



Working Paper

## **Local knowledge of trees among the Bhil in southern Rajasthan with special reference to its value and implications for rural development**

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***Local Knowledge of Trees***  
***among the Bhil in Southern Rajasthan***

***With special Reference to its Value and***  
***Implications for Rural Development***

*Roger Ebner*

*Zurich 1996*



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## **PREFACE**

Knowledge, and indigenous knowledge in particular, is and has probably always been the best representation of what culture means in a respective environment at a certain time. To do research on what is known by local people or indigenous experts, as it is the case in this paper, and to draw the attention of the western sciences as well as decision makers in development cooperation to it deserves attention.

Being a geographer, Mr. Ebner has ventured into the worlds of ethnobotany and ethnomedicine of an Indian tribe in Rajasthan in order to document some of the local knowledge with emphasis on trees and forest products. As far as I can see, he succeeded in grasping their overall significance for the local life-style and perception in general and many aspects of their medicinal value for the forest dwelling tribal population in particular. The examples reveal the local esteem and appreciation of the environment that local knowledge represents.

Contributions as Mr. Ebner's are valuable for several scientific disciplines. They are relevant in discussing the possibilities of a sustainable use and management of resources in the intercultural interface within India and with regard to worldwide attempts to self-sustained development through local efforts. Modern sciences can share and integrate to a certain, although limited extent, elements of indigenous knowledge as well adapted experiences based on empirical evidence. The cultural and spiritual dimension of empirical knowledge, however, is at least what makes it an autochthonous representation of nature.

The study of Mr. Ebner has originated in the wake of the collaboration between the Chair of Human Geography at the University of Zurich, the Chair of Forest Policy and Forest Economics at the Swiss Federal Institute of Technology, and Seva Mandir, a renowned Indian Non-Governmental Organization working in Southern Rajasthan. My special thanks go to Mr. Ajay S. Mehta and the staff of Seva Mandir who facilitated and supported Mr. Ebner's field work. I hope that the results of this investigation are of as much interest to concerned people in India and elsewhere as they are to us.

F. Schmithüsen

**CONTENTS**

Foreword	III
Summary	V
1. Introduction	1
1.1 Motivation and preparation	1
1.2 Sagwara, organisation of the work	2
2. 'Indigenous knowledge' in development	5
3. Culture and indigenous knowledge	7
3.1 The concept of culture and space	7
3.2 Theoretical background: professional vs. local knowledge	8
4. Issues of my field research in Sagwara	12
4.1 The importance of trees and forests for the Bhil	12
4.2 The perception of the environment	14
4.3 The interaction of space and knowledge	16
4.4 The development of local knowledge and an outlook	18
5. Indigenous knowledge in the context of development policy	19
References	23
<b>APPENDIX</b>	
A1 General methods used to reveal indigenous knowledge	24
A2 PRA and anthropology and the relevant methods	25
A3 Methods used	27
Tree list - General and medicinal uses of trees in Sagwara	34

## FOREWORD

This paper is an extract of a final report that ended my studies in geography at the University of Zurich. The contents will highlight the value of indigenous knowledge in an environmental context, particular for Non Governmental Organisations (NGO) working in the rural areas of India. The first part is written specifically for the benefit of leading personnel within NGOs. By providing an insight into the historical development of local knowledge within the context of development policy I aim to demonstrate the importance of the subject "Local or indigenous knowledge". By referring to some of the results of my own fieldwork in Sagwara, Udaipur District (South Rajasthan, not to be confused with the larger town of the same name in Dungarpur district) it may be possible to adapt the strategies and thought processes relating to my research on indigenous knowledge in Sagwara for use in areas covered by other organisations.

In the appendix of this paper I aim to provide some of my basic field work material accumulated during my field trips (60 days in total) in Sagwara to interested development institutes. This includes a list of 90 different tree species. The introductory comment of the appendix reveals the various field work methods used to acquire information. This part of my final report is expected to be of the most value to the staff of the NGOs who are frequently working in the field and who have the closest contact to the rural population of their own working areas. The tree list (page 37ff.) can be used as a starting point for the evaluation of data concerning a similar subject in another locality. The list can fuel discussions on the different uses of trees in other areas of Rajasthan or India and may tally with my findings or reveal contradictions.

I would like to convey my thanks to the people who supported me throughout the writing of the German report and for the period of field work in India, and also to the people who made possible this English version; in particular:

- Prof. Dr. A. Leemann, Former head of the Chair of Human Geography at University of Zurich, Switzerland
- Prof. Dr. F. Schmithüsen, Head of the Chair of Forest Policy and Forest Economy at the Federal Institute of Technology, Zurich, Switzerland
- PD Dr. K. Seeland, Scientific fellow worker at the Chair of Forest Policy and Forest Economics at the Swiss Federal Institute of Technology, Zurich, Switzerland
- Dr. R. Hager from Swiss Development Cooperation, Berne, Switzerland
- A. Jäckle from Intercooperation, Berne, and Mr. H.J. Ambühl from Swiss Development Cooperation, Berne, on whose initiative I was granted the resources that enabled me to write this English version of my final report
- My friend Marielle Rijke, London, who corrected my less than perfect English
- The staff of Seva Mandir Udaipur, India. Particularly to Mr. Ajay Mehta and Mrs. Neelima Khetan
- Pankaj Mishra my Indian interpreter

- Prof. Sharma, Ayurvedic College, Udaipur
- Deep N. Pandey, Chief Conservator of Forest, Forestry Department, Udaipur
- Goverdhan Singh Chowdhary, Old Silver Shop, Udaipur
- Irene Ziesig, who was responsible for printing both versions of the report.

A very special thank you goes to the very co-operative population of Sagwara for their hospitality and the warm-hearted welcome I experienced. In particular I would like to mention Maharaj, Sajuji, Tavraji, Lakshmanji, Bhimji, Phulchandji, Heeralji, Amratlalji, Dublaji and Kakuaji.

*Picture 1: The tea stall in Sagwara just opposite the school (see also picture 2) was the meeting point for the men of the village and a place where I was able to participate in their many interesting discussions.*

## SUMMARY

In the last fifteen years academics and professionals have increasingly recognised the value of indigenous knowledge and its importance in the theoretical discussion of the institutions involved in development. With the realisation that the development projects of the post war period were a failure, came the search for a new direction which emerged in the form of a more participative approach and the acknowledgement that indigenous knowledge had an important role to play in development projects of the future.

Looking back on the past fifteen years one has to admit that there is a lack of practical work using this approach in a development context. Having specialised in development issues during my studies in geography at the University of Zurich I became aware of this situation and endeavoured to write a report which would highlight the problems associated with such an approach and the opportunities for using this method successfully in practice.

With the guidance of Dr. K. Seeland I formulated a project with the principle aim of evaluating the indigenous knowledge of trees and forests in a locality (to be decided upon at a later date) in Southern Rajasthan. I was to be based in Udaipur and associated with Seva Mandir, a well respected NGO working in the area. Following an extensive preparatory phase which involved travelling through the Udaipur District and speaking to different inhabitants of the many rural village communities, I finally settled upon Sagwara - a remote village inhabited by the Bhil tribe, surrounded by relatively dense forest - as the focus of my case study.

