

New meaning for old knowledge- Reinvigorating Participatory Approaches to Conservation and Sustainable Management of Biodiversity and Ecosystem Services

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Abstract- People's Biodiversity Register (PBR) documents diverse aspects such as biodiversity and ecosystems services in a location Narwana Village Panchayath, Kangra District, Himachal Pradesh, status of folk (traditional/indigenous/local) knowledge, their applications, history, ongoing changes and forces driving changes in biodiversity resources, gainers and losers in these processes and people's perceptions of how these resources should be managed. A number of PBRs have been prepared in different parts of India beginning 1995 through initiatives of NGOs and educational institutions working with local communities and village councils and other administrative bodies, like State Biodiversity Board and National Biodiversity Authority. These attempts have been motivated by a desire to promote decentralized systems of management of natural resources and to create the basis to equitable sharing of benefits of commercial utilization of folk knowledge of uses of biodiversity. The documents bring together important locality specific information on biodiversity resources and ecological processes affecting them. They lead to recognition of conservation oriented local practices such as for instance, protection of sacred groves. They help to mobilize local communities to prudently manage local biodiversity resources in ways that would promote equitable Benefit Sharing and social justice. There are many encouraging signs globally, as well as within India, the Convention on Biological Diversity, and the subsequent National Biodiversity Act of 2002 intends to promote decentralized democratic systems of governance and institutions of co- management of natural resources incorporating aspects like PBR will have an important role to play in promoting conservation, sustainable use and equitable sharing of benefits of biodiversity resources in the coming decades. It is however important to recognize that not all folk knowledge may be valid, not all folk practices wise, and it is important to create systems of careful assessment of the knowledge practices. Whereas it is important to document knowledge in PBRs, it is equally important to engage with this knowledge as well as the community knowledge holders for these documentations to be effective in management of our bio-cultural diversity and ecosystems.

Index Terms- Biodiversity; Traditional; Ecological Knowledge; Convention on Biological Diversity; People's Biodiversity Registers;

I. INTRODUCTION

The People's Biodiversity Register (PBR) Programme is an attempt to record biological resources, associated traditional ecological knowledge, people's folk knowledge and perception of the status, uses, history, use of Biological Resources, but the organization differs among the different streams of knowledge. Folk knowledge is maintained, transmitted, and augmented almost entirely in the course of applying it in practice; it lacks a formal, institutionalized process for handling. Folk ecological knowledge and wisdom are therefore highly sensitive to changing relationships between people and their eco-logical resource base (Gidgil et. al. 1993). Today, both are eroding at a fast pace for two reasons: firstly, people now have access to newer resources such as modern medicines and are no longer as dependent on local medicinal plants and animals as before; and secondly, people are increasingly losing control over the local resource. However, folk knowledge and wisdom, with their detailed locality- and time-specific content, are of value in many contexts. They must therefore be supported in two ways: by creating more formal institutions for their maintenance and, most importantly, by creating new contexts for their continued practice (Preeti Singh 2014). The program of "People's Bio-diversity Registers" (PBR) is such an attempt.

It is a program of documenting how lay people, primarily rural and forest-dwelling communities, understand biological resources and their ecological setting. The information recorded relates to present status as well as changes over recent years in distribution and abundance; factors affecting such change, including habitat transformations and harvests; known uses; and economic transactions involving these organisms. The document also records the perceptions of local people about ongoing ecological changes, their own development aspirations, and preferences as to how they would like the resources and habitats to be managed. We summarize here our experience of developing the concept and organizing the preparation of PBRs in different parts of India, the resultant understanding, and the interest that this program has generated. The People's Biodiversity Register is a programme of organizing information available in the domain of slow science on the status, uses and management of the living resources. This is the information with practical ecologists, people who deal with living resources as a part of their daily

subsistence activities - as grazers, as fisher folk, as basket weavers, hunters etc. It is information with simple folk, who are nevertheless specialists of slow science (Gadgil et. al. 1993), such as tribal medicine practitioners, healer, or expert honey gatherers. It is also information with more sophisticated practitioners of slow science such as physicians trained in Ayurvedic colleges. The information may be purely orally transmitted or contained in palm leaf manuscripts or in printed Ayurvedic texts. The information may be guarded as secret, as certain herbal remedies are or may be very widely known - as the use of turmeric as an antiseptic is all over India. This information may be documented in full, or as claims that only partially reveal the information. It needs to be collated, verified, synthesized and made available to the society at large, as well as fed back to the village communities.

