. Further the proposal of TDU includes creation of a digital herbal pharmacopeia of the medicinal plants of the HD Kote – this is not being attempted by KBB as they restrict to just coarse-level inventory. The pharmacopeia information in this digital knowledge product will link locally available medicinal plants to their medical uses sourced from classical ayurvedic literature with meticulous references from Samhitas and Nigantus so that the health related information in the pharmacopeia is 100% reliable. The proposal for HD Kote is thus a pilot project and a model to prepare similar taluka level pharmacopeia in Karnataka State. The pharmacopeias will combine botanical, ecological, GIS & traditional health sciences and use ICT to provide educational services to rural households and schools & colleges in taluka.

4.3. The output of the TDU proposal is a Digital Knowledge Product which is very useful and accessible to all rural households and schools and colleges in the taluka. So, that it can be used for both health education and environmental education. The dissemination partner of the project is SVYM is serving the community for more than 25 years and in addition to ICT will use community radio as a tool for wide spread dissemination of the knowledge product. The product will also be provided to government and non-government organizations in the forestry, health and education sectors working in the taluka.

4.4. Mr. Darshan Shankar reiterated that the budget of this intensive project is realistic and it has been very transparently drawn up with complete detail of tasks, unit costs, calculated for man days for completion of each task. The budget also includes support for the design, development and dissemination of educational modules on primary healthcare for rural households and environmental education for teachers in schools and colleges of the taluka. But TDU has made an attempt to reduce its overall budget by 37% from the original submission. However additional Rs. 23 lakhs have been added for procurement of imageries cost estimation was provided by KSRSAC.

5. Dr. Roy and Dr. Sanjappa agreed that the KBB objective is just restricted to inventory and that the scope to cover forest areas in whole state would make the sampling coarse and aggregated information – which, though important for state-level assessment, cannot meet the scope of the TDU innovation which aims at developing of a digital herbal pharmacopeia of the medicinal plants in HD Kote on pilot basis and its use at local level into the traditional health-care system. Thus, the TDU proposal is not only more detailed in content and granularity but also is linked to a societal application of healthcare – these 2 unique points make the proposal very distinct and much more scope that what KBB is doing.

6.   Dr. Gayatri Saberwal observed that the TDU proposal is quite unique and innovative and noted that the scope of KBB and TDU projects are entirely different. KBB looks at overall state-level information which is important in its own way and TDU proposal looks at local-specific detailed inventory and application – this is more societal linked to end-use. In fact, Health department and AYUSH department must be the end user for the proposal even as KBB and FEE may be associated.

7.   Thus, the 2 experts opined that the TDU proposal is entirely different and the approach of TDU is more robust in design and relevant from applications and use point of view. The experts also noted that KBB has not provided any detailed proposal but their representatives have participated in the meetings – thus, the committee has used its best expert knowledge in this regard to surmise on KBB proposal. However, the experts noted that the only common element of interface between KBB efforts and TDU proposal must be to ensure same image and GIS framework that is used for "cross-linking" the beat-level units of KBB with the grid-level units of TDU sampling and also that the TDU data/applications for a taluka could be linked to the KBB state-level efforts from a Portal point of view. The 2 experts suggested that as a formal communication has been received from KBB on their inputs, it would be important to communicate to KBB the view of the expert committee.

(Action: Member Secretary, KJA to communicate expert committee view to KBB)

8.   Based on the expert discussions and above observations, the following suggestions were made by the Expert Committee on the modified TDU proposal:

8.1.   The project is very innovative and unique and is first-of-its kind and must be supported and implemented.

8.2.   Grid-Sampling is unique and must be designed carefully. High-resolution satellite image and good spatial framework (as per K-GIS Standards) must be adopted so that the granularity and position-match is best achieved. This will ensure that population which the project.

8.3.   KSRSAC is having the Cartosat/Quickbird satellite imageries of 2010/2005 for the HD Kote taluka but it is recommended that latest satellite imageries be procured and used through KSRSAC – especially in the context of K-GIS which will be implemented. If K-GIS is already providing for funds for latest images and mapping, the same could be used by KSRSAC to support TDU and the budget can be removed from TDU proposal – this will ensure no duplication of efforts and budget and also proper utilization of public funds.

8.4.   It would be good to include details of useful plants of the India as part of the Pharmacopeia database and to address their related traditional value.

8.5.   Budget is too high and budget seems to include many items which do not seem direct to project - software, equipment etc need to be justified; too many people salary is

included and no man-days effort is made optimally to complete the activity/tasks listed; the unit manpower cost assumed is very high and not in tune with government costs of manpower (example, design of survey protocol can be done in 3-4 days instead of 20 days which cost INR 90000). Normal government standards of cost for human resources, estimates of efforts, equipment usage etc must be adopted as public funds are used and there must be sync between the systems of costing. Thus, expert committee recommends that the budget needs to be revised and reduced considerably.

8.6. Even as KBB, FEE could to be associated for the TDU project, the end-user department must be linked with TDU project and this could be either Health or AYUSH Department (or both), with association of FEE Dept and also KMB. It is suggested that KJA could recommend to the end-user agency (health or AYUSH) a good inter-departmental project monitoring/review structure for the TDU project considering various aspects of survey and end-use.

9. In conclusion, Expert Committee suggested that the above suggested/recommended points may be considered by TDU and 2nd revised proposal could be prepared and submitted by TDU – which can be circulated/sent to the experts for their final opinion and then could be considered by KJA and recommended to proceed for next action. It was agreed by experts that another meeting may not be required and that expert inputs on 2nd revised proposal can be obtained off-line.

10. Dr. Mukund Rao thanked the Expert Committee for a very intense and thorough review conducted and also for providing valuable recommendations. Dr. Rao also thanked Mr. Darshan Shankar and TDU team for providing all details. He also gratefully acknowledged the support of KBB and FEE Department and other experts.

(Mukund Rao)
Member-Secretary, KJA
May 16/Jun 18, 2015

To,

Members of Expert Review Committee

Copies for information to:

o   Chairman, KJA
o   All Members of KJA
o   ACS/Principal Secretary, Forests, Ecology and Environment, GOK
o   CEO, Karnataka State Medicinal Plants Authority
o   Director, Karnataka Biodiversity Board, GoK
o   Principal Secretary, Dept. of Higher Education, GoK

Annexure I to Annexure III: Action taken report on 1ˢᵗ review meeting

No	Recommendations given by the expert committee (KJA)	Actions taken
1	To Integrate both the botanical and medicinal literature already published.	Prepared a bibliography of 100 sources for botanical and medical literature attached. (**Appendix 1 to Annexure I of Annexure III**)
2	The project methodology must be based on a detailed granular GIS derived using higher images (say, Cartosat or DigitalGlobe) and compatible to better than 1:10k scales of information representation and framed of KGIS framework.	KSRSAC collaborating partner in this project is having the QuickBird satellite imageries of 2005 for the HD Kote Taluk. The land use map prepared on the said imageries is available with the centre. The latest available satellite imageries will be procured through KSRSAC and the data will be framed to K-GIS Spatial framework. The land use classes will be finalized by KSRSAC in consultation with TDU-FRLHT & the preparation of land use maps based on the latest satellite Imagery will be finalized.
3	Standardization and inter-operable to IBIN and IBF databases- national repository and is available on a wider research network	The database will have Application Programming Interface (API) to establish communication with websites like India Biodiversity Information Network (IBIN) and India Biodiversity Portal (IBP) etc. The data will be exchangeable using suitable data exchange formats like XML or JSON. The GIS data will be made available through Web Mapping Service (WMS) to serve georeferenced map images over internet, that are generated by a map server using data from a GIS database.
4	GIS Apps and other database applications must be clearly defined and detailed - modules with illustrations and examples	Android app / e- modules:- (**Appendix 2 to Annexure I of Annexure III**) 1. Environmental Education Program; 2. Educating the households on 30 primary health conditions.
5	Survey methodology to be explained based on granularity and grid-size to be designed keeping satellite image details/resolution in mind and also use of precision-GPS instruments.	It is estimated that approximately 150 such 0.1 ha. plots may be required for HD kote, of these 90 plots will be covered in the 1st year and the balance 60 plots in the 2nd year by a team consisting of three competent field botanists and two field assistants.
6	How traditional health knowledge is validated and verified – so as to avoid negative effects and back-lash? In modern medicine there are laid down practices for validation/verification/actions (effects, reactions, dos and don'ts etc) – the same must be assured for traditional health knowledge. This has to be assured and details of this may be explained.	We have initiated with preliminary guidelines for preparing the traditional health knowledge for the users - so as to avoid negative effects and backlash. It will include information on preliminary diagnosis for management of phc at household level with information on do's and don'ts, precautions and dosage level. (See ex of zero draft of manual - **Appendix 3 to Annexure I of Annexure III**))