The following report is a summarised English translation of my final report and contains the more significant results of my field research. In the first section I introduce the frame conditions of the field work in Rajasthan. I continue with an overview of the theories of the past fifteen years relating to indigenous knowledge in the context of development and which begins to outline the difficulties one has to face while working with indigenous knowledge.

In the chapter 'culture and space' I provide a theoretical framework for my interpretation of the indigenous knowledge that was evaluated during the case study. Following a definition of the terms 'culture' and 'space' I explain the differences between professional and local knowledge. This is the theoretical core of the report which seeks to demonstrate the way in which information in a traditional context should be treated and understood. For those people who wish to incorporate traditional knowledge in practical work and those who use the information in development projects it provides advice on the ways in which this completely new orientation in the approach towards the rural population can be implemented. For the fieldworkers, it stresses the importance of learning to listen to the people and accepting the equality of the two knowledge systems. They must also accept that the members of the rural population are, in the context of their specific environment, absolute experts (particularly in parts of Rajasthan where the climate is in many parts so dry) and are the most efficient users of local resources, practised in accordance with knowledge that has been passed down through generations. Taking this seriously necessitates a new approach to discovering the situation in the villages

and in a fundamental change in the discussions between fieldworkers and the rural population. One important question must be how development can help the target population maintain its well adapted lifestyle, a consideration that can only serve to strengthen the self confidence of rural communities which in itself is a necessary aim in all development work. Only a culture which functions well and can maintain a lifestyle in its specific, often harsh natural environment.

During my fieldwork I made an effort to uphold these principles as closely as possible and in the chapters four and five I reveal the more significant results of my data. Firstly, I show the value of trees and forests for the Bhil in the village of Sagwara. The value of different parts of the trees as ingredients in medicines formed the greater part of the data. Using this aspect of the knowledge as an example I was able to substantiate one of the primary conclusions of the report: indigenous knowledge as an integral part of a culture is strongly bound to the immediate surroundings and is therefore influenced considerably by the factor of locality. This implies that development workers should evaluate all available data relating to the socio-cultural, natural and historical frame conditions in which the evaluated knowledge is situated and also that each situation is unique. Projects that have worked in one locality cannot necessarily be replicated elsewhere. It is essential to understand and consider the lifestyle of the target population before initiating any development plans that will affect its culture. This report sets out to demonstrate just how important the forests and the knowledge of the different uses of tree species are for a community such as the Bhil and that the conservation of the forest area with its diversity of tree species are fundamentally linked to the tribes existence.

This report is aimed at staff of NGOs working in rural areas and indeed, for anyone else who has an interest in the subject. I hope I have provided sufficient information and viewpoints to provoke a fruitful debate on a subject as complex as indigenous knowledge. To date, the main shortfall of the new approach is that it has yet to be incorporated on a sufficient scale at a practical level. As I mentioned earlier - every village possesses very individual circumstances and I am therefore unable to write a general prescription stating how to incorporate indigenous knowledge into participatory projects. My hope is that I can encourage practitioners to experiment with case studies, gather information and gain practical experience to make a significant contribution to the subject in the field of development.

## 1. INTRODUCTION

### 1.1 Motivation and Preparation

I have always been interested in foreign countries. It was one of the main reasons why I chose to study geography, with anthropology as a second subject, at the University of Zurich, Switzerland. Because geography is such a vast topic, I specialised after a while on human geography (cultural, social and economic) with a main emphasis on developing countries. At the end of these studies every student was required to submit a thesis on a subject of his choice to be awarded the final diploma.

My interest in India and Nepal was awakened through contact with PD Dr. Klaus Seeland of the Swiss Federal Institute of Technology (Sociologist at the Forestry Department), who has been involved in research on these countries for 15 years. Dr. Seeland has had regular contact with Seva Mandir one of the leading NGOs in Udaipur, Rajasthan since 1988. His frequent visits culminated in a project which dealt with 'Indigenous knowledge of trees and forests in the tribal area'. It was an honour when Dr. Seeland suggested I chose this subject. My attachment to Seva Mandir for 7 months was a great opportunity to gain some practical experience in the field and take a closer look at the work of an NGO to decide if I was suited to a job in this profession in the future.

Seva Mandir was founded 1968 by Dr. Mohan Singh Mehta an influential person within the Government of Rajasthan. Today his grandson Ajay Mehta is the head of a full time staff of 280 people working in over 400 villages covering more than half of Udaipur District. While the initial aim of the organisation was to raise the standard primary education among the rural population, other units have since been added to develop the rural, and later the urban population and to fulfil their basic needs. The organisation now includes an income generation unit as part of a women's unit, a health unit with a hospital in Kocchawara near Kherwara, a forestry unit and wasteland development unit, and an engineering unit (building anicuts, pumps and wells). Finally, a management unit was set up to oversee the strategical aspects and planning of projects, for public relations matters and the representation and management of the organisation as a whole.

I visited Seva Mandir in September 1992 and stayed for ten days to assess the working conditions in the field. I had no idea how people belonging to the tribes from the Bhil or Meena villages would react to the appearance of a foreigner. I was positively surprised by the friendliness of the people. Full of enthusiasm I returned to Switzerland to prepare my research period in earnest.

On the basis of my initial experiences in India I formulated a project which was financed by Swiss Development Cooperation, Berne. This would entail a period of general fieldwork to evaluate the indigenous knowledge of trees and forests and a closer examination of the subject when I had gained a clearer impression of the values of the people in the research area. Thus my initial general aims were as follows:

1. Evaluation of different aspects of local knowledge of trees in a village in South Rajasthan.
2. Clarification of the value of trees and forests for the local population and an analysis of their perception of the environment.
3. Discussion of the interconnections between space (locality) and knowledge.
4. To provide an overview concerning the development of indigenous knowledge over the recent past and to discuss the implications for the future.

