Available online at www.ewijst.org

ISSN: 0975-7112 (Print)
ISSN: 0975-7120 (Online)

Environ. We Int. J. Sci. Tech. 6 (2011) 155-165

Environment & We An International Journal of Science & Technology

Revitalize Traditional Health Care System for Sustainable Development and Medicinal Plants Conservation in Uttarakhand Himalaya

P.C. Phondani[1*], R.K. Maikhuri[2], Vikram S. Negi[1], L.S. Rawat[2], L.S. Kandari[3], Abhay Bahuguna[2], N.S. Bisht[4] and B.P. Kothyari[1]

[1]G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora-263643, Uttarakhand, India

[2] G.B. Pant Institute of Himalayan Environment and Development, Garhwal Unit, Srinagar-246 174, Uttarakhand, India

[3] School of Natural Resources and Environmental Sciences, College of Agriculture and Environmental Sciences, Haramaya University,P.Box # 138, Dire-Dawa, Ethiopia

[4]H.N.B. Garhwal Central University, B.G.R. Campus Pauri (Garhwal), Uttarakhand, India

*Email prakashphondani@gmail.com

Abstract

The traditional communities of the Uttarakhand state in India have a rich health care tradition, which have been in practice for hundreds of years. If proper values are added in the traditional knowledge based health care application of medicinal plants resources, employment opportunities can be created in the Himalayan region. A series of workshops and village level meetings on traditional health care systems were organized between year 2007 to 2010 in Alaknanda catchment and its adjoining areas of Uttarakhand in order to understand the present status and perceptions of traditional herbal practitioners (*Vaidyas*). A total of 240 participants actively participated in the workshop/meetings of which 150 participants were exclusively *Vaidyas*. Forming a strong association of *Vaidyas* for making their system of health care more practical and effective, was one of the major recommendation of the workshop. The aim of the *Vaidyas* association is to revitalize traditional health care system and conserve natural medicinal plant species on which *Vaidyas* system depend for curing ailments.

Keywords: Conservation, Sustainable development, Medicinal plants, Traditional health care system, Himalaya.

Introduction

Traditional herbal remedies have always played a key role in the health care systems, across the world. In India, the native people still exploit a variety of herbal plants for curing various ailments. The preparation and administration of plant based drugs vary from one place to other and one society to other. The knowledge of herbal medicines is gradually perishing, although some of the traditional herbal practitioners (men and women) are still practicing the knowledge of herbal healing systematically and effectively (Maikhuri *et al.*, 1998). Various plant species are frequently used by

the traditional herbal practitioners of the entire Himalayan region for curing various diseases (Kala *et al.*, 2005). Living close to nature, traditional societies have acquired unique knowledge about the use of wild flora and fauna, most of which are unknown to the people who live away from such natural ecosystem as forests (Maikhuri *et al.*, 2000, Negi *et al.*, 2010). Within the span of several generations, the circumstances under which *Vaidyas* or local practitioners of herbal medicine in the Himalayan region treat patients, make herbal medicine and impart knowledge have declined to the grate extend (Maikhuri *et al.*, 1998). Historically, most of the traditional herbal practitioners belonged to a lineage of traditional *Vaidyas* and were taught medicine by their parents or other elder relatives for humanities but the boundaries between healer and householder, herdsman and trader were fluid and shifting. For the purpose of this discussion, we can think of professionalization as the strategies employed by *Vaidyas* to transform and defend their practice, and the attendant medicinal, social and cultural impacts of this process of change (Phondani, 2010). In the case of Himalayan traditional *Vaidyas*, this process of association is playing out in relation to the regional and international conservation agendas, biomedicine and scientific truth, *Vaidyas*, patients and home communities. Similarly, although very little research has been done to prove or disprove the sustainability of traditional health care system, this trope of indigenous knowledge and sustainability is used as both an argument for the preservation of traditional culture and as a need to reform backwards or non-scientific practices (Sienna, 2002).