In PBR's process involving a collaboration between people working in the organized sector (e.g., educational institutions, government agencies, and NGOs) and the practical ecologists, peasants, herders, fishers, and traditional healers (all in the un-organized sector), is as significant as the product: the recorded information. A subset of the information collected, especially that pertaining to medicinal and other economic uses, has been recorded by ethnobiologists working in academic institutions and for the pharmaceutical industry and other commercial interests. In this process, however, the local people are treated as anonymous informants; they receive no particular credit for their knowledge, and the information is accumulated with little reference to particular localities and times. The PBR process, on the other hand, aims to record the information with full acknowledgment of the source; it thereby serves as a possible means of sharing of benefits that may flow from further economic utilization of such information. Another subset of the information recorded in PBRs is collected during "Participatory Rural Appraisal" (PRA) exercises that feed into decentralized development planning. Generating good information for such participatory development is also an objective of PBRs; the PBRs differ from PRAs in their greater emphasis on recording all pertinent knowledge, including changes over the recent past, and in giving specific credit for the information collected. Although we have so far completed only one round of PBRs in any one locality, FRLHT expect it eventually to become an ongoing process of monitoring ecological change and generating the necessary information for locally adaptive management of living resources.

Narwana Village Panchayath situated in Kangra District in the Western [Himalayas](#) region of [Himachal Pradesh](#), **GPS Coordinates: 32.1738027** Latitude, **76.3867737** Longitude. The Economy of Narwana Village Panchayath consists mostly of agriculture and animal farming. It's included in the research

because that place rich in the Traditional knowledge, entire spectrum of ecological and social regimes. Local Health Traditions should be regarded and established as a valuable traditional system. The various herbal formulations prepared and used by traditional vaidyas and other information must be documented systemically so as to avoid the gaps in the traditional knowledge and traditional crops.

II. MATERIALS AND METHODS

The study site Narwana Khas Village Panchayath, Kangra District Himachal Pradesh selected as to represent the entire spectrum of ecological and social regimes within the state of Himachal Pradesh. National Biodiversity Authority (NBA) has been working in close collaboration with State Biodiversity Boards (SBBs), research/educational institutions, State Governments and civil society organizations to provide technical support for the constitution of BMCs and preparation of PBRs.

The first task of the FRLHT coordinators was to select the study sites that would represent the entire research spectrum. After study areas were selected, field investigators were chosen from among college or university-level science teachers or workers of rural development or environment-oriented NGOs. Many of these people are from nearby localities, and have considerable previous familiarity with the study sites. The field investigating teams worked closely with, and often included, some of the local residents. The principal investigators of the program, college teachers, university teachers, Community members, BMC members and school teachers. There were government officials, and many individuals engaged in development activities on their own.

The methodology of field investigations included the following components: Status of biodiversity resources such as populations of medicinal plants, cultivars of fruit trees or freshwater fishes. Various factors such as harvests from natural populations, changes in agricultural practices or discharge of industrial effluents, affecting the biodiversity resources. Ongoing involvement of local communities/ individuals in sustainable use and conservation of biodiversity resources, such as systems of regulated grazing on pastures, maintenance of varieties of fruit plants like jackfruit on farm bunds or protection of fish in sacred ponds. Local knowledge, widely shared and publically disclosed of properties and uses of biodiversity resources e.g. Drought-resistance of a certain cultivar, methods of preservation of food or use of certain plants in treating human or livestock diseases. Local knowledge only partially disclosed; for instance, a claim that a particular medicine woman knows of a cure for asthma.