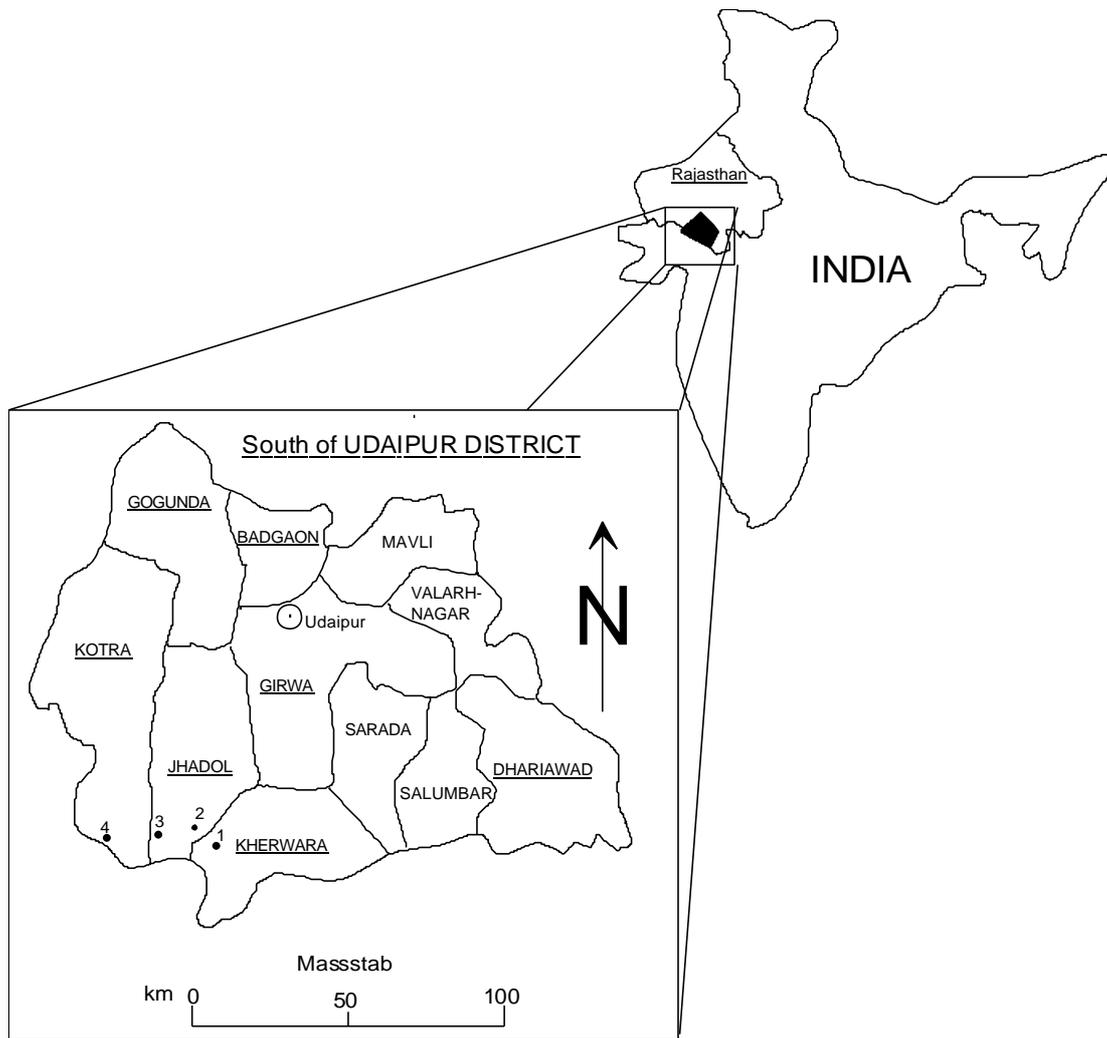
I returned to Udaipur in September 1993 and stayed until April 1994. In the initial phase I visited many different areas of Jharol Block: Jamun/Madla, Bharabhilwara, Som, Oгна, Banerwa and Suwali Bhamti. I accompanied Mr. S.K.Srivastava (D.F.O. Udaipur North) to the Gogunda area and later went with Seva Mandir to Sagwara in Kherwara Tehsil. After a month and a half I chose Sagwara as a primary village and expected to make comparative studies in Bharabhilwara or Banerwa. I found however, that it takes time to get to know a village and studies elsewhere would have been too time consuming.

### **1.2 Sagwara, organisation of the work**

Sagwara is a remote village about 100 km from Udaipur. It is reached by following the NH8 until Rikshabdeo (70 km) and travelling the remaining 30 km on a difficult road. Sagwara comprises of 8 revenue villages and is spread over 85 sqkm (!) of hilly terrain. It was clear that I could never cover the full area. I therefore concentrated on 4 or 5 phallas and looked at 2 others. Half of the village (7 or 8 phallas) I have never seen. The social structure is relatively uniform. Most of the population belong to the Bhil tribe, the few exceptions being Jains and Banyans, most of whom have been shopkeepers for generations.

I chose Sagwara as a case study because the villagers there have a tradition of fighting for their forests. During Nehru's leadership for example, a delegation from Sagwara went up to Mount Abu to confront the Prime Minister during his speech there. The people, having heard that the Rajasthan Government wanted to take over all forest areas, protested for their rights to the forests until Nehru granted them a paper which stated that the forests belonged to the people. Later the villagers fought against the government sanction which permitted the cutting of wood by contractors. In 1977, 1984 and 1988 the people formed a resistance movement (not always passive) and sent a delegation of villagers to Udaipur and later even as far as Jaipur. Each time the government was forced to withdraw the sanction. The last case was a poor example of local forest policy. All the rural areas in Rajasthan were suffering from the severe consequences of three consecutive drought years and the Government officials thought that the resistance power in Sagwara was broken. Luckily it was not.

Map 1: The location of Sagwara, South Rajasthan



JHADOL = Tehsils in which Seva Mandir is working  
SALUMBAR = Tehsils without Seva Mandir activities

1) Sagwara

Other villages where I spent several days researching the circumstances:

2) Jammun/Madla

3) Bharabhilwara, Nala/Magra

4) Banerwa

All in all I visited Sagwara ten times. During the first two or three fieldtrips I concentrated on gaining people's trust and establishing as many contacts as possible. I had to learn how to approach them. This took some time but to gain acceptance was not too difficult when you approach without prejudices and try to be yourself. At the outset I conducted a series of short interviews to establish the views and attitudes of different people and the kind of problems they experienced, which gave me a clearer impression of those who were likely to be suitable informants for my research purposes. Furthermore, in this initial phase I did a lot of walking to familiarise myself with large areas of the village. On these occasions I was also introduced to the local flora which helped to prepare me for the coming interviews concerning the different tree species. I prepared a list of trees (appendix), most of which I took from the book 'Local

trees, local uses' (Sharma/Sarin 1989). The list grew longer with each interview - I went through it with many different people, and on occasions with whole groups of villagers, although initially only with men. In this way I systematically evaluated 90 tree species; further information about other plants was added throughout the field trips. I was astonished by the large number of people who knew virtually all the tree species and who were able to provide me with data concerning fodder, fuelwood, construction and medicinal values. My intention was to interview a large cross section of people in order to establish the social distribution of their knowledge of trees. It took a long time to arrange a meeting with the women due to some reluctance on their part to have a meeting with men and also because they were apparently much more involved in their daily work. I also spent time with a class of school children to evaluate their knowledge and its transfer to the younger generation. The results were quite disappointing. Of 16 students (only one girl) aged 14 to 15 years, only two had a really respectable knowledge. The others knew very little about the different species.

I adopted an open-minded approach when conducting my research in the hope that the direction my study would take would become apparent during the process. I soon recognised that data on the medicinal values of plants would be an important feature of this survey. During a SWACH training (a successful health programme to eradicate the guinea worm) in Sagwara I met two Ayurvedic doctors who provided me with some useful information about the quality of the Bopas (traditional healers) methods of treating illness. At the Ayurvedic College in Udaipur, I met Prof. Sharma who went through my data collection and analysed it from the point of view of Ayurvedic science.

During my fieldtrips I needed an interpreter who gave me a voice and more importantly an ear in the villages. The quality of the study was hinged on his ability to cope with people and his aptitude for translating my sometimes complicated questions in a way that was comprehensible to the villagers. For the last four months I was accompanied by Pankaj Mishra a civil engineer who worked for Rajasthan Rural Development for two years. He was more than an interpreter, he was a partner and his ideas opened my eyes to issues I would not otherwise have noticed.