Recently ethno-medicinal studies have offered immense scope and opportunities for the development of new drugs. Some modern drugs have been derived from folklore and traditional medicines (Phondani *et al.*, 2010a). The revitalization of *Vaidyas* systems of treatment can provide self-reliance in primary health care and can even contribute to the frontiers of medical knowledge. Therefore, protection of their indigenous knowledge, public awareness, empowerment of local medical practices and education are also important for successful implementation of such activities and in raising the rural communities consciousness regarding the importance of indigenous knowledge system related to the use of medicinal plants. The conversion of socio-cultural traditions and indigenous knowledge in to livelihood means and economic opportunities has also the advantage of preserving the rapidly eroding cultural knowledge and practices which are increasingly threatened due to globalization and homogenization of people practices and knowledge. At the dawn of the 21st century, ethnobotanists have identified the loss of medicinal plant diversity and erosion of traditional knowledge of health care system as an issue of major concern. As rural economies open up and markets get globalised, the local institutions, which supported traditional processes of livelihood, are breaking down. Ripples of these changes adversely affect the income, employment and cultural milieu of the traditional societies. In this process the knowledge base that has been accumulated over generations also gets swept away into oblivion. This vanishing stock of knowledge is invaluable in many respects. It not only forms a locally available low input technology but also provides useful information for future technological development. Appropriate interventions in the form of policy inputs, training, awareness creation, documentation etc. can, in most cases, revitalize local traditions and health care systems. Therefore, the present paper is an attempt to highlight the traditional health care system practiced in the remote high altitude areas, categorization of traditional herbal practitioners based on their practices, and the

process of formation role and function of *Vaidyas* association towards revitalization of traditional health care system and conservation of natural medicinal plant species.

Study area and socio-economic profile of the people.

The present study was carried out in Alaknanda catchment and its adjoining areas of Uttarakhand state in India. The catchment of Alaknanda River extends between 29° 58' 34" to 31° 04' 20" N and 78° 34' 31" to 80° 17' 54" E. It narrows down towards west and tapers off at Devprayag making confluence with the river Bhagirathi and forms the holy Ganga. It covers a wide range of climatic conditions under altitudinal variation of 642-7817 m asl. The Alaknanda catchment stretches in four districts of Garhwal region of Uttarakhand viz., Chamoli, Rudraprayag, Pauri and Tehri. The rural settlements are located in the altitudinal limit of 1400 to 3300 m asl. The catchment area is categorized by sparse population, undulating terrain, far-flung small villages difficult to approach, scattered land holdings more so on slopes and agro-pastoral economy, little use of simple technology, inputs and low productivity.

The study area with almost no industrial development and thereby low employment potential stimulate local youth to seek employment away from their homes. The problem of youth moving away gets aggravated in the areas where an inhospitable climate outweighs the sentimental attachment of people with the native land. Agriculture is the primary occupation of the people all through the region but the agricultural land use patterns vary from region to region. The traditional societies of the region have their own culture, tradition and religious beliefs. The major occupations of these societies have been livestock rearing and agriculture.

Materials and Methods

The research methodology include tracing the multiple paths through history, identity, and medical epistemology manifest through *Vaidyas* practices, assessing the impacts of socio-economic and cultural changes and perceptions of medical efficacy among patients and *Vaidyas*. In conducting research among traditional herbal practitioners, we have employed formal and informal interviews, recorded the credibility of local *Vaidyas*, documented case studies of *Vaidyas* system and conducted participant-observation in a number of contexts, from workshops/meetings on traditional health care systems. Besides annual and bi-annual meetings and workshops of the board members of the Paramparik Gramin Chikitsak Sabha (PGCS) has provided an ideal setting in which to work with *Vaidyas* as they think constructively and critically about the forms and goals of their future course of actions and functions. We organized a number of workshops and village level meetings and video recording was also done in different localities of the study area during the year 2007- 2010, in which various stakeholders (local people, traditional herbal practitioners, environmentalists, Ayurvedacharya, medical doctors, scientists, social workers, school teachers and NGOs) were invited to participate and to help in documenting the indigenous knowledge on medicinal plants based treatments and listing of well-known *Vaidyas* of the study area. Perceptions of all categorize of *Vaidyas* about utilization of medicinal plants for curing various types of ailments were also recorded. Traditional herbal practitioners were gathered for discussing different uses of medicinal plants, methods and periods of collection, conservation and management strategies, flow of knowledge and prospects in traditional health care systems, especially in the Uttarakhand Himalaya.

