

**Smt. S. M. Panchal Science College, Talod-383 215,  
District: Sabarkantha, Gujarat**

Name of the Scheme: **Financial Assistance to College Teachers for undertaking  
Minor Research Projects**

UGC XI<sup>th</sup> Plan :: Year: 2012-13 to 2014-15

**ANNUAL REPORT OF THE WORK DONE ON  
MINOR RESEARCH PROJECT**

1. Project report : **ANNUAL REPORT**
2. UGC Reference No. : **F. No. 47-1144/09(WRO); 21/8/2012**
3. Period of report from : **1<sup>st</sup> June 2013 to 31<sup>st</sup> May 2014**
4. Title of research project : **Study on Traditional Medicinal Plants  
used by tribe-Kathodi in Aravalli  
ranges of Dist. Sabarkantha**
5. (a) Name of the Principal Investigator : **Dr. Bhasker L. Punjani**  
(b) Department and College where work has progressed: **Botany Department,  
Smt. S. M. Panchal Science College,  
Talod-383215; District: Sabarkantha, Gujarat**
6. Effective date of starting of the project: **1<sup>st</sup> June, 2013**
7. Grant approved and expenditure incurred during the period of the report :
  - a. Total amount approved Rs. : **1,00,000/- (Rupees One lakh ONLY)**
  - b. Total amount received Rs. : **75,000/= (Rupees Seventy Five thousand ONLY)**
  - b. Total expenditure Rs. : **60,120/= (Rupees Sixty thousand one hundred twenty ONLY)**
8. Report of the work done :
  - i. Brief objective of the project: **To document Traditional knowledge  
on Medicinal Plants used by tribe Kathodi of Dist.  
Sabarkantha, Gujarat**
  - ii. Work done so far and results achieved and publications, if any, resulting from the work: **NA**
  - iii. Has the progress been according to original plan of work and towards achieving the objective if  
not, state reasons: **Yes**
  - iv. Please indicate the difficulties, if any, experienced in implementing the project: **Nil**
  - v. If project has not been completed, please indicate the approximate time by which it is likely to  
be completed: **Not completed, will be completed within one year i.e., on 31<sup>st</sup> May, 2015**

- vi. A summary of the work done for the period **1<sup>st</sup> June, 2013 to 31<sup>st</sup> May, 2014** may please be sent to the Commission on a separate sheet: **Annual report attached herewith.**
- vii. If the project has been completed, please enclose a summary of the findings of the study. Two bound copies of the annual report of work done may also be sent to the Commission. **Not completed, when completed will send two copies of the final report**
- viii. Any other information, which would help in evaluation of work done on the project. At the completion of the project, the first report should indicate the output; such as (a) Manpower trained (b) Ph. D. awarded (c) Publication of results (d) other impact, if any. **Nil**

**Principal**

**Principal Investigator**

## SUMMARY OF THE WORK DONE ON MINOR RESEARCH PROJECT DURING ONE YEAR (From Date: 01/06/2013 to 31/05/2014)

The Kathodi is a primitive Scheduled Tribe in Gujarat state. The name '**Kathodi**' is derived from the word 'Katho', i.e. catechu, and Kathodi are the makers of catechu. **Katho** is the thickened material extracted from the wood of plant Kher (*Acacia catechu*). The collection of Non-Wood Minor Forest produces from the forests help the Kathodi to generate small income for the family and they do feed on these produces as forests considered as a vital livelihood support system. They utilized forest resources for collection of food, medicine, fodder and grass, fuel wood, etc. to fulfill their daily needs and they also play a part in conservation of such wild plant species.

According to Kathodi informants plant derived treatments are safe, effective and affordable traditional medicines. The study revealed that the Kathodi tribe still relies on local flora to treat human as well as veterinary diseases. During the study in the Kathodi dominated villages/areas such as Vandhol, Aantarsuba, Bandhana, Badarkha in Vijaynagar Taluka of district Sabarkantha, Gujarat area **38** plant species recorded from several Kathodi informants.

Their food requirements are fulfilled from wild species available in the forests. They dig out underground parts like roots/bulbs/rhizomes/corms from:

- ❖ Kando-*Dioscoria bulbifera*, Huvary-*D. pentaphylla*,
- ❖ Dholi musali-*Chlorophytum borivillianum*, Satavari-*Asparagus racemosus*.