Working with Angelina Malik and Marielle Rijke was a worthwhile experience as they were able to motivate people, particularly the women and conducted very interesting interviews. Ramnarayan from Indian Institute of Forest Management (IIFM) in Bhopal accompanied me to Sagwara on one occasion. I profited very much from his impressive knowledge of the different tree species.

Seven months of fieldwork here in Rajasthan will leave their mark on my personality. I learned a lot about myself, most of all that the luxuries you take for granted at home aren't necessary to be happy. My time in Sagwara was an enjoyable and unforgettable experience.

## 2. 'INDIGENOUS KNOWLEDGE' IN DEVELOPMENT

Following this rather comprehensive introduction which I feel is necessary to reveal the background and the frame conditions of my own research, I will continue by elaborating on the term indigenous knowledge within a development context. In chapter 4 I refer to specific aspects of my case study which will help to clarify the theoretical background discussed in the following chapters.

Most development institutions in the last decade have shown an increasing awareness of the importance of local or indigenous knowledge and there is a proliferation of published literature on the subject. Previous development efforts which attempted to emulate the path taken by the western world; a process that took 200 years, have met with little success in the countries of the south. More recently, those involved in the development process have realised that strategies devised in accordance with the 'top-down' approach of the last decades, have had little impact on living conditions. By the 1980's it was evident that development policy had stagnated in the face of reality and a new approach was necessary. Basic needs strategies, sustainable development and participation of local communities became the new fashionable terms and the value of indigenous knowledge could no longer be ignored within this context.

The publications of scientists like Chambers (1979), Brokensha et al. (1980), Geertz (1983), Richards (1985), Cernea (1985) and Dove (1988a) who in recent years were well known 'think tanks' in the big development debate, brought indigenous knowledge to the forefront of development co-operation. Depending on the background and the point of view of the various authors, the different terms used were 'indigenous knowledge', 'indigenous technical knowledge', 'local knowledge' or 'traditional knowledge'. In this paper I prefer to use 'indigenous knowledge' except when I wish to emphasise the spatial aspects of the term; in this instance I use 'local knowledge'.

The academic discussion of the subject 'indigenous knowledge' is as old as anthropological fieldwork itself, but the importance of it for development was only recognised about 15 years ago. When the 'big theories' of modernisation or dependencia failed, the theoretical discussion had to begin anew. Howes and Chambers from the Institute of Development Studies in Brighton (UK) published in 1979 the influential study 'Indigenous Technical Knowledge: Analysis, Implications and Issues' and launched a new way of thinking which incorporated the scientific disciplines of geography and ecology. This change in outlook was further provoked by the oil crisis which turned the scientific interest towards using alternatives to nonrenewable resources.

This then was the learning process prior to the discussion about the potential of indigenous knowledge. Certain individuals within international organisations such as the World Bank (Cernea) and the FAO (de Montalembert), and other influential members of both governmental or non-governmental development institutions have conducted research on the use of indigenous knowledge in relation to some of their projects. In most studies the first priority was rural knowledge concerning the management of the fields as this aspect was considered the

most important in the context of subsistence and fundamental to the existence of a particular culture. The rationale behind the phrase 'the farmers do best' is based on the concept that the stock of indigenous agricultural knowledge can be used as a foundation for the development of rural areas. Central to this way of thinking are the alternatives to the former modernising theories which are the decentralised, participatory and locally supported development strategies based on the knowledge of the rural population (Leemann 1989:3). Even so, development projects of today rarely consider the problem of how cultural tradition can adapt to or even survive, the ongoing social, economic and environmental change.

Two characteristics of the earlier unsuccessful development theories have still to be eradicated. Firstly, in spite of the fact that reasearch and development within these new frame conditions have been ongoing now for over a decade, the local population is still unable to participate in the development process. It is true to say indigenous knowledge has been evaluated, but it was taken out of context to a central research institution and 'improved'. This adapted knowledge was then made available through different projects to other people. The results of this process were often unsatisfactory as development personnel went on to adapt the frame conditions to the new knowledge input instead of vice versa. It is not always feasible to extract knowledge from its social context, to transform it and to successfully reintroduce it (I will return to the importance of 'the local factor' in the results of my fieldwork further on in this paper, ch. 4.3). The practices described above are just another product of neo-colonial prejudice based on the assumption that our knowledge is considered to be superior to that of the rural population in the developing world. Again it is another approach with a top-down strategy and the knowledge flows only in one direction. Participation in development demands equal rights between western and indigenous knowledge systems without any prejudices.

Secondly, the practical work with the new approach has a tendency to favour the more technical aspects of indigenous knowledge. This can also be seen by the fact that the first authors associated with this new approach such as Howes and Chambers (1979) spoke of 'indigenous technical knowledge' or later still, about 'local management systems' (Niamir 1990). Thrupp (1987:2) opposes this view by stressing that local knowledge involves much more than just the technical aspects. It involves wisdom in general, ideas, perceptions and the capacity for innovation which incorporate the ecological, biological, geographical and physical environment. Thus, local knowledge is a holistic concept which has evolved to cope with specific living conditions and it is this that makes it strong. Projects that emphasize only the technical aspects are likely to fail. Again it is this holism which makes the practical work with local knowledge very demanding, a task that local NGOs in particular have to be aware of and try to solve. I hope that with this paper, I can suggest ways of avoiding the problem areas and give advice to ensure that the subject is handled successfully.

### 3. CULTURE AND INDIGENOUS KNOWLEDGE

#### 3.1 The Concept of Culture and Space

It is important to clarify the concept of culture on which the following chapters are based. Prof. B.K. Roy Burman made his view clear at a speech he held in 1993 in Delhi, on the relation between the members of traditional culture and the area they inhabit: 'I want to clarify that I am not using the term 'indigenous' in a chronological sense. By indigenous I mean people who are rooted in their immediate environment, whose social organisation is woven round the management of their immediate environment and whose cultural elaboration takes place primarily through interaction with the immediate physical and social environment.' This view shows the strong spatial relation of traditional cultures. Seeland (1988:48) defines culture as a result of the development of people who are confronted with the specific frame conditions of their environment. Thus, the existent life style is the most adapted one. Cultural changes only take place when there are also changes also to the immediate (social, physical, climatic) environment. A culture with its knowledge is a reflection of the environment and represents it. Culture can be defined as 'the commonly accepted knowledge of a group of people' (Vansina 1985:127f.). Members of a community share ideas, values and images which exist collectively and which are unique to that community. The way experiences are perceived and incorporated are the same within a culture and are transferred to others by the process of socialisation. One of the main goals of my original report was to assess the degree to which the knowledge of individuals and society as a whole was influenced by their specific physical and social environment.

It is important to see the area in which a culture is settled, from the perspective of that community. There are three dimensions of space in which the interactions of a culture take place and which can benefit those making observations and analyses in the field:

- practical/physical: agriculture; common property resources
- emotional/social: social relationship with the environment; native land
- spiritual: holy, mystic places

Local knowledge is determined by its spatial context and by a specific group of people, who define themselves by their knowledge. A community based approach that aims to reveal the specific conditions of a society and its natural environment and which promotes an understanding of their ways of thinking and acting rejects the universal theories of the development discussion. Niamir (1990:2) in this context speaks of 'ecological particularism'. Anthropologists use the term 'locality' which emphasises the importance of revealing precise information about the interviewee and the place and time an interview takes place because basically every interview situation and thus the information gained, is unique. The evaluated data of a research project about indigenous knowledge has to be seen in a wider regional context in order to reveal the general and more precise values of the information and which thus makes it possible to bring to light the specificities of that particular area. It has to be shown how the knowledge is expressed in the chosen area and what the society itself believes is worthwhile knowing. An

important part of elementary research is the need to establish the distribution of knowledge in relation to sex, age, caste and family.