No	Recommendations given by the expert committee (KJA)	Actions taken
7	GIS database could be prepared in English, the front-end GIS and user interface must have local language interface	Provision for a translator has been made in the budget to implement this suggestion.
8	Training of local workers is important but details of how training and awareness campaigns would be done must be explained – as these are efforts and impact cost and time.	There shall be two types of training targetted to different groups. (1). Training on Environment Education for school teachers and students and (2) Training on promotion of local health traditional knowledge for selected village members, health workers, PHC staff including ASHA, ANMs, Anganwadi workers. The Trained staff of SVYM will execute these training programs for above mentioned target groups by organizing workshops, lectures, focus group discussions and village level meetings, resource persons shall be invited as and when needed. Details are in proposal
9	To include list of the plants which would form part of the database as a quick-listing and also to address their related traditional value	Noted and reflected in item 4. Other outputs recommended by the expert committee.
10	Protection of the Traditional Knowledge and ensuring that vested commercial exploitation does not happen – this has to be built in – both for access of GIS and also from a GOK control point of view to ensure equity, fairness and protection of local/traditional knowledge. Built-in safeguards for this must be detailed	Two rules will be followed - 1. Traditional knowledge related knowledge of communities will not be placed on databases and pharmacopeia, but will reside in PBR's People Biodiversity Registers in the custody of Biodiversity Management Committee's/local BMC's. 2. Red Listed species and the distribution information will be restricted only to State forest Departments and GoK.
11	GIS and Database Access rules and role-based access is important and must be the core mechanism for software and access. While total database can have all parameters, what citizens can access, what GOK officers can access, what TDU will manage, what others can access needs to be regulated. Details of this must be written down clearly.	
12	Disclaimers on database and un-validated data must be clearly specified. If some plants there is no pharmacopeia data available, then these must be flagged so that further research and updates can be possible.	Noted and will be reflected.
13	How repeated data updation cycle is useful for the GIS Pharmacopeia needs to be explained – as this is not a static one-time database.	Updation depends on three kinds of information. 1. Any new plant identified/recorded 2. New reference texts are added or any contemporary studies of clinical evaluation is reported from the research sector. 3. Adding new plant medicinal plant entities based on folk knowledge (Ex: - Shankapushpi). The folk knowledge will remain in PBR's

No	Recommendations given by the expert committee (KJA)	Actions taken
14	Can the project consider harvesting functions and include yield estimation functionality – this may be explored. This will be extremely valuable for GOK to know potentials of these medicinal plants and products (though this information can be also commercial value which must not get vested exploited).	TDU - FRLHT teams have been involved in several case studies relating to sustainable harvesting of wild medicinal plants. Lessons from such studies will be suitable incorporated in respect of specific medicinal plant species of this region.
15	Roles and responsibility of TDU, KSRSAC, SVYM and also of interfaces with KBB/KaMPA and Forest Dept of GOK needs to be clearly detailed. This is crucial to determine project networking and task responsibilities.	Roles and responsibilities of TDU, KSRSAC and SVYM reflected in the proposal.
16	The project must be monitored by a KJA Expert Committee to monitor progress and suggest any mid-term changes. The committee could include GOK officers, Experts, TDU etc so that regular monitoring is enabled.	Suggestion is welcome.
17	TDU to consult and meet Forest/Env Department and Ayush departments to address how the pilot can be up-scoped into a state-wide activity, at an appropriate time, and how GOK departments can support the same.	TDU team has briefed Shri Vijay Kumar Gogi (Director, AYUSH) and he conveyed his appreciation and support during the meeting. 2. TDU has submitted the modified proposal copy to Shri Madan Gopal I.A.S, Forest Ecology & Environment Dept. who has expressed his appreciation and forwarded the proposal to Karnataka Biodiveristy Board for information and feedback.
18	Budget is too high for the relatively small geographical area (H.D. KoteTaluka). Seems to include many items which are not direct to projec, too many people salary involved etc. The budget needs to be realistically re-looked into.	Reduction in overall budget by 37% from the original submission. However additional 23 lakhs have been added for procurement of imageries as per the recommendation by the expert committee (serial no. 2) Activities have been relooked and some activities which are not directly contributing to the project have been dropped, in order to keep up the core theme of this project intact.
		No specific investments on new softwares but rather on training and capacity building. Open source softwares to be used (XML, JSON, WMS, POST GRES, POST GIS),
19	TDU is an institution of repute and it could be provided an institutional overhead (as per GOK norms or say ~15%) so that such institutions sustain their research momentum and are able to long-term support medicinal plants and traditional knowledge research in the state.	Included

Appendix – 1 to ANNEXURE-I of Annexure III

	Preparation of a Bibliography of 100 books related to authentic botanical and medical literature	
1	MEDICO-BOTANICAL STUDIES OF B.R.HILLS OF MYSORE DISTRICT	ANNONYMUS
2	CONSERVATION AND UTILIZATION OF MEDICINAL PLANTS BY KUDUBI TRIBALS OF KARNATAKA	BALAKRISHNA GOWDA, BORAIAH, G. & FAROOQI.A.A
3	FOLKLORE MEDICINE OF SOUTH WEST KARNATAKA	BALAKRISHNA GOWDA & BRORIAH.G.
4	FLORA OF KARNATAKA VOL-1	C.J. SALDHANA.
5	FLORA OF KARNATAKA VOL-2	C.J SALDHANA
6	FLORA OF COORG (KODAGU)	KESHAVAMURTHY.K.R., YOGANARASIMHAN
7	FLORA OF HASSAN	SALDHANA. J
8	FLORA OF CHIKMAGALUR DISTRICT, KARNATAKA, INDIA	S.N.YOGANARASIMHAN, S.SUBRAMANYAM & B.A. RAZI
9	FOREST TREES OF MYSORE AND COORG	JOHN CAMERSON,
10	ETHNOBOTANY OF MYSORE AND COORG,KARNATAKA STATE	Rajendra D. Kshirsagar&N.P.Singh
11	FLORA OF SOUTH KANARA:(Dakshina Kannada and Udupi districts of Karnataka)	Gopalakrishna Bhat, K.;
12	MEDICINAL PLANTS OF KARNATAKA	K.R. KESHAVA MURTHY
13	FLORA OF UDUPI	K.Gopalakrishna Bhat
14	A SYNOPTIC FLORA OF MYSORE DISTRICT:with an appendix of unani, ayurvedic and trade names of drugs	Raghavendra Rao, R;Razi, Basheer Ahmed;
15	FLORA OF GULBARGA DISTRICT	Y.N. SEETHARAM,K. KOTRESHA & S.B. UPLAONKAR;
16	FLORA OF DAVANAGERE DISTRICT,KARNATAKA,INDIA	B.K. Manjunatha, V. Krishna, T. Pullaiah.
17	FLORA OF BANGALORE	S. V. Ramaswamy, Basheer Ahmed Razi
18	FLORA OF KARNATAKA ANALYSIS	B.D. Sharma ... [et al.].
19	FLORA OF TUMKUR DISTRICT,KARNATAKA	Bhaskar, V.;Kushalappa, C.G.;
20	FLORA OF EASTERN KARNATAKA Vol. 1	N.P.Singh
21	FLORA OF EASTERN KARNATAKA Vol. 2	N.P.Singh
22	FLORA OF SHIMOGA DISTRICT KARNATAKA	DR. S.N. RAMASWAMY;DR. M. RADHAKRISHNA RAO; DR. D.A. GOVINDAPPA;
23	Flora of Bellary	
24	DISTRICT CENSUS HANDBOOK BELLARY	B.K. DAS;
25	DISTRICT CENSUS HANDBOOK CHITRADURGA	B.K. DAS (1)
26	FLORA OF RAJIV GANDHI NATIONAL PARK,KARNATAKA	R. Manikandan, P. Lakshminarasimhan.
27	FLORA OF ANSHI NATIONAL PARK,WESTERN GHATS,KARNATAKA	Sachin A Punekar& P. Lakshminarasimhan.
28	MEDICO-BOTANICAL STUDIES OF BILIGIRIRANGAN HILLS,MYSORE,KARNATAKA	Vivekananda GirijanaKalyana Kendra;