Results and Discussion

Status of traditional health care system in rural areas of Uttarakhand

For millennia, human societies have been depending on plants and plant products for various remedies. In certain areas, these folk medical prescriptions are endemic and have survived through ages from one generation to the next orally. Generally, these systems of medicine depend on old people's experiences. Indigenous systems of medicine are specially conditioned by the cultural heritage and myths. All mythological texts celebrate the central Himalayan region as the land of Gods. The Himalayan people believe that unhappiness of such local Gods is the cause of all diseases. In their medical system they use magico-religious therapies and natural therapies against diseases (Tiwari, 2003).

Magico-religious therapies

Mostly the magico-religious physicians are called Pujari, who are the mystic-priest of a village. The Himalayan rural people use some native medicine but if a person does not recover from an affliction, his/her relatives approach the mystic-priest (Pujari). The Pujari tells them whether the patient is under the spell of an evil spirit or has incurred the anger of the local god, or whether he/she is suffering from some sort of illness. In the latter case, the patient is taken to a village herbal physician for treatment. If the Pujari decides that the patient is under the spell of an evil spirit, he/she recommends some other mystic-priest who, with the help of hymns, drives the spirit away. It is generally believed that the spirit will leave the patient after performing 'puja' (some special ritual) and providing the articles demanded.

Finally the Pujari puts some ash marks on patient's forehead, which is locally called as Bhabhuti. If the Pujari says the patient is under the anger of the local God or deity, he/she recommends a magico-religious ceremony known as _'Jagar'_ to placate the God. Jagar is always held at night in a large room of the patient's house. A crude drum (nagara) and a metallic plate (thali) are played, the Jagaria chants hymns, and the Dangaria (who acts as a mousier for appearance of God) begins to dance. When the dance and the music reach their climax, the patient's household god speaks through the medium of the Dangaria about the cause of his anger and suggests solution accordingly. Everyone has to fulfill the demands of the God because failure to do so may result in serious consequences not only to the patient but also to his family. One may witness such a magico-religious ceremony in any village of the Uttarakhand Himalaya, even among the educated classes and all have faith on this system because large numbers of the patients are cured by it. These medical systems are psycho-somatic in nature and need to be properly investigated.

Natural therapies

The use of plants for treatment in the Himalayan region dates back to prehistoric times. The indigenous knowledge about medicinal plants and therapies was composed verbally and passed orally from generation to generation. Much later, some of this information was systematized in treatise forms like Atharveda, Yajurveda, Charak Samhita, Sushrut Samhita, etc. These systematized systems of knowledge about medicinal plants and therapies are included under Ayurveda-the

Indian Traditional Medicine System. Despite the development of rural health services, rural people still use herbal native medicines to a large extent for curing common ailments like cough, cold, fever, headache, body-ache, constipation, dysentery, burns, cuts, scalds, boils, ulcers, skin diseases and respiratory troubles, etc. The herbal medicines are prescribed by the household women's, elder persons, Pujari, Ojhas (physicians practicing witchcraft.) and traditional herbalists locally known as *Vaidyas*.

Household women

Many household women in the study area use herbal drugs for curing the ordinary ailments of infants and children. The herbal drugs are mostly available to them from their kitchen stock, kitchen garden, village fields and near forest areas of the region.

Elderly persons

In the villages the elderly persons, Pujari, Ojhas, and priests, etc., know quite a few medicinal plants, which grow in their village surroundings. They use these plants by preparing herbal drugs against several ailments. The services provided by these people are entirely free.