Sagwara, the village where I conducted my case studies, is situated in a localized natural setting in a relatively dry area of Southern Rajasthan. It is impossible for the people to subsist in such conditions without an explicit knowledge of their environment and the use of their natural resources. It is in the interest of the Indian government to encourage people to remain in the villages to avoid overburdening the towns. This is only possible if the social systems in the rural areas continue to work without significant external interference and the people are able to use their natural resources legally. Referring again to the above definition of the concept of culture, the rural population must be able to sustain their individual cultures in their own localities. This has to be an important consideration in any development initiative and necessitates a more participative approach, which is advocated throughout this paper.

### 3.2 Theoretical background: Professional vs. local knowledge

If one comes into contact with traditional cultures in developing countries it is essential to be aware of the fundamental differences. Some of these differences between the western based, formal, professional knowledge and the local, indigenous, traditional and popular knowledge are shown in table 1. From this, it is evident that there is a large discrepancy between myself as a member of western society, the leading, western-educated elite in India and the rural population living at subsistence level. This is particularly true in the Indian context with its conservative educational system, introduced by the British colonial power. To handle such contradistinctions is a difficult task for a field researcher but is also a challenge. This requires the researcher or the fieldworker, at least at the outset, to suppress his own educational background if he is to develop a feeling for the ways of thinking and acting of the examined society. This is necessary in the analysis of a field trip, if one is to make accurate conclusions and also during projects in order to act in the interests of and according to the perception of the population to be developed. This also has implications for the use of methods of appraisal in the field (appendix).

Table 1: Comparison of professional and popular knowledge

<b>Professional knowledge</b>	<b>Popular knowledge</b>
technical	practical
systematic	random, fragmentary
can be proven scientifically	unique to each case
standardised	unstandardised
specialized knowledge (of sometimes contradicting theories)	special knowledge and every day knowledge (no contradictions)
formally taught/learnt	based on experience; passed down through socialisation
is constantly revised through further research	claims to be right indefinitely
not urgently relevant to practicalities of life	must be relevant to the practicalities of life

Source: Based on a transcription of a lecture of PD Dr. K. Seeland: 'Cultural aspects of forest management and conservation', Dept. VI of Swiss Federal Institute of Technology in Zurich, Winter 94/95.

The definitions in table 1 are the extremes of the two concepts of knowledge and should not be taken as true contradictions. There are, depending on the particular situation, always aspects the two knowledge systems have in common. The professional knowledge has its roots in the so called scientific revolution of the 17<sup>th</sup> century. The academic, technical way of thinking developed independently and away from every day understanding. This separation did not occur on such a scale in traditional society. Here the knowledge developed according to the basic requirements of the people and has been passed on through the generations. As a result, the knowledge remained a more integral part of the culture of the people and it is likely, although not yet proven in this paper, that the amount of so called 'common sense' knowledge among traditional cultures remained much greater. This discrepancy has to be kept in mind while working in the field. Our abstract models of culture as a basis of western academic development theories cannot be transferred to the local setting of rural cultures. There, the knowledge is based on intuition and the tangible. This knowledge based on experience, incorporates specialised and every day knowledge and, in spite of the fact its existence is often only fragmentary, is perceived as holistic, without contradictions and valid indefinitely by the indigenous people. They see themselves in a closed system (Howes/ Chambers 1979:5). The knowledge is, through its direct links to their life context very practical and utilitarian. It refers to those aspects which make life within the specific society and within the ecological frame conditions possible. Thus, indigenous people have a very well developed empirical knowledge and are experts within the context of their lives. They have excellent powers of observation and can recognise correlations but not necessarily causalities. This shows the potential of a participative development approach which can combine local knowledge with the analytical strength of the outside expert. This also encourages people to remain in their original habitats, thereby avoiding the problems associated with overcrowding of the larger cities and desertion of the rural areas. People who are experts within their life context can often feel helpless in other environments and in spite of the adaptability of the human being, feelings of homelessness persist.

The study of indigenous knowledge allows us to look at the way a local population perceives its environment. It shows what people themselves see as important and practical. What is valued as a resource can differ within each individual culture and results in different uses of knowledge. A famous example is the Eskimos who can identify 16 different types of snow from its texture. The common feature of traditional cultures is that their production technologies are woven in a system of cultural values (Seeland 1988:46) and that the people see themselves as part of, but never as the owners of nature and thus their actions are not geared to maximising profit. Their relationship to the environment is more a symbiotic one.

Local knowledge has often been neglected in the past by many of the experts and organisations within development co-operation who implied that local knowledge is backward, conservative and based on ignorance and myths. Thrupp (1989:139) suggests this theory forgets that ignorance is not based on a lack of intellect, it is rather a sign of poverty, social inequality and the lack of access to crucial resources. Conservative and backward practices are thus an expression of the local frame conditions and are adaptations to counteract local risk. The fact is

that attempts were made to introduce development through a socio-economic change i.e. through the elimination of the traditional lifestyle (Dove 1988b:1) and through the technology transfer based on western know-how. The failure of this transfer shows that there is no straightforward solution to development. As I mentioned before during the last 15 years another scientific paradigm appeared. By adopting a more participative approach, some successful development projects demonstrate a judgement that the two different knowledge systems are of equal worth.

One significant aspect of indigenous knowledge that one should be aware of during field studies is the unequal distribution of this knowledge within the community. As I mentioned earlier, the common sense knowledge appears to be far greater in the rural areas of developing countries than it is in societies of, or influenced by, the west. It is this particular knowledge which forms the core of a culture and which is an important distinction between the different cultures. Of course there is also an unequal distribution of knowledge within a specific culture which has its specialists on different subjects, such as medicinal treatments. There are differences between sexes and within the age groups, and due to varying individual capabilities and levels of interest, but there are also differences between social and economic classes (in the Indian context also castes). As I experienced in my field studies the social aspects are not that important within the relatively homogenous tribal structures. Here I found that the levels of knowledge varied among different age groups and the sexes for reasons which will be discussed at length further on (ch. 4.4). The different physical, social, and spiritual surroundings mentioned before (ch. 3.1) can influence individuals within the society, to value different aspects of the local knowledge. There are groups in a traditional society who legitimise their position through their specific knowledge and also keep this a secret within the family. Therefore it is essential during interviews in the field to establish the personal background of the interviewed person to reveal why this person chooses to disclose or to retain certain information and to analyse the conversation accordingly.