They collect wild fruits and seeds such as

- Baheda-*Terminalia bellerica*, Aamla-*Emblica officinalis*,
- Jambu (*Sizygium jambolana*), Karamda (*Carissa carandas*),
- Bor (*Zizyphus* sps.), Karagdi (*Celastrus paniculata*),
- Mahudo (*Madhuca indica*), Karanj (*Derris indica*), etc.

They also collect gums/resins from the forests such as:

- Saledi (*Boswellia serrata*), Dhav (*Anogeisus latifolia*),
- Khakhro (*Butea monosperma*), Golaro (*Lannea coromandelica*), etc.

During interaction it was revealed that they use different plant species for the treatment of single disease to prevent over exploitation of a particular plant species. They keep seeds/underground parts for the natural regeneration and thus avoid over exploitation of the plant species. They search new areas/localities in the forests for use of plants.

According to the World Health Organization (WHO), 80% of people still rely on plant-based traditional medicines for primary health care. The efforts made to document the healing practices used by Kathodi community with details of materials, methods and doses & duration. The tribe-Kathodi people of Aravalli ranges have a vast wealth of plants, which are rich sources of medicinal compounds. The recorded plant species are recommended for further phytochemical / pharmacological investigation and nutritional analysis, which might result in discovery of new drug molecules for human welfare.

**Smt. S. M. Panchal Science College, Talod-383 215,  
District: Sabarkantha, Gujarat**  
**Final Report of the work done on the Minor Research Project**

1. TITLE OF THE PROJECT: *Study on Traditional Medicinal Plants used by tribe-Kathodi in Aravalli ranges of Dist.: Sabarkantha*
2. PRINCIPAL INVESTIGATOR: **Dr. Bhasker L. Punjani**
3. INSTITUTION: **Smt. S. M. Panchal Science College, Talod-383 215, Dist.: Sabarkantha, Gujarat.**
4. UGC APPROVAL LETTER NO. **F. No. 47-1144/09 (WRO); Date: 21<sup>st</sup> August 2012**  
AND DATE:
5. DATE OF IMPLEMENTATION: **1<sup>st</sup> June-2013**
6. DATE OF COMPLETION: **31<sup>st</sup> May-2015**
7. TENURE OF THE PROJECT: **Two years**
8. TOTAL GRANT ALLOCATED: **Rs. 1,00,000/= (Rs. One lakh rupees only)**
9. TOTAL GRANT RECEIVED: **Rs. 75,000/= (Rs. Seventy Five Thousand only)**
10. FINAL EXPENDITURE: **Rs. 95,737/= (Rs. Ninety Five Thousand Seven Hundred Thirty Seven only)**
11. OBJECTIVES OF THE PROJECT:
  1. To document the forest resources used by the tribe.
  2. To analyze patterns of Kathodi-Forest interaction, in particular on medicinal plants.
  3. To show dependency on forest produces for their food requirements.
  4. To understand constructive attitudes on sustainable use of forest wealth.
  5. To search medicinal plants used and measures to prevent over exploitation.
12. WHETHER OBJECTIVES WERE ACHIEVED: **Yes**
  1. The Kathodi is a primitive Scheduled Tribe in Gujarat state. The name '**Kathodi**' is derived from the word 'Katho', i.e. catechu, and Kathodi are the makers of catechu. **Katho** is the thickened material extracted from the wood of plant Kher (*Acacia catechu*). The collection of Non-Wood Minor Forest produces from the forests help the Kathodi to generate small income for the family and they do feed on these produces as forests considered as a vital livelihood support system. They utilized forest resources for collection of food, medicine, fodder and grass, fuel wood, etc. to fulfill their daily needs and they also play a part in conservation of such wild plant species.
  2. We know 25% of modern medicines are made from plants first used traditionally. The discovery of cardiac drug digoxin derived from the plant Foxglove (*Digitalis purpurea*), natural uterine stimulant from Ergot (*Claviceps purpurea*), the analgesic morphine as a CNS stimulant from Opium (*Papaver somniferum*), strychnine from Zerkochala (*Strychnox nuxvomica*), quinine for