29	NAGARHOLE NATIONAL PARK	LAMBERT M. SURHONE, MARIAM T. TENNOE, SUSAN F. HENSSONOW
30	A Note on the Floristic Diversity and Ethno-botany of Chitradurga District	Dr. N.M. Ganesh Babu,
31	STUDIES ON MEDICINAL PLANTS IN DHANVANTARIYA NIGHANTU VOL.1	VAIDYA D.K. KAMAT
32	INDIAN MEDICINAL PLANTS VOLUME .VOL 1-5	WARRIER,P.K. et al (EDS.)
33	INDIAN MEDICINAL PLANTS Vol 1 -4	K.R. KIRTIKAR, B.D. BASU & AN I.C.S.
34	SOME CONTROVERSIAL DRUGS OF INDIA	DR. BAPLAL VAIDYA
35	INDIAN MATERIA MEDICA, FIRST EDITION 1908, 3RD EDITION 1954	LATE DR.K.M.NADKARNI & A.K.NADKARNI
36	AYURVEDIC DRUGS AND THEIR PLANT SOURCES	V.V. SIVARAJAN AND INDIRA BALACHANDRAN
37	ASTANGA HRIDAYA KOSHA	ANONYMOUS
38	THE AYURVEDIC FORMULARY OF INDIA PART 1. 1st Ed.	Ministry of Health & family Welfare
39	MATERIA INDICA	WHITELAW AINSLIE
40	A CATALOGUE OF INDIAN SYNONYMS	MOODEEN SHERIFF
41	SINGLE DRUG REMEDIES	MOOSS,N.S.
42	GLOSSARY OF VEGETABLE DRUGS IN BRHTTRAYI	THAKUR BALWANT SINGH & DR. K.C.CHUNEKAR
43	NIGHANTU ADARSA VOL. I & II	BAPALAL G. VAIDYA
44	GANAS OF VAHATA	N.S. MOOSS
45	LA-HARITA SAMHITA	ALIX RAISOM
46	A DICTIONARY OF THE ECONOMIC PRODUCTS OF INDIA VOL.I - 4	GEORGE WATT
47	THE AYURVEDIC PHARMACOPOEIA OF INDIA PART 1. VOL.1	ANONYMOUS
48	PHARMOCOGNOSY OF AYURVEDIC DRUGS NOS.01, 02	ANONYMOUS
49	PHARMACOGNOSY OF AYURVEDIC DRUGS NO.10	KOLAMMAL,M.
50	DRAVYAGUNA VIGNANA VOL.2,5,5N	PROF. P.V. SHARMA
51	A HANDBOOK OF MEDICINAL PLANTS	DR.P.N.V.KURUP, DR.V.N.K.RAMADAS&JOSHI P
52	INDIAN PHARMACEUTICAL CODEX VOL.I	MUKERJI,B
53	AN INTERPRETATION OF VAN RHEEDE'S HORTUS MALABARICUS	DAN H. NICOLSON, C.R.SURESH AND K.S MANILAL
54	HERITAGE OF THE TAMILS -SIDDHA MEDICINE	S,V, SUBRAMANIAN & V.R. MADHAVAN
55	MEDICINAL PLANTS OF KARNATAKA	K.R. KESHAVA MURTHY
56	BHARATIYA VISHA VAIDYA	DR.P.SATYA NARAYANA BHAT
57	INDIAN BEST MEDICINAL PLANTS	
58	MATERIA MEDICA	VAIDYA RATHINAM K.S., MURUGESH MUDHALIAR
59	MEDICINAL PLANTS OF INDIA (VOL 1- KARNATAKA)	YOGANARASIMHAN
60	DICTIONARY OF TREES AND PLANTS VOL-1	MUNIVER P. MADHAVAN AND MUNIVER H.CHITHIRAPUTHIRAN
61	ALL INDIA COORDINATED RESEARCH PROJECT ON ETHNOBIOLOGY	BOTANICAL SURVEY OF INDIA

62	JAMI-UL-MUFRADATH-AL-ADVIA-WAL-AGHZIA VOL-1	ZIAUDDIN ABDULLAH BIN AHMED-AL-INDALSI
63	UNANI ADVIA-E-MUFRADA FOURTH EDITION 1986	HAKEEM SYED SAFIUDDIN ALI
64	SELECTED HERBO-MINERAL REMEDIES FIRST EDITION	PROF.HAKEEM MOHAMMED ZAHOORULHASAN
65	HAMDARD PHARMACOPOEIA OF EASTERN MEDICINE	HAKIM MOHAMED SAID
66	HOMEOPATHIC PHARMACOPOCIA OF INDIA V1 1st Ed.	Govt. of India
67	HOMEOPATHIC PHARMACOPOCIA OF INDIA VOL-2 SECOND EDITION	Govt. of India
68	HOMEOPATHIC PHARMACOPOCIA OF INDIA VOL-4 FIRST EDITION	Govt. of India
69	HOMEOPATHIC PHARMACOPOCIA OF INDIA VOL-5	
70	HOMEOPATHIC PHARMACOPOCIA OF INDIA VOL-6	GOVT. OF INDIA
71	A CHECK LIST OF HOMEOPATHIC MEDICINE	
72	THE USEFUL PLANTS OF INDIA	ED. SHRI S.P. AMBASTA
73	FORMULARY OF SIDDHA MEDICINES	IMPCOPS
74	THE HANDBOOK OF INDIAN MEDICINE THE GEMS OF SIDDHA SYSTEM	T.G. RAMAMURTHI IYER
75	THE SIDDHA FORMULARY OF INDIA	Govt. of India
76	BOGAR VAIDYUM - 700	DR. S. PREMA, P.V. NAGARASAN
77	AGATHYAR VAIDYA KAVIYUM - 1500	V.R. MADAVAN
78	DANVANTIRI KULANTHAIVAKADAM	K. LALITHAMBIKA
79	MULIGHAI KALANGIYUM	DR. N.K. SHANMUGAM
80	SIDDHAR'S SCIENCE OF LONGEVITY AND KALPA MEDICINE OF INDIA	DR. A. SHANMUGA VELAN
81	MULIGHAI KALANGIYUM	THIRUMALAI NATARASAN
82	MULIGHAI PESUGIRATHU	KUNDRATHOOR RAMAMURTHY
83	THE PLANT-BOOK	MABBERLEY D.J.
84	THE HONEST HERBAL	VARRO E. TYLER
85	Ethnobotany of Rice Weeds in South Asia	Raju R.A.
86	A Study of the Local Health Traditions of Spiti	NimaManjerkar
87	Magic and Medicine of Plants	Reader's Digest
88	Wealth of India	CSIR, DELHI
89	A guide to important medicinal plants used in Homoeopathy-vol I	Ed: Vikramaditya and Prakash Joshi
90	Vaidya Chintamani	Medical manuscripts
91	Vaidya Grantha	Medical manuscripts
92	Ayurveda Mahashastra	Medical manuscripts
93	Ravanamuktabalagraha	Medical manuscripts
94	Ayurveda Jyotisha	Medical manuscripts
95	Bhasmalu	Medical manuscripts
96	Vaidyachikitsasankshepa	Medical manuscripts
97	BalagrahaChikitsa karma	Medical manuscripts
98	Nadinidhanapaddhati	Medical manuscripts
99	NadinidanaGrantha	Medical manuscripts
100	Garbhiniprashne	Medical manuscripts

Appendix – 2 to ANNEXURE-I of Annexure III

ODK Based Online Survey

Software Application

Specifications

Table of Contents

Survey Question Types

1. Text question: Capture notes to gain in-depth insight on a plant, or simply use it to collect text notes within a form. Enter information using the onscreen text keyboard.

2. Numeric input question: Tag a positive whole and floating-point numbers using the onscreen numeric keyboard. e.g. how many places has this species re-occurred?