Traditional herbalists

Traditional herbalists are professional herbal practitioners. They are mostly less educated but have considerable knowledge of the herbal drugs and their uses. They keep stocks of crude drugs for sale and prescribe these for common ailments. The traditional herbalists either maintain a small shop or a wanderer.

Categorization of *Vaidyas* on the basis of their healing practices

Ayurveda is arguably the oldest medical system in Indian sub-continent. In the evolution of Ayurveda, the Himalayan region has played an important role with restricted habitats of many valuable medicinal plant species (Kala *et al.*, 2004). Therefore, the inhabitants are still dependent on the traditional *Vaidyas* (practitioners of Ayurveda) for treating disease due to isolation and relatively poor access to modern medical facilities in remote and far flag rural areas. Usually, there are two routes to become a *Vaidyas*. One may be trained through Universities and another by knowledgeable traditional *Vaidyas* (Table 1). The traditional *Vaidyas* are those who received therapeutic knowledge either by means of family traditions or by being trained by another *Vaidyas*. Being a family tradition, the herbal knowledge of traditional *Vaidyas* was primarily restricted to a few elders within the family. In Uttarakhand Himalaya there are different categories of traditional *Vaidyas* (Kala, 2005). We have categorized *Vaidyas* in six categories based on their expertise in healing a particular group and nature of diseases (Table 2). The medicinal plants listed and are used in a variety of medicines by different categorize of *Vaidyas* highlighted that such as Common *Vaidyas* use maximum number of plants (34%) followed by Pashu *Vaidyas* (22%), Nadi *Vaidyas* (18%), Vish *Vaidyas* (14%), Haddi *Vaidyas* (9%) and least number of plants used by Pujari *Vaidyas* (3%) for curing ailments (Figure. 1).

Table 1 List of *Vaidyas* specialized in curing a particular disease through traditional health care system in Uttarakhand

S.No.	*Name of* Vaidyas	*Age (years)*	*Sex*	*Education up to class*	*Specialization*	*No. of patient treated (in years)*	*District*
1	*Chandra Ballabha Purohit*	*78*	*M*	*Ayurvedacharya*	*Asthma*	*80 (1978-2010)*	*Chamoli*
2	*Bachi Singh Belwal*	*32*	*M*	*Nil*	*Physician*	*40 (2003-2010)*	*Pauri*
3	*Balwant Singh Rawat*	*63*	*M*	*Vth*	*Nerve specialist*	*108 (1988-2010)*	*Chamoli*
4	*Bichna Devi*	*60*	*F*	*Nil*	*Carbuncle*	*37 (1992-2010)*	*Rudraprayag*
5	*GulabSingh Gajwan*	*61*	*M*	*VIIth*	*Ulcer*	*10 (1990-2010)*	*Rudraprayag*
6	*Jagat Singh Negi*	*57*	*M*	*Nil*	*Child specialist*	*318 (1980-2010)*	*Chamoli*
7	*Jagat Singh Pharswan*	*78*	*M*	*Nil*	*Bone fracture*	*97 (1973-2010)*	*Chamoli*
8	*Kedar Dutt Maiduli*	*69*	*M*	*IInd*	*Diabities*	*200 (1980-2010)*	*Chamoli*
9	*Kedar Singh Danu*	*63*	*M*	*Vth*	*Veterinary*	*221 (1980-2010)*	*Chamoli*
10	*Kuwar Singh Rawat*	*44*	*M*	*Vth*	*Jaundice, Snakebite*	*42, 13 (1993-2010)*	*Tehri*
11	*Narayan Singh Rawat*	*51*	*M*	*Nil*	*Leucorrhea*	*178 (1987-2010)*	*Chamoli*
12	*P. D. Pandey*	*73*	*M*	*Vth*	*Jaundice*	*4000 (1980-2010)*	*Tehri*
13	*Pitamber Dutt Phondani*	*94*	*M*	*Ayurvedacharya*	*Jaundice*	*3300 (1972-2010)*	*Tehri*
14	*Pooran Singh Rawat*	*80*	*M*	*Nil*	*Physician*	*500 (1980-2010)*	*Chamoli*
15	*RadhaKrishna Kimothi*	*89*	*M*	*Ayurvedacharya*	*Leucoderma*	*235 (1965-2010)*	*Rudraprayag*
16	*Ram Krishna Pokhriyal*	*42*	*M*	*Xth*	*Rheumamatism, Leucorrhea*	*240 (1990-2010)*	*Pauri*
17	*Shiv Singh Negi*	*53*	*M*	*VIIIth*	*Rheumamatism, Piles*	*463 (1989-2010)*	*Rudraprayag*
18	*Sitab Singh*	*62*	*M*	*Nil*	*Tongue, Tonsil*	*30 (1982-2010)*	*Chamoli*
19	*Sobti Devi*	*46*	*F*	*Nil*	*Ladies specialist*	*218 (1991-2010)*	*Rudraprayag*
20	*Trilok Singh Negi*	*46*	*M*	*Vth*	*Eye disease*	*38 (1991-2010)*	*Chamoli*
21	*Harinandan Joshi*	*64*	*M*	*VIIIth*	*Kidney stone*	*22 (2000-2010)*	*Champawat*
22	*Liladhar Joshi*	*57*	*M*	*Vth*	*Anti cancer*	*07 (1999-2010)*	*Champawat*