malaria fever from Sincona (*Cinchona officinalis*), ephedrine from *Ephedra* sps. for curing asthma/respiratory disorders, Artemisine from *Artemisia annua* effective against resistant malaria, etc. are plant derived drugs. It is the herbal phytotherapy that has seen the biggest interest in the modern era. About 85% of Japanese doctors prescribe herbal medicines and two-thirds of the Indian populations use Ayurvedic medicines. The Kathodis have their own indigenous/traditional phytotherapy practices, knowledge and beliefs incorporating mostly plant-based medicines used singly or in combination to treat and prevent ailments and to maintain their well-being. According to Kathodi informants plant derived treatments are safe, effective and affordable traditional medicines. The study revealed that the Kathodi tribe still relies on local flora to treat human as well as veterinary diseases. During the study in the Kathodi dominated villages/areas such as Vandhol, Aantarsuba, Bandhana, Badarkha in Vijaynagar Taluka of district Sabarkantha, Gujarat area 67 plant species of 44 Angiosperm families recorded from several Kathodi informants.

3. Not only their dependency on local flora for medicines but also their food requirements are fulfilled from wild species available in the forests. They dig out underground parts like roots/bulbs/rhizomes/corms from Kando-*Dioscoria bulbifera*, Huvary-*D. pentaphylla*, Dholi musali-*Chlorophytum borivillianum*, Satavari-*Asparagus racemosus*, they collect wild fruits and seeds such as Jambu (*Syzgium jambolana*), Karamda (*Carissa carandas*), Bor (*Zizyphus* sps.), Karagdi (*Celastrus paniculata*), Mahudo (*Madhuca indica*), Karanj (*Derris indica*), etc. They also collect gums/resins such as Saledi (*Boswellia serrata*), Dhav (*Anogeissus latifolia*), Khakhro (*Butea monosperma*), Golaro (*Lannea coromandelica*), etc. from the forests. Even in this modern era they heavily dependent on forest produces to fulfill their daily food requirements and to generate economy. The important NTFP collected by the tribe Kathodi include fruits of Baheda-*Terminalia bellerica* and Aamla-*Emblica officinalis* which are available in plenty in the forests and they have good demand in the local market. Flowers and fruits/seeds of Mahudo-*Madhuca indica*, ripe fruits of Karamda-*Carissa carandus*, gums/resins of Saledi-*Boswellia serrata*, Dhav/Dhavdo-*Anogeissus latifolia*, Wood of Kher-*Acacia catechu*, Gums of Deshi baval-*Acacia indica*, Culms of Bamboo/Vans-*Bambusa arundinacea*/ *Dendrocalamus strictus*, Khakhra leaves and gum-*Butea monosperma*, Gum of Limdo-*Azadirachta indica*, Seeds of Karanj-*Derris indica* and fruits of Aamli-*Tamarindus indica*, etc.
4. During interaction with the Kathodi informants in the fields/forests we came to know their positive attitude towards the sustainable use of forest wealth. They only collect plant parts of their use; unnecessary harm to the plant/other plant parts was avoided during collection. For example, when they dig out any underground part(s) for their need they collect required amount, the rest of the part kept as it is, and so the plant can be saved to grow further in the next season. They collect leaves without damaging big branches. Likewise, they collect only seeds or fruits from the plants and not damaging rest of the plants. They know their dependency on forests and sustainable use of the plant species. Of course, other forest dwellers damage whole plant and thus number of certain plant species are becoming very less in the forests. They are worried about the gradual lose of quality and quantity of the forests in terms of number of plant species.
5. During interaction it was revealed that they use different plant species for the treatment of single disease to prevent over exploitation of a particular plant species. They keep seeds/underground

parts for the natural regeneration and thus avoid over exploitation of the plant species. They search new areas/localities in the forests for use of plants.

### 13. ACHIEVEMENTS FROM THE PROJECT:

The Vijaynagar taluka is included in Sabarkantha district of Gujarat. The hills of Aravalli Mountain comprise the boundaries of this region with dry deciduous forest type. The main tribe in the area is Bhils.