3. Multiple Choice – Single Answer: Surveyors are given multiple answer choices to a question and they need to select one correct or suitable option as response to the question.

4. Multiple Choice – Multiple Answer: Surveyors are given multiple answer choices to a question and they need to select all option suitable as response(s) to the question.

5. Information screen: Create a separate information text screen that is inserted between survey question types.

6. Image screen: Display a static image on the screen with the ability to add information text that is tagged to the image.

7. Date and Time question: Capture the date and time using a spinner selector.

8. Signature: Prompts the respondent to sign the touch screen with their finger.

9. Photo Capture: Allows the surveyor to take a photograph on camera equipped devices and add information text to that image.

10. Barcode Scanner: Prompts surveyor to scan a barcode or QR Code on camera equipped devices. Eliminate data entry mistakes and collect survey data faster.

11. Dropdown question: A multiple choice question type that allows the surveyor to choose only one option from a list of scrollable answers.

Offline Data Collection Form

1. The App should work offline so that the surveyor does not have to worry about an Internet connection while collecting data.

2. Tablet devices can store hundreds of survey results and offline survey functionality is important for remote locations or interiors with limited reception as in our case.

3. Have the ability to upload results manually or automatically whenever the device is connected to the Internet. If the Internet connection disconnects half way through the upload process, the app safely stores the remaining results on the device until the next upload.

4. The App should enable multiple surveys that the surveyor can quickly switch between them when it's offline, without losing any of the captured results.

5. All question types should be supported while collecting offline form data with the app, including the display of photos and the playing of videos.

Skip Logic

Customize the next question that is displayed in the survey based upon the surveyor's response to a question. It should allow the surveyor to create complex, branched surveys without the need for any coding languages or confusing interfaces. The custom flow functionality allows the surveyor to segment the responses with a minimum of effort.

Device Management

1. The App should include enterprise-level management tools for use with a lot of devices. Remote field surveyors should be able to operate – even in the remotest of locations.

2. The App should make it easy to manage remote field works and track when each mobile device last uploaded results.

3. Data protection should be implemented at the App level and should work with the hardware and firmware encryption to secure data collected in the event that a physical device is stolen or lost.The encryption and decryption process should appear seamless to surveyors; however, a passcode can be made mandatory when accessing the device.

Data Download / Upload

The App should have export options that will allow downloading or uploading the data collection results both in SPSS format and in CSV (comma separated value) format.

GPS Mapping

1. Collecting GPS data with each survey result is an important setting that will enable when the surveyor is setting up the survey. When the photo capture question type is used, the GPS coordinates should be recorded in the photos' metadata. Most open source software mapping tools should be able to map our GPS photo metadata.

2. Adding GPS coordinates in the photograph metadata is important to keep track of where a photo was taken so that surveyors can always find their way back to the exact location a photo was taken.

Survey Editor

1. The App should provide the ability to Insert, move and copy/paste questions with just a few simple mouse movements

2. The App should provide the ability to collaborate with colleagues during the questionnaire design phase

3. Provide a device preview to quickly test the survey layout and design so that the surveyor can check out what works and what doesn't instantly, without the hassle of uploading al iterations to the mobile device.

Multilingual

The survey language setting should allow the surveyor to configure the language that is displayed on the mobile device. It should atleast support Kannada, Hindi, Tamil and English to begin with.

SURVEY SOFTWARE APPLICATION SPECIFICATIONS FOLLOWED BY A BRIEF ON E-MODULES

The E- Modules will be developed specifically for this project to enhance and reinforce teaching and learning on the subject of environment and medicinal plants. This will be designed to meet the needs of those just beginning to teach or learn online, those who have taught for several classes and are ready for more instructional ideas and also for those seasoned teachers and self motivated students who are ready to challenge themselves and move to another level of teaching and learning. There will be three Main Modules called Beginner's, Intermediate and Advanced courseware. Other components available include several Stand-Alone Modules that are topic specific like home medicinal gardens and offer excellent information on topics of great interest and value to the community. The students will also get videos of the lectures done by TDU experts in the various subjects that they can use to learn anytime, anywhere.

Each course module will have a "Help" link that provides learners a self help through frequently asked questions in all subjects and also basic technical help if students or teachers need assistance with the course or technology. There is also a General Reference section where students will find additional resources that are useful for their further reading that could include articles, books, etc. The courseware can be accessed anytime-anyplace to accommodate busy schedules provided the students or teachers have access to the internet. At the end of the modules, students and teachers can take a self assessment to assess the level of knowledge they have acquired through the course.

Appendix 3 to Annexure-I of Annexure III

Manual to Use Medicinal Plants for Primary Health Care
(zero draft)

INTRODUCTION

The traditional primary health care system in India is embodied in a 'people's health culture'. This culture is based on very effective and sound region-specific health practices involving about 8,000 species of plants across the length and breadth of the country. Whereas most of the medicinal plants used in these local health cultures were freely available in the vicinity of the household, some of these were also raised and maintained in the home herbal gardens. This 'people's health culture' provided an easy and cost effective succor to day to day primary health care problems of the local communities over centuries on one hand and also continued to develop and evolve alongside the codified Indian Systems of Medicine like Ayurveda, Siddha, Unani and Gso-rigpa on the other hand.

The last century saw a temporary setback to these time-tested practices due to lack of recognition and necessary societal support. The danger of permanently losing our extremely rich knowledge base related to plant based herbal traditions and driving many of the associated plants to extinction started haunting the humanity. However, this dismal scenario is in for a change due to a global resurgence of interest in natural and organically grown products. The relative safety of whole plant based drugs, in contrast to the synthetic ones, is being increasingly appreciated. It is in this context that home grown medicinal plants offer a high quality, low-cost, easily accessible and safe primary health care option. To make this easy and cost effective health care option a reality, our linkages with plant based health traditions would need to be re-established.

This manual provides a list of plants/ plant material used for alleviation of various primary ailments along with easy and reliable methods of use of the plants/ plant material. The ailments covered in the manual are limited to minor problems, mild deviations from normal health and those that can be easily diagnosed and self-managed. References to complex and chronic ailments that do need professional medical advice have been deliberately avoided. The primary health care problems listed in the manual have been categorized into the following major groups:

1. Common Problems (acidity, burning feet, constipation, cough, cuts and wounds, diarrhea, fever, headache, hoarse throat, indigestion, sore eyes, stomach ache, urinary problems, vomiting, worms, etc.)

2. Women Health – Pregnancy and Gynecological Problems (pregnancy care, breast milk purification and production, menstrual disorders)

3. Health Promotion (general immunity, mental and liver tonics, hair care)

The plants/ plant material short-listed in this manual have been selected on the following criteria:

- Confirmed clinical efficacy of the plant i.e. the recommended uses of the plants have been drawn from the practices actually prevalent and tested by authorities in the field. **Even as these plants are also known to be used in many serious ailments, reference to their use in this manual has been limited to PHC conditions only.**

- Confirmed identity of the plant i.e. plants having ambiguous identity in view of multiple names for one species and one name for many species have been avoided.

- Safety factor i.e. only those plants have been included having no known toxic effects.

- Ease of use of plants/ plant parts i.e. the recommended plants have simple methods of use.

- Multiple uses i.e. the recommended plants can be used in more than one condition.

- Ease of maintaining plants in home herbal garden i.e. recommended plants are easy to maintain and are amenable to harvest in a short period of time.

- Aesthetic appeal i.e. the recommended species form excellent ornamental plants.

- Easy availability of planting material i.e. the planting material is easily available across the country.