The pattern in age classes of traditional *Vaidyas* indicates a decline in the number of *Vaidyas* across generations. The decline in tradition is also due to decline in number of *Vaidyas* coming forward to adopt this traditional healing practice professionally. A series of workshop and meetings were organized and discussion was held with both old and young *Vaidyas* listing in this text (Table 2) indicated that the attitude of the younger generation is less supportive towards continuing the *Vaidyas* tradition because they realized that there is a less income opportunity in this tradition. Although cultural precepts dictated that *Vaidyas* do not charge directly for services, payments were negotiated in culturally, economically as well as various other social means appropriate in the form of cereals, pulses, vegetables etc. Formerly, taking fees for any kind of treatment was highly discouraged (Nautiyal et al., 2005). Realizing that health care is an essential need it was believed that if a fee was charged that the poor might be deprived from the treatment. The low cost of herbal medicine and its unlikely income is one of the reasons that younger people are discouraged from carrying forward the *Vaidyas* profession. On the other hand, the cost of allopathic medicine is twenty times higher than the cost of herbal medicine so there is a public demand for services (Samal *et al.,* 2004).

Table 2- Categorization of traditional herbal practitioners (*Vaidyas*) based on their healing expertise for curing different types of ailments

S. No.	Categorized of *Vaidyas*	Healing expertise
1.	Nadi *Vaidyas*	Nadi *Vaidyas* have an expert to identify the diseases on the basis of nerves.
2.	Vish *Vaidyas*	Vish *Vaidyas* have an expertise in treating the poisonous diseases.
3.	Haddi *Vaidyas*	Haddi *Vaidyas* are the bone settlers and treat bone related disorders.
4.	Pashu *Vaidyas*	Pashu *Vaidyas* are the experts in treating veterinary diseases.
5.	Pujari/Mantra *Vaidyas*	Pujari/Mantra *Vaidyas* are treated diseases through magico-therapies.
6.	Common *Vaidyas*	Common *Vaidyas* treat all kinds of common diseases.

Vaidyas Association in Uttarakhand

There are diverse beliefs and practices among various traditional practitioners, but the aim of all is to cure ailments and maintain traditional health care system (Nautiyal *et al.,* 2005). Geographical factors have not only contributed to regional variations in such traditional therapeutic practices, but also have prevented close contacts among the various traditional herbal healers in different parts of the country. Human societies living in the remote and high altitude areas have remained isolated due to poor accessibility and harsh climatic and geographical conditions. Over the centuries, this isolation has shaped their unique art, culture and traditions of therapy. However during recent past due to changing socio-economic and cultural scenario,

development infrastructure of modern health care centres and lack of interest of the younger generation in indigenous practices of curing disease is gradually declining from the Himalayan region (Kala, 2005; Kala *et al*, 2005).