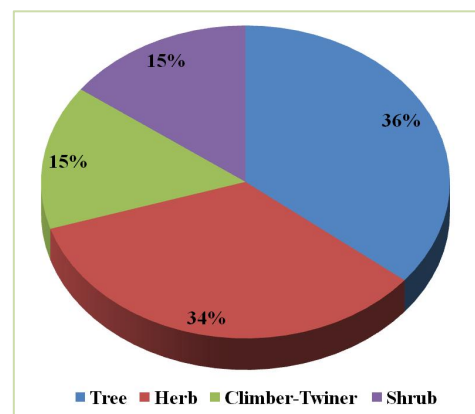
The Kathodi tribe is restricted only in four villages i.e., Antarsuba, Bandhana, Vandhol and Badarkha of Vijaynagar taluka. Kathodis are yet backward and they depend totally on the forests and forest produces for day-to-day requirements. They collect minor forest produces such as honey, gums i.e., 'Kher' (*Acacia chundra*), 'Dhav' (*Anogeissus latifolia*), 'Kadayo' (*Sterculia urens*) etc.; fruits i.e., 'Aritha' (*Sapindus emarginatus*), 'Amla' (*Emblica officinalis*), 'Dolo' (*Madhuca indica*) and 'Baheda' (*Terminalia bellirica*); various tubers i.e., 'Dholi Musli' (*Chlorophytum borivillianum*), 'Satavari' (*Asparagus racemosus*) etc. They sell out these produces at local shop for economic returns. They treat various ailments with plant remedies on the basis of their rich knowledge about the plant species found in forests.

Medicinal plants are inseparable from local livelihoods because they have long been collected, consumed, and managed through local customs and knowledge. Management of traditional therapies is urged, because the therapies are empirically and knowledge based, often culturally inherited and important to pharmacology and local livelihoods. However, traditional therapies are currently being eroded due to changing lifestyles, perceptions, social transformations, and increased literacy rate.

Within the study area, medicinal plants were the main ingredients of traditional therapies, and they were considered a main lifeline and frequently were the first choice. These species possess potential for pharmacology. The study recorded the medicinal uses of 67 plant species from 12 informants, which were distributed among 63 genera and 44 Angiosperm families.

### 14. SUMMARY OF THE FINDINGS:

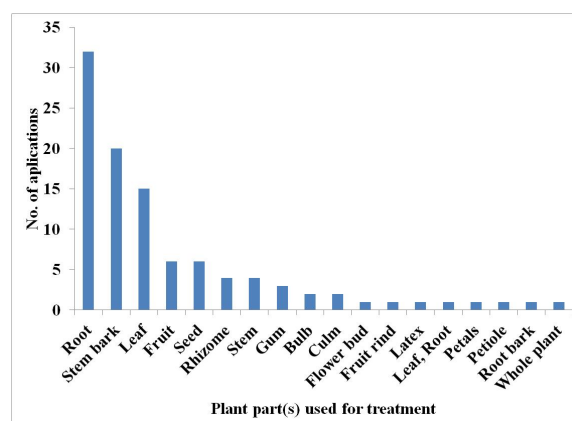
Out of recorded total 67 plant species, the habit or life-forms includes 24 trees (36%), 23 herbs (34%), 10 shrubs (15%), and 10 twiners & climbers (15%). Of these species 85% belong to Dicots and remaining 15% Monocots. A total of 49 different ailments were cured using 67 Angiosperm plant species. Maximum 9 applications were recorded for snakebite, followed by 6 applications each for cough & cold and scorpion sting. It is interesting to note that for the treatment of each of the diseases like cough & cold as well as snakebite six plant species were used



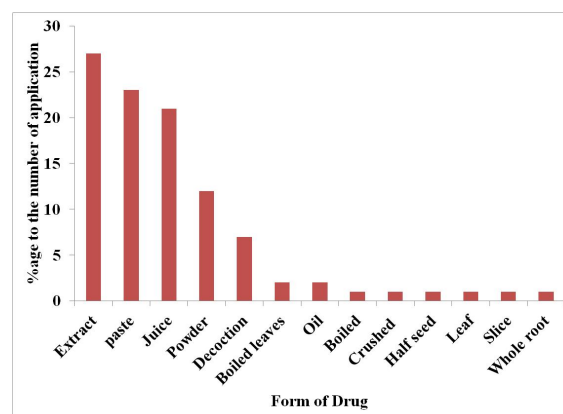
whereas for each of the diseases such as Diarrhoea, piles and scorpion sting five plant species were used.