Methods of using plants for home remedies

The standard measures used for the purpose of various formulations suggested in this manual, are

1 **cup = 150 ml/ 150 gm, 1 tsp = 5 ml/5 gm.**

Unless otherwise specified, the general methods for processing medicinal plants are as given below:

Fresh Juice (*Svarsa*): Wash the material (plant/ plant part) to remove dirt, chop into small pieces and crush well. Squeeze the crushed material through a clean cloth and collect the juice. Fresh juice should be used immediately. (*adusa, tulsi, patharchur, drumstick, hibiscus, mehendi,lalbaclu*)

Herbal Paste (*Kalka*): Crush the thoroughly cleaned fresh plant material, add a little water and grind to make a paste. (*hibiscus,Mehendi, dub, bhuamla, lalbaclu*)

If the material is dry, then powder the material, heat with a little water and make into fine paste. As the paste cannot be stored, it is advised to prepare the paste afresh every time it is to be used.(*dry ginger, khas*)

Herbal Powder (*Churna*): Dry the material well in shade. Crush and pound or grind to make fine powder and sieve through a fine cloth. Powder can be stored in airtight containers for up to one year. (*shakakul, asgandh roots*)

Decoction (*Kashaya, Kvatha*): Decoction is made by boiling the herbs in water over low flame. For preparing a decoction, wash the material (dry or fresh) to remove dirt, chop into small pieces and pound well. Mix1 part of the pounded material with 16 parts of water and boil on a low flame till the water is reduced to about ¼ of its original volume. Strain and use the liquid residue. Decoctions can be stored for about twelve hours and fresh decoction should be prepared every day. (*adusa leaves, neem leaves, neem bark*)

Milk Decoction (*Ksirapaka*): For preparing milk decoction,wash, chop and pound the material. Mix 1 part of the material with 8 parts of milk and 32 parts of water and boil on a low flame till almost all the water gets evaporated. Strain and use the liquid decoction. Milk decoction can retain its potency for about a day and, therefore, needs to be consumed within a day of its preparation. (*pipali, brihmi*)

Hot Infusion (*Phanta*): Hot infusion is prepared by steeping the herbal material in hot water. For this, clean the herbal material and pound it well. Soak one part of this material in eight parts of boiling hot water and allow it to cool. Strain and use the liquid. Fresh infusion should be prepared every time. (*neem bark, neem leaves, giloya*)

Cold Infusion (*Hima*): For preparing cold infusion, add one part of the thoroughly cleaned herbal material to six parts of water and keep overnight. Squeeze the material in water and strain it the next morning and use the liquid residue. Fresh infusion should be prepared every time. (*giloya*, *neem bark*)

Herbal Tea: Crush the herbal materials into coarse powder. Boil 1-2 tsp in one and a half cup of water till it reduces to about one cup. Add sugar to taste and drink. (*coriander& cumin seeds,lemon grass*)

Leaf Pulp: Especially of 'aloe vera' leaves. Cut open the 'aloe vera' leaf from one side by giving a longitudinal incision. Scoop out the pulp with the help of spoon.

Trikatu: Take equal quantities by weight of 'pipali', 'black pepper' and 'dry ginger', clean these items, dry these and make into powder. Then mix the powder thoroughly and keep for future use.

Triphala: Take equal quantities by weight of 'harara', 'bahera' and 'amla', clean these items, dry these and make into powder. Then mix the powder thoroughly and keep for future use.

PRIMARY HEALTH CARE WITH PLANTS

A. COMMON HEALTH PROBLEMS

Under this chapter are included mild deviations from normal health and those that can be self-managed with the help of medicinal plants and kitchen herbs. More than one line of cure has been suggested for many of the primary health conditions and any one of these can be used depending upon the convenience and availability of the plants/materials. For best results, where indicated both external and internal medications can be followed simultaneously.

1. COUGH & RESPIRATORY TROUBLES

Symptoms & Causes : Tightness in chest, difficulty in breathing, wheezing, nasal congestion, cough with or without phlegm due to exposure to irritants or cold; excessive intake of sour, fermented or cold food & drinks and excessive physical strain.

GENERAL COUGH & COLD

·   Dry ginger, pipali, amla: Boil together 10 gms each of 'dry ginger', 'pipali', 'amla' and sugar in 2 glasses of water until it reduces to 1 glass. On cooling add 2 tsp of honey. Take this decoction in 2 equally divided doses in the morning and evening on empty stomach.

·   Patharchur: Mix ¼ glass of leaf juice and 1 tsp of honey and drink in the mornings and evenings for 2-3 days. This is especially indicated in cold and sneezing. Alternately, cook the leaves and eat in the evenings for 2-3 days.

·   Lemon grass: Crush together 4 fresh leaves of 'lemon grass', a pinch of peeled and chopped fresh 'ginger' and 5 'black pepper' seeds. Boil this mixture in 2 glasses of water till it reduces to half. Take this freshly prepared decoction twice daily for 7 days.

DRY COUGH

· <u>Tulsi& fresh Ginger</u>: Take a handful of 'tulsi' leaves and a pinch of peeled and chopped fresh ginger. Grind well to form a fine paste. Make small round tablets (of the size of black pepper) and dry in shade. These can be stored in airtight container. Whenever required, crush 1-2 tablets to make powder. Mix this powder in 1 tsp of honey and take 3 times a day for 3-5 days. Especially useful for children.

· <u>Adusa</u>: Take 2-3 thoroughly washed tender leaves, boil these in 1 cup of water and reduce it to half. Drink this freshly prepared decoction thrice daily for 7 days.

· <u>Adusa& Ginger</u>: Prepare juice, paste or powder from the leaves of 'adusa'. Mix 1 tsp of this with ½ tsp of 'ginger' juice, and take thrice daily for 7-10 days.

· <u>Adusa, Dry ginger, Harara, Pipali</u>: Take 1 tsp powder of each of dried leaves of 'adusa', 'Dry ginger', 'Harara' and 'pipali' and make into a paste with 1 tsp of 'honey' and ½ tsp of 'ghee'. Take 1 tsp of this paste 3-4 times a day for 7-10 days. It is especially useful in asthmatic cough.

· <u>Gudmar</u>**:** Dry the seeds and pound to make powder. Take 5-10 gms of the powder with warm milk.

WET COUGH

· <u>Aloe vera</u>: Fry 2 tsp of leaf pulp in ½ tsp of ghee. Take with a little sugar in the morning, noon and evening for 3 days.

· <u>Ginger</u>: Crush fresh rhizomes to extract juice. Take 1 tsp of freshly prepared juice with honey thrice daily for 7 days.

· <u>Tulsi</u>: Extract juice of 10-12 fresh leaves. Mix this juice with 1 tsp of honey and take twice daily for 3 days.

· <u>Pipali</u>: Take 40-60 ml of milk decoction of 'pipali' 4-5 times daily for 4-5 days. It is especially useful in cough with yellow sputum.

· <u>Patharchur</u>: Mix 1 tsp of leaf juice and ¼ tsp of sugar and take it 2-3 times a day for 3 days. Especially useful for children.

· <u>Trikatu powder</u>: Take ¼ tsp of 'trikatu' powder mixed in 1 tsp of honey 4-5 times daily.

· <u>Gudmar</u>**:** Dry the seeds and pound to make powder. Take 5-10gms of the powder with warm water in phlegmatic conditions.

· <u>Gudmar</u>: (Inhalation of fumes): The root bark is collected and dried. This is burnt and the fumes inhaled. The treatment is effective in phlegmatic conditions. It can be done at the end of sneezing. Take a few red hot ambers on a metal plate. Drop the root bark pieces on to the ambers. Keep the plate at a distance and direct the fumes towards you. Sit straight with calm mind taking deep inspirations and expirations. Inhale the smoke through one nostril. Emit the smoke only through the

mouth. Inhale from both the nostrils taking turns. Relax for 15 minutes. Do not wash immediately. Spit out the phlegm. Avoid inhalation in running nose condition.

Precaution: *Avoid cold food, exposure to cold, dust and sleep during the day. Use spices like pepper, ginger and garlic in food and use warm clothing*.

ACIDITY

Symptoms & Causes: Sour belching and burning sensation in the gastric region due to untimely intake of food, excessive intake of hot and spicy foods, consumption of alcohol etc.

· Giloya: Crush fresh shoot to extract juice. Take 1 tsp of the juice with honey thrice a day for 7 days.

· Shakakul: Crush fresh tubers to extract juice. Take 6 tsp of this juice with sugar in the morning and evening for 7 days.

· **Shakakul: Pound dry tubers to make powder. Boil together 3 tsp of this powder with ½ cup of water and ½ cup of milk till the solution is reduced to half. Take 6 tsp of this concoction with sugar 2 times a day for 7 days.**

· Triphala powder: Take 1 tsp of 'triphala' powder with honey thrice daily.

· Anar: Make decoction of 20 gm of the rind of fresh fruits. Take ½ cup of this decoction mixed with 1-2 tsp of honey thrice a day for 7 days.