III. RESULTS

Table-1 Overall Result of the PBR Documentation Work in Narwana Village Panchayath

Description	Narwana Village Panchayath, Kanra District, Himachal Pradesh
Population detail	Total: 2532, Male: 1341, Female: 1191

Geographical Position	GPS Coordinates: 32.1738027 Latitude, 76.3867737 Longitude
Geographical Area	363-83-71 hectare
Climate: Rainfall, Temperature, Other weather pattern	The climate is sub-humid. The temperature varies from 15° C - 30° C and dips to 0 degree. The January month is coldest while the June as hottest month. Most of the rainfalls occur during July-September. Average annual rainfall ranges from 1800 to 2500 mm. Snowfall is experienced rarely.
People and Culture	Most of the people belong to Hindu and Muslim communities. No Christians are reported.
Total Forest Area	123 acres
Total Cultivated Area	64 acres
Total Biodiversity Management Committee Member	7 Members
Total Healer	15 healers
Total Remedies	115
Total Disease	80
Total Plant use	125
NTFP based livelihood activities	A significant Tribal population of Gaddi depends on collection and trading of Non-Timber Forest Produces for their livelihood.
Animal Husbandry	Livestock e.g. Jersey cow (hybrid) and local breed of buffalo and Goat and Sheep are the other important vocation of the villagers.

Figure-1 Map of Study Area



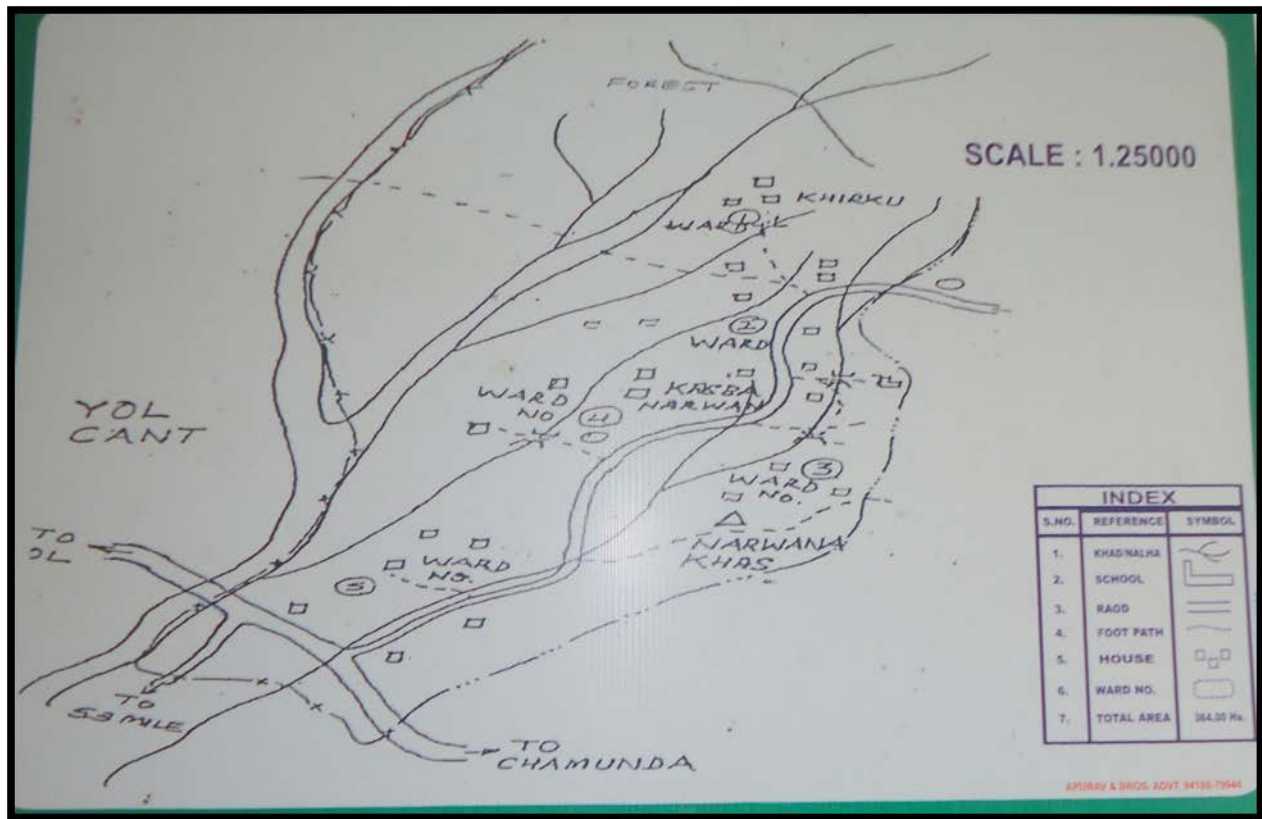


Figure-2 Map of Narwana Village Panchayth



Figure-3 Meeting of BMC Members and Villagers with Dr. M.L. Thakur, State Project Coordinator, UNEP ABS Project, Himachal Pradesh State Biodiversity Board, at Narwana Village Panchayath on 12 February 2014