In view of this, to maintain and strengthen traditional health care system was realized by a team of *Vaidyas* and therefore they took keen interest to develop an association of *Vaidyas* called *Paramparik Gramin Chikitsak Sabha* (PGCS) in Uttarakhand which is reservoir of traditional system of medicines practiced by the traditional herbal practitioners (*Vaidyas*). In this regards a series of workshops and meetings were organized in various places over a period of three years involving more than 240 traditional *Vaidyas*, academicians, medical doctors, scientists, forest officers, environmentalists and NGOs of the Uttarakhand Himalaya (Photo plate 1). A proposal from every participants come to form an association of the *Vaidyas* so as to keep and maintain their system of health care alive and revitalize it by fostering educational and professional alliances between local *Vaidyas* and Ayurvedic system of medicines exist in the region. The name of the association was coined Paramparik Gramin Chikitsak Sabha (PGCS) and was formed and registered in 2009 under the registration act 21, 1860 from govt. registration office Gopeshwer, Chamoli, Uttarakhand by a group of traditional *Vaidyas*.

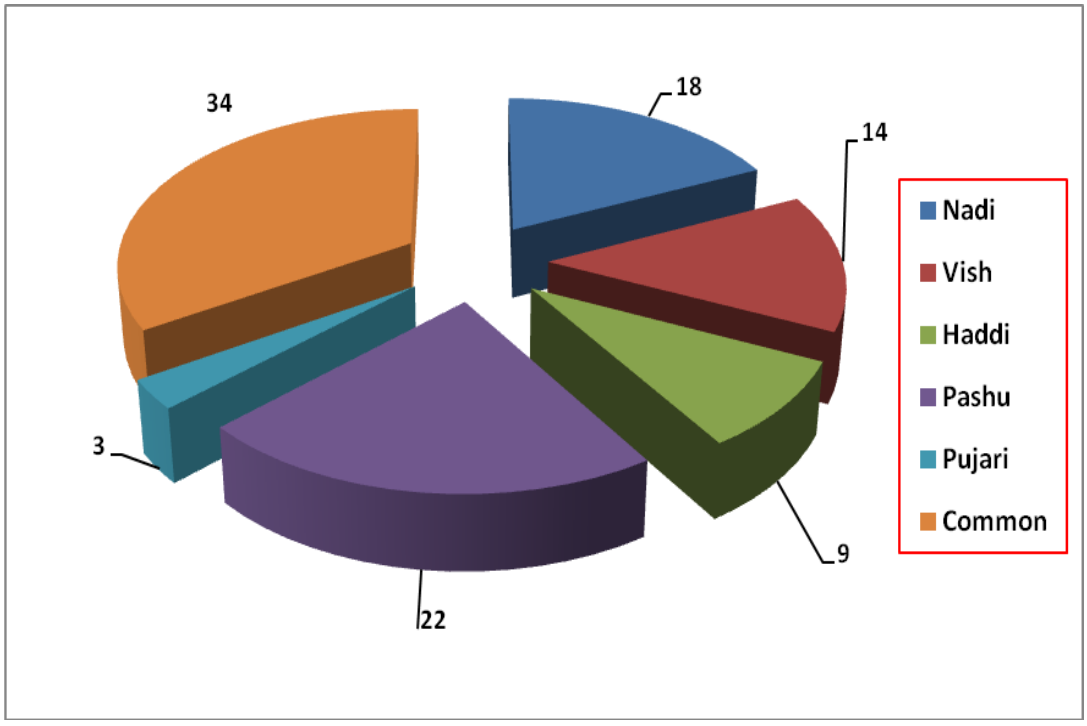

Figure 1 - Percentage of medicinal plants utilized by different categorize of traditional *Vaidyas* for curing ailments