Precaution: *Avoid hot, spicy and pungent foods and exposure to heat*.

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Extracts of the discussion of 3rd Meeting of KJA

o Prof Sadagopan mentioned that KJA-TC, in its 2nd meeting held on January 6, 2015, had considered a proposal from Institute of Trans-disciplinary University (TDU), Bangalore in partnership with Swami Vivekananda Youth Movement (SVYM), HD Kote and Karnataka State Remote Sensing Applications Centre (KSRSAC), Bangalore for "A Replicable Knowledge Resource for one taluka in Karnataka in the form of Geospatial Database of Local Medicinal Plants and a Taluka specific Herbal Pharmacopeia on an ICT platform for one taluka in Karnataka (H.D. Kote)".

o While KJA-TC had found the project worthy of further pursuit and would be a systematic way of creating the pharmacopeia database. It is unique and innovative and will enable knowledge on medicinal plants, KJA-TC had suggested that an expert review of the proposal be conducted including Forests Dept, Health Dept, KBB and others and help in scoping the focus of proposal. After this expert review, KJA can consider the proposal and recommend for further action.

o Dr Rao mentioned that an expert review meeting involving 3 national-level experts – Prof PS Roy, Dr Renu Swarup and Prof Sanjappa – alongwith officers of FEE Department, MPA, KaMPA, KJA etc had been organised on January 27, 2015 on the proposal. TDU had made a presentation of the project to the experts. The Expert Review had made about 18 technical and managerial recommendations – formal minutes of the Expert review had been issued with detailed recommendations. Expert review had suggested that the TDU could incorporate the recommendations made into a revised proposal and submit it to KJA – which once again would be reviewed by Experts. The post-review final proposal from TDU is awaited – after which KJA may consider and take next steps.

o Members of KJA appreciated the ideation of a pharmacopeia GIS database and also noted the excellent progress made in the review and evaluation of the proposal. KJA endorsed that TDU can re-submit the final proposal after incorporating review points – after which Experts can once again review and make final recommendations to KJA.

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Extracts of the discussion of 3rd Meeting of KJA – Technical Committee

TDU Proposal to Develop a Geospatial Database of Local Medicinal Plants

Dr. Mukund Rao mentioned that KJA Expert Review Team had reviewed the proposal on Jan 29, 2015 and May 13, 2015 and had provided extremely important inputs. The feedback of the reviewers has now been incorporated a revised proposal is submitted to KJA. Dr Rao mentioned that the review committee had also strongly supported and endorsed the project as an innovative project – unique in India and being done for first time. The review committee had also considered the letter from Karnataka Biodiversity Board (KBB) on a state-wide project that KBB is doing to survey medicinal plants – the Review Committee had noted the KBB project was a state-wide survey of medicinal plants at coarse grids but the TDU proposal was at micro-level of taluk with detailed grids that would provide detailed inventory of medicinal plant and the proposal also plans local-applications of health interfaces at local level (which the KBB proposal is not attempting). The recommendations of review committee were part of background notes for the meeting. Prof. Darshan Shankar and Prof. Ved from TDU presented the revised proposal with budget of INR 2.85 crores.

- Dr. Gayatri Saberwal noted that a very good review has been conducted and that there is all round support and appreciation for the proposal. The review committee recommendations have been all incorporated and has approved the proposal for KJA to consider.
- Mr Valluri appreciated the concept and suggested that the GIS applications and societal interface is of high value and unique.
- Mr Naidu mentioned that this is a very unique project and could impact medicinal plant systems and also local-specific health practices. He appreciated and endorsed the proposal for consideration.
- Dr Saberwal mentioned that the revised budget is INR 2.85 crores and only KJA has to consider.
- Dr Rao mentioned that while FEE and KBB and KAMPA are supportive of the project, the real user is the Health /Ayush departments. Thus, their "pull-in" for user-acceptance is also important. This has also been recommended by the Review Committee.
- KJA-TC formally approved the TDU proposal of INR 2.85 crores for further consideration by KJA. KJA-TC also suggested for discussions with user department - Health/Ayush department as "anchor departments" for project but FEE/KBB/KAMPA could also be involved – basically so as to link the local specific taluk details with state-wide details that KBB organises.

(Action: TDU proposal proposed for KJA consideration; KJA to engage with Health/Ayush Department for anchoring/implementing the possible KJA recommendation).

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Extracts of the discussion of 4th Meeting of KJA

TDU proposal to Develop a Geospatial Database of Local Medicinal Plants

Prof. Sadagopan mentioned that KJA Expert Review Team had reviewed the TDU proposal on January 29, 2015 and May 13, 2015 and had provided extremely important inputs. The feedback of the reviewers has now been incorporated and a revised proposal has been submitted by TDU to KJA. Prof. Darshan Shankar and Prof. Ved from TDU presented the revised proposal with budget of INR 2.85 crores in 3rd KJA-TC Meeting.

- Dr. Rao mentioned that the 2 Expert review committee meetings have been extremely useful The Experts have finally strongly supported and endorsed the project as an innovative project – unique in India and being done for first time. Dr rao mentioned that Experts committee had also considered the letter from Karnataka Biodiversity Board (KBB) on a state-wide project that KBB is doing to survey medicinal plants – the Review Committee had noted the KBB project was a state-wide survey of medicinal plants at coarse grids but the TDU proposal was at micro-level of taluka with detailed grids that would provide detailed inventory of medicinal plant and the proposal also plans local applications of health interfaces at local level (which the KBB proposal is not attempting). The Experts have recommended that the project at INR 2.85 crores for HDK taluk be taken up by KJA for further action – the end user agency of GoK could be Health/Ayush department (as per experts).

- Based on expert review, Dr Rao requested KJA to formally endorse/approve the TDU project of INR 2.85 crores for HDK taluk to be recommended to Health/Ayush Department. Soon KJA Secretariat is facilitating a meeting of TDU with end-user Health/AYUSH Dept as the discussions and their inputs would help in user-anchoring the project and also for ownership of project as recommendation of KJA to GoK. Based on discussions with Health/Ayush department, Chairman, KJA could then formally approve the project and recommend to GOK of for appropriate funding.

- KJA Members agreed/approved TDU Proposal of HDK for INR 2.85 crores and recommended to discuss/engage with Health/AYUSH department and after that Chairman, KJA could formally submit recommendation to GoK.

(Action: KJA Secretariat to facilitate a meeting of TDU with Health/AYUSH Department
for anchoring/implementing the possible KJA recommendation;
Chairman, KJA to recommend the TDU proposal as a recommendation of KJA to GoK)

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Meeting of Chairman to Discuss TDU Project with Principal Secretary of Health and Family Welfare Services

Date: July 24, 2015
Venue: Room No. 422, 4th Floor, Vikasa Soudha

Invitees:

1. Dr. Kasturirangan, Chairman, KJA
2. Sri. Atul Kumar Tiwari, Principal Secretary, HFW
3. Sri. P. S. Vastrad, Commissioner, HFW
4. Sri. Vijaykumar Gogi, Director, Dept. of AYUSH
5. Ms. Sowjanya, Mission Director, National Health Mission
6. Sri. Ananth Desai, Programme Officer, Dept. of AYUSH
7. Sri. Darshan Shankar, Vice-Chancellor, TDU
8. Sri. D. K. Ved, Advisor and Emeritus Professor, TDU

KJA Secretariat:

9. Mr. Deepak, SRA, KJA
10. Ms. Anuradha, SRA, KJA
11. Ms. Jayashri, RA, KJA

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Deliberations:

1. Principal Secretary, HFW, Sri. Tiwari welcomed everyone to the meeting and introduced his colleagues to the Chairman and to the Members present in the Meeting. He also mentioned that Member-Secretary, KJA had briefed him of the KJA proposal and also that he had a meeting on July 23 with his officers to discuss on the project in detail and obtain views from them.