Table-2 Formulation recorded for various diseases

Disease	No. of formulation
Stomach disorder	08
Cut and wounds	08
Respiratory (cold, cough, bronchitis, asthma, running nose)	07
Tooth decay, tooth ache	05
Dysentery, diarrhea	05
Jundice	04
Women specific (Heavy menstrual discharge, white discharge)	05
Ear problem (ear pain, ear rotting)	03
Joint pain	06

Documentation and Assessment of People's Biodiversity Register was carried out in Narwana Village Panchayath, Kangra District Himachal Pradesh. All healers from different village of Narwana Village Panchayath (Narwana Khas, Narwana Kaswa) were interviewed and nutritionally important food and vegetable crops collected from the 20th January to 24th March 2014.

Table-3 Land use pattern

Type	Total area shown in hectares as shown above under land use	Percentage
Cultivated land	64	31%
Forest land	123	60%
Grazing land	2	1%
Irrigated land	9	5%
Non Irrigated land	6	3%
Total	204	100%

Graph- 1 Land use pattern

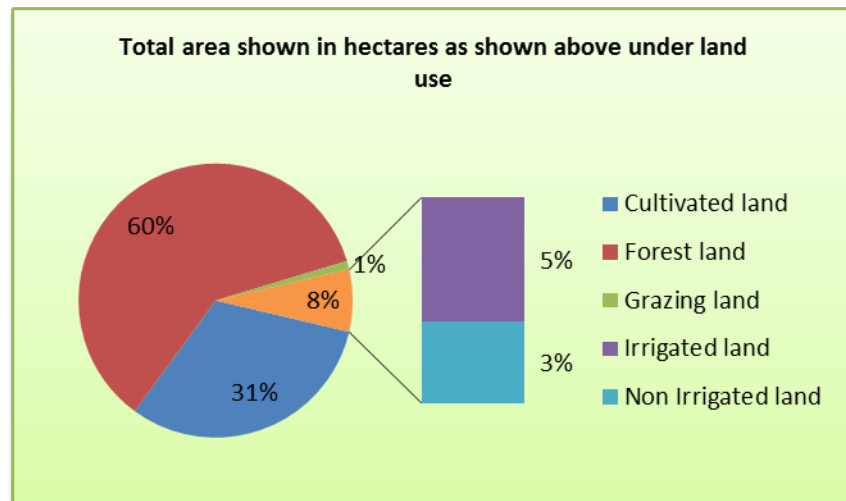
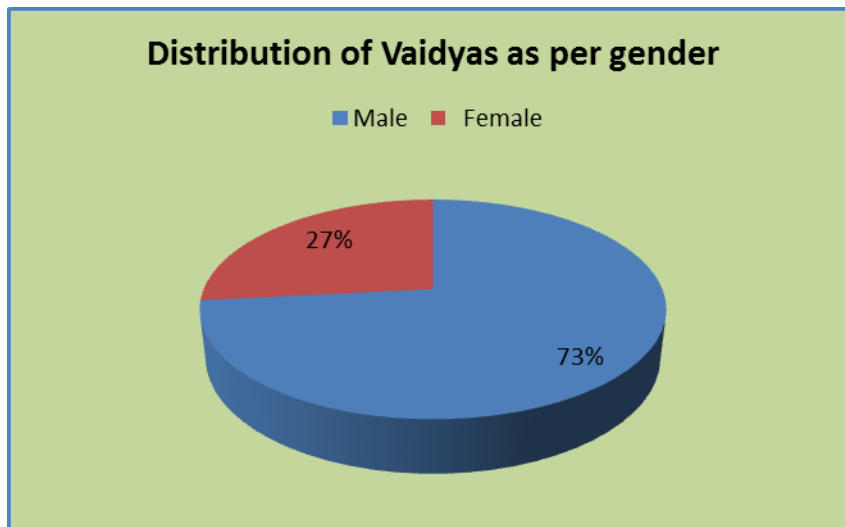


Table-4 Distribution of Vaidyas as per gender

Gender	No of vaidyas	Percentage
Male	11	73%
Female	4	27%
Total	15	100%

The table shows that male vaidyas account for 73%, female vaidyas account for 27%.