In the recently published literature, examples revealed and emphasised the importance and value of indigenous knowledge. From an academic point of view the traditional knowledge can look 'pre-logical' or even 'irrational' (Howes/Chambers 1979:5), but when one sees it within the cultural context and considers the different influencing dimensions, the academic evaluation has to be revised. One of the strengths of indigenous knowledge is the holism which is based on immediate observation and the possibility to order and classify the different elements within an ecosystem. Ethnobotanists in particular were able to profit from studies of indigenous botanical knowledge which had significant implications in their research on biodiversity. The awareness of the value of indigenous agricultural knowledge related to intercropping systems has also increased following the environmental disasters of the externally introduced monocultures. Today, basic research on the indigenous intercropping systems is done throughout the world to make it of use to other people. Other current research of local knowledge is done in relation to agroforestry, pest control, seed selection, nitrogen fixing plants, cattle breeding, polycultures, use of wild plants and traditional medicine.

External and Indian planners, researchers and experts have reason to feel threatened by the introduction of indigenous knowledge in rural development. In the past they have legitimized their position with their specific (western) knowledge and thus perhaps now feel they lack authority in their approach to the people in the field. Both the researchers and the local people have to adapt to the new situation and to redefine their role. For academics above all, the way forward necessitates a fundamental change. The ethnocentric view of implying one's own culture is superior to that of a foreign one has to be eradicated. It is important to clarify the new position and its purpose to the traditional groups and not - as has often been the case in the past - just to give them the impression of spying on them in order to use the information elsewhere or even to use it against them. The participative approach is raising the confidence people have in their own capabilities and increases their awareness of environmental issues which is a substantial step in the right direction. However, here one may also find a potential obstacle to working successfully with a participative approach. The local elite may feel that their power and authority locally would be threatened by research and development projects involving entire communities and because increasing self-confidence on a greater scale could also lead to a resistance movement against existing power structures. It is therefore absolutely necessary to gain local political support in a participatory approach.

The term 'traditional knowledge' also implies a temporal component which refers to the passing down of ideals, values and norms through the generations contributing to the identity of an individual within a group. At first glance this can imply that the knowledge is static and inflexible. On the contrary, one has to realise the context of these cultures which have no written traditions concerning their ways of thinking and acting. Vansina (1985) speaks of 'oral societies'. The transmission of cultural traditions and knowledge has always been done orally through socialisation and through the constant repetition of songs, speeches and stories. Therefore its existence is random and fragmentary (table 1). If somebody is to use their knowledge it is necessary that it is applied and adapted to a specific context. 'The remembering is the recreation of what we knew before' (Vansina 1985:147). Changes of the physical and social frame conditions are leading to a modification of the indigenous knowledge system. This has been happening for many years although more recently, traditional cultures have found it more difficult to adapt to an acceleration in the changes to their social, economic and environmental conditions.

Changes within traditional cultures happen only through external force (Seeland 1988:45). Traditional cultures are basically against change. They accept their culture as it is and are not always in search of new means of controlling their immediate environment. However, changes are occurring due to the changes in living conditions within a society, though these are progressing relatively slowly and within small areas. Thus, the changes are not perceived as such. The potential for innovation is also a feature of many cultures. Howes/ Chambers (1979:6) refer to a case in Nigeria where the yield of Yams and Cassava has been substantially improved due to experimentation by the local population and a word for 'experiment' actually exists in the local language (Yoruba). Examples of other technologies

used by some traditional societies appear to have originated as a result of the innovative potential of the local population. It is also likely that some of these changes evolved to counteract harsh natural environments or crises so often a characteristic of regions inhabited by traditional cultures. Generally however, traditional communities value stability and continuity and change only happens slowly.

Today there are very few cultures in existence that have not been in contact to some extent with western culture. The outcome of contact between traditional and western cultures varies from case to case, as does the ability of a society for example to incorporate new technologies into their every day lives. Generally, a synthesis of the two knowledge systems has not really occurred. If anywhere, it is in medicinal aspects where they are the most compatible (Howes/Chambers 1979:6). Either the traditional society is very strong and ignores the innovations coming from outside, or, which is more likely, if traditional society is exposed to change it can become vulnerable and disorientated and the traditional knowledge tends to erode. I do not want to give the impression that all innovation has a negative effect. There are certainly many innovations which have improved the circumstances of traditional cultures and have given them new perspectives. However, in light of the benefits to be gained by maintaining traditional societies and their knowledge, there are many indications demonstrating that if changes are not very carefully introduced people's livelihoods can become unstable, the continuity is lost and a culture and its individuals will suffer.

#### **4. ISSUES OF MY FIELD RESEARCH IN SAGWARA**

##### **4.1 The importance of trees and forests for the Bhil**

Forests are very important within the tribal context. The Bhil, like other tribal communities have adapted over centuries to a life within, or very near to, forested areas and their subsistence living now depends on forest products. The wood itself is used for heating, cooking and construction; herbs, plants and roots are used as ingredients in local medicines and the collection of seasonal fruits supplement the diet of the local people. Furthermore, the forests are used in a communal sense as an important pasture area on which the livestock holder grazes the cattle. The mix of the different tree species is particularly important for perpetuating certain local uses, notably their use in medicinal products, in the manufacturing of agricultural implements (plough, pulling instruments), for goods of every day use and for a balanced local diet. The data revealing the development of different tree species (see tree list in appendix) over the last 30-40 years indicates that even the relatively well maintained forest areas around Sagwara are in danger. The reasons for the decline of some species are both internal and external. On the one hand, the population pressure has also increased dramatically within these rural areas which has had negative implications on the local resources. On the other hand other species became valued for a number of uses outside the locality. Bamboo (*dendrocalamus strictus*) and teak (*tectona grandis*) for example, have been sold as cash crops by outsiders but more significantly by the local population during times of scarcity to provide money to survive the crop failures.

Some authors have established a direct connection between the dry periods - which have without question, become more frequent during the last 20 years - and the declining forest area. The consequences of these droughts are felt most by the rural population. The Forest Department although aware of the problem, has only very recently introduced it as a subject for discussion within its political body. In Rajasthan where 60% of the entire state has an arid climate, the conservation of the existing forest areas and the afforestation of other areas has finally been given precedence in political discussions. The Aravalli hills are of particular interest within this context because they function as a climatological division. However due to extensive deforestation in the area, the role of the mountain range as a barrier against the spread of the desert is severely threatened.

The present situation in the Aravallis is the result of the lengthy, profit orientated, planned and unplanned development in Rajasthan which has seriously affected the local and regional, ecological balance and its social systems. The population within this mountain range lost the rights to the use of their local resources, which are instead legally in the hands of an external elite. This is a profit orientated short sighted scheme that shows little respect for the local population. Indeed, local people are exploited as badly paid labourers who, once the job is complete often have no other choice but to harvest further (illegally) the now scarce resources (mainly wood for construction and fuel) and to sell it in the nearby markets. The result of such shortsighted development is the alienation of the rural population and the destruction of their relationship with the natural environment. The population in the Aravallis is too large to allow migration and settlement elsewhere. It is therefore necessary that they are involved in the plans for the sustainable development of the area and that this development is activated at the earliest opportunity if the damage is not to be irreversible.