Furthermore the creation of protected areas (National parks/Biosphere reserves, Sanctuaries) has meant that *Vaidyas* facing problems in getting medicinal plant resources and thus limiting the use of rare or endangered flora and fauna and are directly linked to the weakening of their practices (Maikhuri *et al.*, 1998). The PGCS

is negotiating changes in their socio-economic circumstances and traditional health practices in relation to their more developed counter parts (Ayurvedic system of medicines) as well as their patients and traditional societies. This association (PGCS) recognized that their system of curing ailments fills a niche in conservation and development agendas of the govt. namely, that of traditional knowledge, they are also identified in their capacity, and often work closely with ethnobotanists. And, as in other regions of the central and western Himalaya, the *Vaidyas* agenda as marginal societies as well as practitioners of ethnomedicine is framed as an appeal for the preservation of indigenous knowledge and tradition as a matter of Himalayan pride.

Conservation and promotion of traditional health care system

Traditional knowledge has enormous storehouse of indigenous wisdom pertaining to conservation and utilization of resources. Since ages, the local people have been in contact with the wild as their habitat and have sound knowledge about the various aspects of these ecosystems. It is only when there is a pressure exerted by externalities that these resources face degradation. The local people have the tradition embedded in their socio-cultural fabric. These traditions are often the hallmarks of conservation philosophy and an unquestioned respect for the nature. Traditionally, the *Vaidyas* have known the secretes hidden in the medicinal plants. Through their legacy, they know the curative and preventive uses of these medicinal plants. As such, they have a vast knowledge base of information which can boost research and development initiatives for promoting the medicinal plants sector. Thus, there is a need for a concerted effort to conserve, promote and document the local traditions and also to incorporate these in the management of medicinal plants.

Conclusions

The traditional culture and indigenous knowledge of traditional societies have faced a series of challenges in the recent past. The rules and regulations governing these societies have gradually broken down. The homogeneity of the societies has given way to heterogeneous settlements. The traditional beliefs and indigenous knowledge of the people are now being questioned by the young generations who are supposed to keep the culture and tradition alive. The traditional social values of neighbours acting as each other's 'keeper' during misfortune or happiness are rapidly diminishing. Another crucial factor responsible for change is the migration of youths from rural areas to semi-urban and urban centres to take up jobs. As these youths grow older in other parts of the state and urban areas they begin to forget their tradition and values and adopt modern culture. In case of death of an elderly person in such societies, a valuable traditional knowledge and practices vanishes. This gap is further widened by the adoption of modern culture. Another problem confronting the maintenance of traditional culture and indigenous knowledge relates to the loss of the natural forests due to commercial exploitation of medicinal plants.

The documentation of indigenous knowledge and evaluation of the use of plants for a variety of purposes assumes greater significance not just to store it, but also to keep it alive and make it available for future use because of rapid socio-economic and cultural changes that are taking place across the traditional community of the region. This implies maintaining the ecosystems or natural habitat as well as the socio-cultural organizations of the local people. However, this would conflict with the

autonomy of the people introduced. It seems that the only alternative is to carefully record the knowledge and insights of the people living in Uttarakhand Himalaya in particular and entire Himalayan region in general.

Photo plate-1: **A)**- Speech of the Chief Guest World Renowned Environmentalist, Padama Bhushan, Shri Chandi Prasad Bhatt. **B)**- Discussion of *Vaidyas* with Experts. C)- Documentation of indigenous knowledge among traditional *Vaidyas*. **D)**- Members of *Vaidyas* Association. **E)**- Formulation of Herbal Drugs by traditional *Vaidyas*. **F)** - Herbal Products Prepared by *Vaidyas*