Graph- 2 Distribution of Vaidyas as per gender



Age wise distribution of Vaidyas

The Table below shows that while there are maximum of 5 vaidyas in the age group of 40 – 60 years followed by 4 vaidyas in 60-100 years age group and reducing to 1 vaidya only in 20 to 40 years age group. It also shows that there are 7 male vaidyas compared to 2 female vaidyas. It further shows that there are no female vaidyas in the age group of 20 to 40 years. This trend shows rapid erosion of folk healing traditions amongst the younger generation and especially among female is of grave concern.

Table-5 Age wise distribution of Vaidyas

Age group in Years	Male	Female	Total
20-40	1	1	2
40-60	4	2	6
60-100	5	1	6
Total	10	4	14

Graph-3 Age wise distribution of Vaidyas

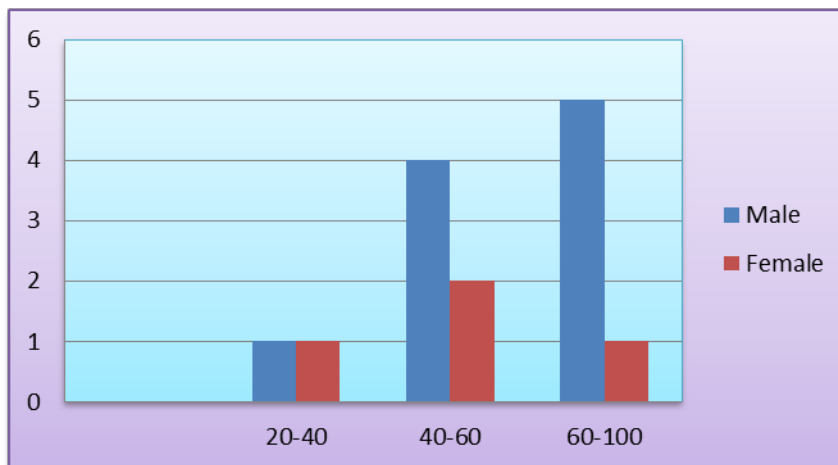


Table-6 List of Medicinal plants of Narwana Village Panchayath used in Primary Health care

Primary Healt

Sl. No.	Local Name	Scientific name	Health Condition
1.	Turmeric	<i>Curcuma longa</i> Linn. (Zingiberaceae)	Skin eruption/Joint pain/Tooth ache
2.	Kainth	<i>Pyrus pashia</i> (L.), Batsch (Rosaceae)	Oral health care
3.	Braa	<i>Rhododendron arboretum</i> Linn. (Ericaceae)	Heat Storke
4.	Banaa	<i>Vitex negundo</i> Linn.	Body swelling
5.	Chittra	<i>Plumbago zeylanica</i> L.	Hair fall, Liver Care, Common Fever
6.	Harad	<i>Terminalia chebula</i>	Cold/ Cough/ Joint pain/ Weight management
7.	Kasamal	<i>Berberis Lycium</i> (Berberidaceae)	Sexual dysfunction /Oral health care/ Eye infection
8.	Jamun	<i>Syzygium cumini</i>	Diabetes
9.	Karela	<i>Momordica charantia</i>	Diabetes
10.	Gandla	<i>Murraya Koenigii</i> (L)Spreng. (Rutaceae)	Health food/ Skin infection
11.	Ajvan	<i>Carum Copticum</i> (L) Benth. & Hook. (Apiaceae)	Sexual dysfunction/ Skin eruption
12.	Kali Basunti	<i>Eupatorium adenophorum</i> Spreng. (Asteraceae)	Cold/ Cough/ Injury
13.	Sans Paud	<i>Asparagus adscendens</i> Roxb.	Injury/ Wound
14.	Phutkanda	<i>Achyranthes Aspera</i> Linn (Amaranthaceae)	Skin eruption /General weakness
15.	Sapdotri	<i>Bergenia cilliata</i> Stermb. (Saxifragaceae)	Sexual dysfunction
16.	Bhang	<i>Cannabis sativa</i> Linn. (Cannabaceae)	Sexual dysfunction
17.	Bish kapru	<i>Stephania glabra</i> (Roxb.) Miers (Menispermaceae)	Outgrowths/ Injury/ wound
18.	Kamla	<i>Mallotus philippiensis</i>	Constipation
19.	Tulsi	<i>Ocimum sanctum</i>	Cold/ Cough/ Cardiac trouble
20.	Behra	<i>Terminalia bellirica</i>	Oral health care/ Tooth ache/Constipation / Weight management
21.	Ambla	<i>Phyllanthus emblica</i>	Weight management