In 1980 the Ministry of Home Affairs formed a committee whose task was to ascertain the effects of the forest policy and to search for possible solutions to the plight of the tribals. The committee pleaded for an understanding of the symbiotic relationship between forests and forest dwellers and stated that for the sound management of the eco-system, the relationship should not only be properly understood but should also be made the bed-rock of operational policy' (Doshi/Vyas 1992:33). The initiation of the Joint Forest Management Programmes (JFM) was the response to this plea, although the JFM projects have so far done little to alleviate problems. Projects are disappointingly small in number and scale and restricted by the slow work progress of the responsible political body. Another very positive move is the recent development of Forest Protection Committees (FPC). The concept of forest protection has been taken up by large numbers of the tribal population, and may even mark the beginnings of an environmental consciousness which, it is hoped, will continue to grow in the future. The tribals in most of the villages I visited are aware that their living conditions are threatened as the forests decline and understand the principles of forest conservation. The numerous NGOs active in South Rajasthan must now harness this growing potential with the support of the state government.

The climatic situation in the Aravallis demands a life style which has developed over centuries and is essential to the survival of local cultures. In spite of the fact that the Bhil have been exploited for a long time by landlords, they have been able, particularly in the more remote areas like Sagwara, to maintain a high degree of personal integrity and morale. Outside influences however, jeopardised the future of the tribal cultures again and again, notably the Bhils whose rights of usufruct over local resources were curtailed. Sagwara, thanks to the strength of local resistance, was able to retain its power over the surrounding forests, but in many cases forests have been made accessible to other parties whose interests differed from those of the local population and usually resulted in their destruction. As we have become aware of the mistakes made in the past, we are also more aware of the importance of understanding people's way of life in a traditional setting that has remained relatively undisturbed, such as the one found in Sagwara. An area is used most effectively by the local population (and not by outside experts) who may possess exclusive knowledge concerning different uses of local tree species. The uses are an expression of the actual local reality and it is vital that a community can reproduce them within the legal, ecological and social frame conditions. This can only happen if the value of forests for the rural population is accepted and if their rights of usufruct are, for the most part, returned to them.

When indigenous knowledge was introduced to the development debate, academics in the western world concentrated more on knowledge about the management of the fields. The forest, although so crucial to the existence of many cultures, was for a long time overlooked until research on biodiversity and global forest conservation activities eventually discovered the potential value of indigenous knowledge of trees and forests for the global environment. This report endeavours to show the importance of forests and the knowledge of the different uses of tree species for a community such as the Bhil and that the conservation of the forest areas with its whole variety of species is fundamentally connected to the existence of the Bhil.

#### **4.2 The perception of the environment**

I frequently experienced the astonishing powers of observation of the population of Sagwara and their ability to identify even the slightest changes within their natural surroundings. They have excellent empirical knowledge of the different elements of the ecosystem. Such astute observation was also reinforced by the data I gathered concerning the different uses of trees. I obtained, for example, evidence of two plants (i.e. Helpi - *flueggea leucopyrus*) which were able to show, through their changing characteristics, that rain was imminent. The fact that the people value or reject various tree species as cattle fodder also suggests excellent powers of observation; an impression that was confirmed over and over again. Local people accompanied me on long walks in the area, pointing out many different types of flora and describing its uses, which would otherwise have gone unnoticed by myself. Such experiences convinced me of the strength of the bond between these people and their environment. However, if one considers that the Bhil practice predominantly subsistence agriculture in harsh climatic and edaphic conditions, such knowledge no longer seems so unusual. The observation of the fauna and flora belongs existentially to the lives of these farmers and is part of their professional every

day life. They are also able to recall unusual climatic events dating back many years and the elderly use the 'quality' of the summer monsoon to relate to other significant events in history spanning decades.

The subsistence agriculture of the Bhil influences the seasonal cycle of religious festivities. Festivals such as Holi, Navratri or Diwali in Southern Rajasthan are occasions to thank the deities for the harvests and again demonstrates a deep spiritual relationship with the natural environment. They worship in small temples honouring the rain God Magra Bavji (deity of the forest) and certain trees are deemed holy because they are thought to be the abode of deities and spirits. Contrary to the western way of thinking the human being is not seen as central to existence and the lord over nature, rather he is seen as a part of nature. Nature is respected and feared and there exists a relationship of mutual reciprocity between nature and people. This belief explains to some extent their fatalistic attitude towards the powers of nature, such as the lack of rain.

The local people do not often search for new innovations, preferring instead to try to do the best with the potential they have. The majority of today's generation of parents are not interested in leaving the village in the hope of finding better living conditions elsewhere, although they do want to provide their children with a good education which they feel will give them the chance to leave Sagwara to find a better way of life.

Throughout my field studies I experienced on numerous occasions, the close relationship of the population of Sagwara with their natural environment, notably with their forests. The best example is the long and finally successful battle against the government's policy granting outsiders permission to fell trees around the village. At the outset, the people were primarily concerned with keeping their powers of decisionmaking in relation to their forests. But if one considers the strength of their resistance one has to conclude that they were not motivated solely by economic factors, rather the population was also aware of the negative impact cleared woodland has had on other villages nearby and felt that their immediate living area was similarly under threat. The building up of this resistance movement demonstrates strong social cohesion, and the fact that the emotional and spiritual relationship of the people with their environment played an important role. Following a number of visits to other villages in Southern Rajasthan, I had a strong impression that the social strength of the people in Sagwara was also a result of their freedom to make their own decisions about their natural resources. The population was fully aware of the responsibilities this entailed and were willing to take them on. In other places I visited, as the local population lost the right to care for their resources they gradually lost interest in their natural surroundings until they eventually succumbed to the offer of short term financial gains from the sale of their forest resources.

The local knowledge concerning the possible uses of the relatively more numerous tree species is in direct proportion greater to the rights of management the population has over their natural surroundings. And the greater this knowledge, the better the local culture can function, can reproduce itself and the better it is interconnected within their life context. There is no

comparison between a population caring for its naturally grown forest and a population living in areas that have been replanted with fast growing species such as eucalyptus or acacia which are used as cash crops and 'harvested' in less than ten years. The social relationship of the population to this non endemic species and to this kind of forest monoculture is lacking. In the perception of the Bhil, trees serve a multitude of purposes that are not necessarily economic - often they can be of spiritual value. Because of this it is particularly important that the Forest Department and the NGOs take into consideration the relationships of the target population to the different local varieties rather than just the possible economic benefits. Planting fast growing non native species is a short-term technocratic solution that sooner or later leads to social problems. Indeed, the cultural and social identity of local people should be the main focus throughout the planning and implementation of development projects.

#### **4.3 The interaction of space and knowledge**

The knowledge is formed by the specific living conditions i.e. by space. In a comparison of my field data with data in the publication 'Local trees, local uses' by Sharma/Sarin (1989, compare table 2 in appendix) the different sets of data referring to the medicinal uses of trees proved to be very different and correlations were only found in instances when a tree and its use was widespread and well known far beyond a regional context. This is particularly worth mentioning because the study 'Local trees, local uses' was conducted also within the Bhil tribe in villages around Dungarpur only about 50 km away from Sagwara. What is revealed as local knowledge (at least for the medicinal applications) seems to a certain degree to be formed at an individual level and tends to remain with the individuals rather than being passed on to others. Within the different evaluated pools of data the people themselves play an important role which is not to be underestimated. One example is the medicinal knowledge based on family traditions and on the specific capabilities of the local healers. The whole setting of the data therefore appears to be heterogenic and virtually the contrary of what has been found elsewhere. Differences also appeared during my field studies when on separate occasions I spent time with two local healers each of whom had dissimilar personal backgrounds prior to their becoming healers. Local healers not only consider the physical symptoms of an illness they also examine it within the specific social context. The treatments are particular, even unique to the healer and so therefore are the methods used to apply remedies, many of which are based on specific tree species.