2. Chairman, KJA appreciated Principal Secretary, HFW and his officers for their wholesome support and cooperation and also for their active involvement. He gave overall view of KJA where KJA brings ideas-proof of concepts-pilot experimentation and if found successful and beneficial for the State of Karnataka, are developed into scalable and replicable project implemented by respective Ministries/Department. With regard to TDU-Pharmacopoeia project, he said that KJA had gone through a detailed process on the project proposal submitted by TDU

in September, 2015. KJA had appointed an Expert Review Committee which met two times and reviewed the proposal. Inputs from these two meetings were incorporated by TDU. He further mentioned that the experts have strongly supported and endorsed the project as an innovative project which is unique in India and first of its kind. The Expert Committee has recommended to KJA for undertaking of the project but KJA would like for this department interaction before a final decision is taken by KJA. He requested Mr. Darshan Shankar to brief on the project to the members present.

3.   Mr. Darshan Shankar explained that this pilot project is expected to boost Universal Health Coverage (UHC) in an effective manner. The project proposes to organize a geo-tagged medical plant database and convert it into pharmacopeia knowledge that would greatly benefit local-community in accessing affordable healthcare and enhance the knowledge base of traditional/folk/local healers. This database would also be put to use in academics and local panchayat level. Thus, this project outcome would definitely be a complimentary mechanism in achieving UHC.

4.   Dr. Ved made a detailed presentation of the final proposal that has been recently submitted to KJA. He mentioned that the aim of the proposal is to demonstrate community applications for health and environment security from a GIS enabled knowledge resource of medicinal plants and traditional values – which would be made available as a digital resource to all health centres /health providers, schools, colleges, panchayats and households in HD Kote taluka in Mysore district. The budget for the project is INR 2.34 crore and is for three years. He mentioned that the revised proposal is intended to initiate following which are related to knowledge generation as well as community applications: *(PPT is attached in Annexure-I)*

    3.1. Related to Knowledge Generation

        3.1.1. To develop GIS enabled database of medicinal plants of HD Kote on species, distribution, population status, ecology (micro habitats, associations), parts used and local uses based on appropriate grid size and stratification

        3.1.2. To conduct base line survey on household health expenditure, incidence of the diseases, community health knowledge and practices and end line survey on impact of training

        3.1.3. To develop a taluka level Pharmacopeia for Primary Healthcare conditions, designed for healthcare providers, based on local plant resources and traditional community health practices, revalidated by Ayurveda knowledge system.

3.2. Related to Community Application

3.2.1. To develop Training of Trainers (ToT) modules for health care providers to train households on home remedies for selected primary healthcare conditions.

3.2.2. To develop Training of Trainers (ToT) module for high school teachers on botany, environment education and medicinal plants.

3.2.3. To develop specific e-modules on environmental education and primary health care herbal solutions for selected 30 conditions in Kannada and English for health care providers.

3.2.4. To Conduct the training programs and disseminate the knowledge through community radio broadcasting programs for raising awareness in the taluka on primary health conditions, medicinal plants and environment.

3.2.5. The role of TDU is to focus on the overall project and to work on the GIS enabled Medicinal plants Database and Taluka level herbal pharmacopeia through field survey, and literature review in collaboration with KSRSAC and SVYM and develop GIS enabled database and preparation of the taluka level herbal pharmacopeia. It is also designing TOT modules design for Environment education and Primary Health education and Promotion, Preparation of Guideline notes on species which are threatened, species in commercial trade and regulated use of data sharing based on differential layers of information for public use and government use.

3.2.6. As a GIS partner of this project, KSRSAC would provide higher images (like Cartosat or Digital Globe) 1:10k scales for plot sampling and also share spatial layers and base maps with TDU. It will also extend its support in design of the schema for geospatial database and provide the K-GIS spatial framework and jointly host the medicinal plant database of HD Kote.

3.2.7. As a delivery partner, SVYM develop long term training program for dissemination of community health and environment education modules both for institutional and community based health providers and for high school teachers in H. D. Kote taluka and execute baseline and end line health surveys to periodically evaluate impact of health and environment education programs. It also organizes workshops for medical and paramedical health providers and broadcast the traditional health information through community radio to organize awareness about events in the taluka.

3.2.8. He also reiterated that the proposal seeks to add additional community based tier to the health system viz., the households and the community supported folk

healers. The intention is to deepen the health security of the community and make it less dependent on institutional health services for primary healthcare.

4.   Dr. Kasturirangan enquired about the criterion of selection of H.D. Kote for the project.

5.   Sri. Darshan Shankar responded that the H.D. Kote rich in forest and other natural resources, is among the most backward talukas in the State. H. D. Kote is also one of the few tribal dominated area which is also having wide range of traditional and indigenous knowledge and practices especially regarding the health conditions and health practices among indigenous people. The rationale for selection of H.D. Kote was well appreciated by Dr. Kasturirangan and Mr. Tiwari.

6.   Mr. Tiwari enquired about the rationale for GIS platform to be used in the project

7.   Dr. Ved replied that the acquisition of basic data is fundamental to manage and conserve certain forest ecosystems. Once data are entered in a GIS, maps can be displayed showing general species distributions and the Applications of GIS in Forestry. As the data are updated over time, changes in these distributions can be recorded and analyzed. More customized maps can be created to answer specific resource questions, such as a map that displays the locations of only stressed or diseased species, creating maps that show the spatial relationships between harvestable tree species etc. GIS technologies have greatly increased the amount and quality of information that is available for landscape-scale ecology. This information includes abundance maps for individual tree species, detailed forest/plant assessments.

8.   Mr. Tiwari sought elaboration on the healthcare providers – is the proposal is referring to the health professionals/health care practitioners and also enquired about regulatory issues.

9.   Mr. Darshan Shankar said that the Karnataka Biodiversity Board (KBB) and Karnataka State Medicinal Plants Authority (KaMPA) are the nodal agencies wherein KaMPA is looking after conservation, utilization and development of the medicinal plants sector in the state and KBB is fostering the institutional setup for documentation, sustainable use and development of the rich biodiversity of the State. In terms of TDU project, Dept. of HFW or AYUSH could be nodal agency where the information access and sharing mechanism between KBB, KaMPA could be set up. He also elucidated that the project is envisaging on both institutional and non-institutional health care providers. Non-Institutional health providers are households and folk healers as the project is to educate households to effectively manage primary healthcare conditions prevalent in the taluka and folk healers are actively involving themselves in promotion of folk medicine and practices. Institutional Health providers consist of ASHA workers will be inducted to the training sessions and it also takes into account of Govt. as well as Private health systems into consideration.

10. Mr. Gogi shared that Dept. of AYUSH implemented two projects of KJA during it's I phase – Dravya Kosha and Swastta Vritta. Dravya Kosha was mainly to develop regional pharmacopeia which was put to community use and also used in educational institutions. The project resulted in empowering thousands of rural households of Shivamogga and Tumkuru by education them on self health methods for enhancing their own primary healthcare problems. The project has come out with the publications consists of region specific user guides for home remedies based on ecosystem specific plant resources. Basically the project will identify local traditional healers and dais and interview them. The experiences on diagnosis of health condition and treatment followed to cure or prevent health conditions will be documented. Traditional use of herbal medicines refers to the long historical use of these medicines. Folk healers/community healers have contributed to a broad spectrum of health care needs that include disease prevention, management and treatment. He agreed that the TDU project will be extensively useful as the knowledge could reach in the hands of these folk healers. But he cautioned that information from these healers must not become 'incomplete' or even get distorted.

11. Mr. Gogi said that the Geospatial distribution of the medicinal plants is known to traditional healers of the area. GIS enabled mapping may not e relevant from the view point of local healers. But it may be useful in population estimation of such plants from the view point of conservation at landscape level. Whether present programme has such mandate needs to be understood. A traditional healer or folk healer is an expert in healing one or two ailments. Documenting his knowledge and calibrating the operating procedure with the Medicinal Science of Ayurveda and enriching Ayurveda by inclusion of such practices if they are not part of it is desirable. If the practice is some way detrimental to human health the practice needs o be given up. Training of non-institutional healer/health providers to change their wrong practices and to include 30 commonly prevailing deceases and remedies is fraught with possibility of creating legalized practitioner of home remedies who was otherwise an unsound practitioner for a particular disease or probably a healer of two or three diseases. This is against the provisions of Karnataka Ayurveda and Unani Board Act. The Institutional health care workers have to be an extended arm of the well qualified practitioner for H.D. Kote. There is only one Ayurveda Physician whose services are available for three days a week due to additional responsibilities in an adjoining taluka. Institutional health care providers of Health Department cannot be supervised by AYUSH Department. Hence, this project cannot be internalized by AYUSH Department for implementation and monitoring. If the institutional health care providers cannot be supervised by the qualified physicians of the Department it will be an initiative in isolation of AYUSH structure. Training and certification of Non-institutional healthcare providers (traditional healers) irrespective of their basic knowledge and trying to make them proficient in treating 30 commonly prevailing disease is fraught with regularizing quackery and further authenticate and legalize them.