Table-7 List of Threatened medicinal plants of Narwana Village Panchayath Forests which are endangered that require attention for *in-situ* conservation, sustainable harvest practices and cultivation

Plant Type	Local Name	Scientific Name	Variety	Source of Plants/ Seeds	Local status Past	Local status Present	Parts collected
Plant	Sapdotri	<i>Bergenia cilliata</i> Stermb. (Saxifragaceae)	Wild	Forest	Available	Endangered	Root
Plant	Ajwain	<i>Carum copticum</i> (L) Benth. & Hook. (Apiaceae)	NA	Home Garden	Available	Endangered	Leaves, Seed
Plant	Gandla	<i>Murraya koenigii</i> (L)Spreng. (Rutaceae)	Wild	Forest	Available	Endangered	Root, Branch

III. DISCUSSIONS

Documentation was carried out with the selected Healers, Community members, BMC Members, University, NGOs, Teachers from the different locations of Narwana Village Panchayath, Kangra District, Himachal Pradesh. The entire healer interviewees were male and female healer in the age group of 25 to 85 years. With all 15 healers 80 diseases and 115 remedies was documented and 47 species used in the remedies was collected with the help of 15 healer. Altogether 31 plant species are used in various remedies documented and photography was done for all the documented plants used by the 15 healers.

Among the remedies documented stomach disorder, cuts and wounds was the maximum formulation recorded followed by, Respiratory diseases, tooth related, women's specific problem, ear problem, Skin diseases, Joint pain etc., *Ruellia tuberosa*, *Tragia involucrate*, *Aloe barbadensis*, *Nicotiana tabacum*, *Curcuma longa* were most used plants among the documented remedies shows that they are having high medicinal value. The most used 27 medicinal plants in primary health care.

Habit analysis if the 31 species used in the documented remedies shows 3 herbs, 4 shrubs, 17 trees, 3 climbers, 1 fern. Out of 31 species documented all are having Botanical evidence and 25 out 31 species of wild medicinal plants are reported to be traded. These medicinal plants in the wild offers livelihood security to the local communities.

During the documentation it was found in that they have immense knowledge in the field of traditional medicine and herbal preparation. Due to modernization, the traditional system of the herbal use is not very popular with younger generation. In the past, the indigenous communities had a self-regulatory system that was interwoven in such a way so that each individual could receive certain economic benefits from his profession. Some of the traditional vaidyas were marginal farmer and they provided their services free of cost. In return, the villager helped the vaidyas with their agricultural work and also offered some donation in the form of the cereals, pulses and vegetable. They were happy to share their knowledge. With changing life styles and introduction of immediate economic return in terms of cash, the traditional value to the profession of vaidyas has started changing. The younger generation of vaidyas might have visualized fewer opportunities in the profession for livelihoods. This has resulted in sharp decline in the sharp decline in the number of recognized vaidyas.

The study analysis shows that about the 11 species are reported to have Nutritional important traditional varieties of the crops. It was found that about 3 species under the threatened category.

Agriculture and farm based activities constitute the major livelihood activity. The Table shows a maximum area of 204 acres is used for cultivation of food crops followed by oil seeds and vegetables, fruits, flowers. The study analysis shows a list of 09 nutritionally important food and vegetable crops.