Author's contributions: *Dr. P.C. Phondani (Research Associate) conducted the field survey and drafted the manuscript, Dr. R.K. Maikhuri (Scientist 'E' & project leader) provide valuable ideas, inputs and immense co-operation for organizing meetings and workshops; Dr. N.S. Bisht (Professor) and Dr. B.P. Kothyari (Scientist 'E') both are contributed to improve and modified drafted manuscript; Dr. L.S. Rawat, Dr. L.S. Kandari, Dr. V.S. Negi and Abhay Bahuguna (Researchers) contributed in questionnaire development and tabulation.*

Acknowledgements

The authors are thankful to Dr. L.M.S. Palni, Director, G.B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal Almora for providing facilities; Prof. A.R. Nautiyal, Dr. R.C. Sundriyal and all stakeholders for their immense co-operation and active participation. The authors are also thankful to the National Medicinal Plants Board (NMPB) and NAIP-ICAR Govt. of India for financial support.

References

Kala C. P. 2005. Current Status of medicinal Plants used by Traditional *Vaidyas* in Uttaranchal State of India. *Ethnobotany Research and Application* 3:267-278.

Kala C. P., Farooquee N. A., Dhar U. 2004. Prioritization of medicinal plants on the basis of available knowledge, existing practices and uses value status in Uttarakhand, India. *Biodiversity and Conservation* 13: 453-469.

Kala C. P., Farooquee N. A., Majila B. S. 2005b. Indigenous Knowledge and medicinal plants used by *Vaidyas* in Uttarakhand, India. *Natural Product Radiance* 4: 195-204.

Maikhuri R. K., Nautiyal S., Rao K. S., Semwal R. L. 2000. Indigenous knowledge of medicinal plants and wild edibles among three tribal sub-communities of the Central Himalaya, India. *Indigenous knowledge Development Monitor* 8: 7-13.

Maikhuri R. K., Nautiyal S., Rao K. S., Saxena K. G. 1998. Role of medicinal plants in the traditional health care system: A case study from Nanda Devi Biosphere Reserve, Himalaya. *Current Science* 75: (2) 152-157.

Nautiyal S., Rao K. S., Maikhuri R. K., Semwal R. L. and Saxena K. G. 2005. Traditional knowledge related to medicinal and aromatic plants in tribal societies in a part of Himalaya. *Journal of Medicinal and Aromatic Plant Sciences* 23: 28-41.

Negi, Vikram S., R.K. Maikhuri, P.C. Phondani and L.S. Rawat 2010. An Inventory of indigenous knowledge and cultivation practices of medicinal plants in Govind Pashu Vihar Wildlife Sanctuary, Central Himalaya, India. *International Journal of Biodiversity Science, Ecosystem Services and Management,* 1:1-10.

Phondani P. C., R. K. Maikhuri, L. S. Rawat, N. A. Farooquee, C.P. Kala, S.C.R. Vishvakarma, K.S. Rao & K.G. Saxena 2010. Ethnobotanical Uses of Plants among Bhotiya Tribal Communities of Niti Valley in Central Himalaya, India. *Ethnobotany Research and Application* 8:233-244.

Phondani, P.C. 2010. A study on prioritization and categorization of specific ailments in different high altitude tribal and non–tribal communities and their traditional plant based treatments in Central Himalaya. Unpublished Ph.D. Thesis submitted to H.N.B. Garhwal Central University, Srinagar (Garhwal).Uttarakhand, India.

Samal P. K., Shah A., Tiwari S. C., Agrawal D. K. 2004. Indigenous health care practices and their linkage with bio-resources conservation and socio-economic development in central Himalayan region of India, *Indian J. Traditional Knowledge* 3: (1) 12-26.

Sienna, C. 2002. Himalayan Healers in tradition: Professionalization, Identity and Conservation among Practitioners of gso ba rig pa in Nepal. Proceeding of regional workshop on wise practices and experimental learning in conservation and management of Himalayan medicinal plants Kathmandu, Nepal 411-433.

Tiwari L. 2003. Traditional Himalayan Medicine System and its Materia Medica. History of Indian Science and Technology.