11.1. Training and accreditation of health care providers both institutional and non-institutional should not result in separate practicing cadre without support of legal provisions.

11.2. AYUSH Department does not have wherewithal to have an extended arm of institutional and non-institutional health care providers due to lack of financial, infrastructural and human resources.

12. Mr. Darshan Shankar expressed that there are number of factors that have been identified as responsible for the widespread use of traditional medicine and there is concern for assessing and evaluation of traditional medicine as the folk healers does not come under the health system and they are not licensed practitioners. Diversity, collective ownership guided by customary laws, adaptability to changing contexts and oral transmission are some of the prominent characteristics of this knowledge. Unlike common understanding, it is highly dynamic thus contemporary and not pertaining to a period in time. While knowledge generation and transmission might vary with cultures, there are several similarities in the value systems and modes of transmission of knowledge among communities. While most are not learned in text-based classical knowledge, they are immensely skilled in therapies using regional medicinal plants.

13. Mr. Tiwari expressed that the unregulated or inappropriate use of traditional medicines and practices can have negative or dangerous effects. The major challenge in the development and implementation of the regulation of traditional and herbal medicines related to regulatory issues, assessment of safety and efficacy. A single medicinal plant may be defined as a food, a dietary supplement or a herbal medicine depending on the regulations applying to foods and medicines which makes difficult to define the concept of herbal medicines. Requirements and methods for research and evaluation of the safety and efficacy of herbal medicines are more complex than those for conventional pharmaceuticals. A single medicinal plant may contain hundreds of natural constituents, and a mixed herbal medicinal product may contain several times that number. If every active ingredient were to be isolated from every herb, the time and resources required would be tremendous.

14. Mr. Darshan Shankar expressed that the issue which was raised by Mr. Tiwari could be resolved. The AYUSH as a health care method is suffering because of importance attached to Allopathic health care and lack of adoption of scientific method in AYUSH in treatments. He said that the Policy Framework for Integrative Health Care to be developed which can be added into the proposal as Integrative healthcare utilizes the best therapeutic options from conventional Western medicine, as well as complementary therapies and traditional practices.

15. Mr. Tiwari expressed that one of the most striking differences between traditional and modern medicine is the legal protection given to knowledge. Traditional practitioners have historically shared their knowledge and experience freely - defining 'open-access' before the term even existed. Modern medicine, on the other hand, has stringent intellectual property laws and a highly evolved patenting system used to protect knowledge about drugs or medical techniques. Beyond differences in indigenous and modern knowledge systems, efforts to make traditional medicines mainstream also have to cope with significant differences in regulation. The lack of

regulation means there are just as many fake remedies and false practitioners as there are genuine treatments. And that can have fatal results. The possible information obtaining by these healers must be validated and the date must be obtained to the Department and it should be made available to the public domain as the proposal declared that the information will be obtained in the websites of KSRSAC and TDU. Mr. Darshan Shankar expressed that the public folk knowledge of medicinal plants will not be shared in the public domain as there are many issues involved.

16. Mr. Gogi concerning with Mr. Tiwari stated, that few scientific tests could evaluate traditional medicine products and practices. Quality tests and production standards tend to be less rigorous or controlled and in many cases, practitioners may not be certified or licensed. Some researchers believe that putting a drug that has been tried and tested by thousands of people for decades or centuries through the same hoops as a brand new chemical is not appropriate. So, before a traditional medicine can be imported into a conventional framework of pharmaceuticals, it will require reassessment as there is a chance of misusing by folk practitioners as they will come under the purview of any health system.

17. Dr. Kasturirangan strongly opined that Karnataka should pioneer in bringing this synergy between Traditional Indian Health Care System and Allopathic Health Care System where both will be complementing and supplementing in ensuring affordable and accessible health care facilities to the community and benefit the society in large. In this process as separate cadre could get created and this will enable sustainable Universal Health Care in rural areas. In this way Karnataka can be a leader and this pilot can pave for framing National level policy in achieving the Universal Health Care.

18. Dr. Kasturirangan opined that incorporating traditional knowledge into modern healthcare and ensuring it meets modern safety and efficacy standards is must. There is a rising concern that a growing traditional medicine threatens biodiversity through overharvesting of medicinal plants or increased use of endangered species. Beyond the sustainability of natural resources, marrying traditional and modern medicine faces numerous challenges that stem from key differences in how each is practiced, evaluated and managed. He suggested to that Dr. Valiathan and Dr. Bhushan Patwardhan to review the framework on Integrative Health care suggested by TDU and to review the project progress on continual basis. He also suggested that the KJA must look at the governing structure of the whole project.

19. Pertaining to the Budget, Mr. Darshan Shankar said that the budget of the project is realistic. It has been very transparently drawn up with complete details of tasks, unit costs etc. The budget includes support for the design, development and dissemination of educational modules on primary healthcare for rural households and environmental education for teachers in schools and colleges of the taluka. In the light of the above, he requested to the meeting to consider the budget where in Dept. of AYUSH could be considered nodal agency for the project.

20.   Mr. Gogi shared that the budget earmarked to AYUSH department is very minimal and Dept. of AYUSH is facing insufficient of funds to meet its objectives. So, he requested Mr. Tiwari to look into any alternative mechanism.

21.   Mr. Tiwari said that the budgetary provision for the project could be made available under the National Health Mission and it could be treated as one of innovative projects.

22.   Ms. Sowjanya responded that she will look into the project and budgetary aspects of the proposal and she also said she will come out with the working modalities of the project and will be discussed with the Principal Secretary, HFW.

23.   Based on the discussions and above observations, Principal Secretary, HFW mentioned that the proposal is innovative and that the department and ASYUH would support and take up the proposal. He suggested following points for inclusion by TDU – these points were endorsed by Dr. Kasturirangan:

    23.1.   Selection of H.D. Kote for the project has to be specifically spelled out in the proposal.

    23.2.   Validation and Assessment of traditional knowledge must be considered by the project as the information from the healers on traditional practices may be incomplete and distorted. Most of the community practitioners are not learned in text-based classical knowledge; they are immensely skilled in therapies using regional medicinal plants. It was suggested TDU to not to consider the erroneous practices into the project.

    23.3.   Regulatory Mechanisms to be considered in the project as there is a major challenge in the development and implementation of the regulation of traditional and herbal medicines related to regulatory issues, assessment of safety and efficacy. Requirements and methods for research and evaluation of the safety and efficacy of herbal medicines to be considered.

    23.4.   Development of a Policy Framework for Integrative Health Care to provide holistic primary health services.

    23.5.   The possible information obtaining by these healers must be validated and the date must be obtained to the Department and it should be made available to the public domain as the proposal declared that the information will be obtained in the websites of KSRSAC and TDU.

    23.6.   Dr. Valiathan and Dr. Bhushan Patwardhan to review the framework on Integrative Health care suggested by TDU and to review the project progress.

24.   In conclusion, the meeting suggested that the above suggested/recommended points may be considered by TDU and a revised/modified proposal could be submitted to KJA and Dept. of HFW and AYSUH. KJA, in turn, would submit a formal recommendation on the proposal to Dept. of HFW and ASYUH of GoK.

25.   Mr. Tiwari thanked Chairman, KJA for a very intense work on the project. Dr. Kasturirangan in turn thanked Mr. Tiwari and his colleagues for their inputs and also for providing valuable suggestions. He also thanked Mr. Darshan Shankar and Mr. Ved for providing all details.

26.   The minutes of the meeting issues with the concurrence of Principal Secretary, HFW, Director, AYUSH and on the approval of the Member-Secretary, KJA and finally by Chairman, KJA.

(Jayashri.M)
RA, KJA

Copy to:
Invitees of the Meeting

Copy for kind information to:
1.   Chairman, KJA-TC
2.   Chairman, KJA-MC