The study recorded the medicinal uses of 67 plant species from 12 informants, which were distributed among 63 genera and 44 Angiosperm families. The families Fabaceae, Liliaceae, Caesalpiniaceae and Capparaceae, and plant species *Tridax procumbens*, *Aristolochia indica*, *Embelica officinalis*, *Butea monosperma*, *Wrightia tinctoria*, *Tecomella undulata*, *Enicostema hyssopifolium*, *Asparagus racemosus*, *Cocculus hirsutus*, *Tinospora cordifolia*, and *Costus speciosus* were significant sources of ingredients for folk herbal remedies. The use of plants for treatment of 49 ailments was recorded. The Snake bite was frequent and its treatment with locally available six medicinal plants such as *Aristolochia indica* (Root), *Corallocarpus conocarpus* (Root), *Dendrocalamus strictus* (Culm), *Moringa oleifera* (Gum), *Tinospora cordifolia* (Stem), and *Wrightia tinctoria* (Stem bark/Root). The Cough and Cold was treated using six different plants such as *Allium sativum* (Bulb), *Capsicum annuum* (Fruit), *Cuminum cyminum* (Seed), *Ocimum canum* (Leaf), *Piper nigrum* (Fruit) and *Syzigium aromaticum* (Flower bud). The Scorpion sting was treated using five different plants such as *Balanites aegyptiaca* (Stem bark), *Boerhavia diffusa* (Root), *Butea monosperma* (Seed), *Hemidesmus indicus* (Root) and *Strychnos potatorum* (Seed).

Plant parts used for 102 ethnomedicinal preparations/applications were root, stem bark, leaf, fruit, seed, rhizome, stem, gum, bulb, culm, flower bud, fruit rind, latex, petals, petiole, root bark, and whole plant (panchang). The most frequently utilized plant parts were root in 32 applications, stem bark in 20 and leaf in 15 applications, followed by fruit and seed in 6 applications. The most frequently utilized plant parts were roots of 24 species, followed by stem bark of 15 species, leaf of 12 species, and fruit and seed of 6 species. Preparation methods/form of drug for therapies included extract, juice, and decoction, etc. Plant paste, powder, boiled leaf, and oil were also applied. Plant extract (27%) was most commonly used, followed by paste (23%), juice (21%), powder (12%), and decoction (7%). The mode of administration includes highest internal (64%) followed by external (36%).



It is interesting to note that only single species *Tridax procumbens* leaves are used in the treatment of many diseases like, wound healing, conjunctivitis, eczema and ulcers. The plant Khakhro i.e., *Butea monosperma* used in the treatment of various diseases such as burning urination (petiole), constipation (gum), diarrhoea (gum), and scorpion sting (seed). Thus, these species possessed potential for pharmacology.



Folklore medicine i.e., the *Kathodi* phytotherapy system is commonly found in the study area. The presence and maintenance of this traditional therapy is due to eco-friendly, free

of cost, their belief in its effectiveness and without side effects. Interest in traditional phytotherapy has maintained over the recent years in this community. However, traditional knowledge on plants and the plants for folk therapy are gradually being depleted/ endangered due to effects of modern lifestyles, social transformations, and increased literacy rate in the community.

15. CONTRIBUTION TO THE SOCIETY:

According to the World Health Organization (WHO), 80% of people still rely on plant-based traditional medicines for primary health care.

As the traditional healing practices in Kathodi tribes of district Sabarkantha, Gujarat state was insufficiently documented thus efforts made to document the healing practices used by Kathodi community with details of materials, methods and doses & duration. The tribe-Kathodi people of Aravalli ranges have a vast wealth of plants, which are rich sources of medicinal compounds. Therefore, more concerted efforts are needed for the documentation of all the tribal medicines and their health practices useful in the treatment of various disorders. These recorded ethnomedicinal plants are also require a proper chemical and pharmacological experiments and clinical trials for the development of safe and effective poly-herbal drug formulation. Out of recorded 67 plant species some are recommended for further phytochemical / pharmacological investigation and nutritional analysis, which might result in discovery of new drug molecules for human welfare.

16. WHETHER ANY PH.D. ENROLLED/PRODUCED OUT OF THE PROJECT: **No**

17. NO. OF PUBLICATIONS OUT OF THE PROJECT: **Not published**

**Principal**

**Principal Investigator**