It is observed that there are only 9 traditional crops are under cultivation. This indicates rapid erosion of traditional crop varieties. The people of the Narwana Village Panchayath also depend on activities relating to livestock keeping of cows, oxen, goat, sheep and poultry.

For the future of the Narwana Village Panchayath, Local Health Tradition should be regarded and established as a valuable traditional system. The various herbal formulations prepared and used by traditional vaidyas and other information must be documented systemically so as to avoid the gaps in the traditional knowledge and traditional crops.

IV. CONCLUSION

Traditional societies have accumulated a wealth of local knowledge, transmitted from generation to generation. Experience has taught them how the water, trees, and other natural resources should be used and managed to last a long time.

The People's Biodiversity Register would be prepared in relation to some specified human community of a few tens to a few thousands of households, generally falling within the jurisdiction of a single Panchayath and for the area from over which they gather the bulk of biological resources such as fuel wood or bamboos.

People's Biodiversity Register is a projection to fill the gap between knowledge & ignorance and rich & poor. It is certainly a tool of regional as well as national development with the practical involvement of rural people in a participatory mode for the Assess and Benefit Sharing of Biological Resources.

The present study on documentation of Local Health traditions among the selected 15 healers of Narwana Village Panchayath, Kangra District, Himachal Pradesh gives an insight about the richness of traditional knowledge. The study show that various ailments treated by using the plant species. This would be helpful for further research on exploring their medicinal efficacy, value addition and use in curing for various old and new diseases. On the other hand exploring with more healers would give ocean of traditional knowledge which can contribute for primary health care at low cost. Due to modernization, the traditional system of the herbal use is not very popular with the younger generation. In other words the traditional knowledge is eroding. Therefore, there is a need for preserving rich traditional knowledge from the existing healer through Revitalization of local Health Traditions.

The study also indicates that nearly 3% of the documented medicinal plants fall under the threatened category. There is no need for establishment of Home Herbal Garden and organize awareness of Programmes for conservation and sustainable use of the medicinal plants.

Due to modernization the traditional system of the herbal use is not very popular with the younger generation. In the past, the indigenous communities had a self-regulation system that was interwoven in such a way so that each individual could receive certain economic benefits from his profession. Some go the traditional vaidyas were marginal farmer and they provided their services free of cost. In return, the villagers helped the vaidyas with their agricultural work and also offered some donation of cereals, pulse and vegetable.

With changing life style and introduction of immediate economic return in terms of cash, the traditional values related to the profession of Vaidyas started changing. The younger generation of vaidyas might have visualizing fewer opportunities in the profession to become wealthy. This resulted in sharp decline in the number of recognized vaidyas.

Nonetheless the, knowledge of herbal use is so deeply rooted in society that there are still number of women and men in the village who know the healing properties of many medicinal plant species. The loss of traditional knowledge on preparing medicines is due to the decline in number of vaidyas coming forward to adopt this profession. In addition the survey results indicate that the practice of individual healers of identifying plants and preparing various formulations themselves for the use their patient have been decaling rapidly. Today, due to rapid socio- economic changes and urbanization, most of the vaidyas largely depend on product supplied by the pharmaceutical industries.

The analysis of data in this report reveals the documentation of 115 remedies from Kangra District, Himachal Pradesh in which 31 plants species have been documented, out of 31 plant species 25 plants species are use in the primary health care, only 09 traditional crops are under cultivation. This indicates rapid erosion of traditional crop varieties and that require immediate precautionary step for their conservation and to protect them from getting extinct.

In developed countries like United States a majority of people (55%) combine alternative treatments with conventional medicine. It is important to note that 13% try them because they think that conventional medicine is too expensive (*Stein 2004). They Ayurvedic medicines and the herbal product are cheaper and more available to the poor. In developing countries, where the majority of the people cannot afford the high cost of modern medicines, traditional herbal therapy is the only and most vital option. This aspect traditional herbal healing can be made a highly saleable concept in both developed and developing countries.

The present study of the medicinal plants of Narwana Village Panchayath Kangra District, Himachal Pradesh and various ailments that can be treated by these plant species would be helpful for the further research on exploring their medical efficacy, value addition, and use in curing for various old new diseases.

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