A different picture is revealed when one considers purely the nonmedicinal applications of trees. By comparing my data to that of 'Local trees, local uses' there was no particular difference in the types of trees used for fuelwood, construction or the manufacturing of implements for every day use. These more general uses in both similar natural settings of the Bhil are more influenced by their culture as a whole than the more individual knowledge concerning medicinal applications.

Overall it can be said that knowledge exists only in relation to the particular locality. Thus, the population of Sagwara knows only about trees found in the surrounding area. What was more

unusual was the initiative shown by Tavra an elderly, local healer who travelled through large parts of Rajasthan in search of plant species that could be used for healing and which he managed to cultivate in Sagwara. In spite of this exception most evidence points to the fact that local knowledge should be examined in the context of the specific environment and the data referring to the different tree species show that this is particularly the case for medicinal applications.

Local knowledge has developed at a particular place and is applied by the traditional society. It is an expression of the perception and experience of the people in their village and represents a continuous process. Indigenous knowledge is founded on the human life experience of the natural and social world within its specific and unique setting which is regarded by the inhabitants as their universe from which all knowledge originates. Thus, local knowledge is a complex holistic concept which has developed at a specific place by the people's experience. It is present in spite of the (partial) transformation of a culture exposed to outside influences because the culture adapts to and reflects local reality. The local adaptation increases with the size and strength of the community. What is seen as a resource within a society is very specific to their culture. The life style again is an expression of a pattern of resource use which a community will not relinquish without heavy pressure from outside. From the point of view of western society this attitude appears conservative and backward. But one should not forget that comparatively speaking the local population is extremely careful in its use of local resources (although not necessarily sustainable). The local patterns of resource use and the inclusion of innovation in the whole setting are a reflection of local circumstances and are adaptations to its risks. Traditional societies cannot afford to experiment as long as they depend to such a high degree on their annual crops as possible failure could threaten their very survival.

The issues covered so far mainly refer to the practical and physical aspects of space; the emotional and social dimensions I mention in chapter 3.1. The third, the spiritual level I was unable to study in the limited time I spent with this community. However it is likely that the local factor also has a strong influence even at this level. I make this hypothesis because I was able to determine big differences among the different medicinal applications of the local healers and it is the subject amongst the assimilated data which is the most spiritual. I would go so far as to say that the importance of locality as an influence on indigenous knowledge is so strong that it would be difficult to extract parts of this knowledge and to attempt to introduce it elsewhere. The knowledge is based on the experience of the specific area and it is unlikely that it can be replicated and be of use in another location. People found it in this context difficult to understand the need for something outside their locality when others attempted to introduce it from outside. The best example of this is when I offered to reveal to Saju, the village bhopa in Sagwara, the kind of medicinal uses of the local tree varieties used by other communities in nearby villages (data from 'Local trees, local uses'). He was not interested in acquiring such information because it bore no relevance to his locally formed spiritual background.

I must, however, mention Jan Jagran Vikas, a recently established NGO in Udaipur which is collecting indigenous medicinal knowledge and experimenting with its use in other areas with

some success. One has to keep an eye on the work of this organisation in the future and perhaps to consider the factor of locality within their strategy.

#### **4.4 The development of local knowledge and an outlook**

I have briefly referred to the distribution of knowledge in previous pages. Throughout the relatively homogenous tribal society there were no significant differences amongst families in their general knowledge concerning the uses of local tree species. Between the sexes the differences were based on the division of labour. The women knew considerably more about the nutritive value of leaves and fruits, while the men knew more about the wood from the various species used in the manufacture of implements for every day use or for the construction of houses. The main differences, as mentioned before, relate to the medicinal applications which I concluded were unsurprising considering the spiritual implications of this part of the knowledge and diverse backgrounds of the families and the local healers.

The predominantly subsistence agriculture in this particular area, the homogeneity of the society, which has not yet been affected by external influences and the traditions passed on from generation to generation suggest a high degree of common sense knowledge, the basis of which is land management and the supplementary existential uses of forestry products. Vansina (1985:124f.) supports this, saying that that this phenomena is common within all oral societies (Sagwara among them) and is much more developed here than in more diversified societies. Goody (in Vansina 1985:120) uses the term 'dynamic homeostasis'. It important to note that Goody also regards culture as something which is not static. He writes that traditional cultures also have to cope with external influences and that this requires continuous adaptation to changing frame conditions so that they are in fact as dynamic as western cultures. We find a considerable amount of innovative potential although this is no longer able to keep pace with the new situations created by the ever-increasing external influences. This results in mounting imbalances within the traditional society.

The people within these societies are thus losing the confidence in their own capabilities. The external influences in Sagwara are probably responsible for the declining interest of the younger people in their cultural heritage. Thus actors in the field should, at the outset, endeavour to raise the self-confidence of the people. The evaluation of indigenous knowledge and its inclusion in participative projects may be a step in the right direction. I experienced first hand the people's appreciation for this approach. They realised for the first time the value of their own knowledge.

I stayed overnight in the local school of Sagwara during my field trips and was therefore able to closely observe the Indian educational system. It was clear that many traditional Indian values are spread through the singing of the National anthem in the mornings, and via images of Tagore and Gandhi on the school walls. While the basics of education such as reading, writing and mathematics were covered, there was, in my opinion a lack of education among the young that related to their more immediate environment and their local cultural values, particularly in view of the fact that the teachers in Sagwara belonged to the same community and appeared to have a wealth of information concerning local social, political and environmental issues.

## 5. INDIGENOUS KNOWLEDGE IN THE CONTEXT OF DEVELOPMENT POLICY

In an evaluation of development co-operation over the last 50 years one can only conclude that it has not solved many problems (and may even have been responsible for adding to them) in the developing countries. The reasons behind this are chiefly, the use of unadapted technologies, unsuitable or incomplete evaluations and monitoring and unsatisfactory management of the projects. These problems have put serious pressure on the people working within the field of development to adopt an approach that takes into consideration traditional agricultural methods and indigenous knowledge in general.

Terms such as 'development' and 'progress' as they were understood for a long time and often still are today, are somewhat ironic considering the high human ideals of the western world they stand for. Today western society provides financial, technical and scientific help and yet simultaneously regards its own cultural development with growing scepticism. Many individuals of our society feel that they have forfeited their spiritual roots for the sake of development and as a consequence they look for that inner peace among the cultures in the developing world. Such observations have convinced some leading personalities responsible for development policy, of the need to dispense with the ethnocentric world view and to work more with the potential they find in the target regions. They also recognise the importance of involving the local population in their projects and aim to benefit these people in relation to their specific living conditions, the projects therefore had to be on a smaller scale. It was also necessary to find reliable partners in the developing countries whose experience of working closely with the local population would be a great asset. At first the development institutions focused largely on agriculture, on the basis that it provided the best opportunity to raise people's standard of living in the shortest amount of time. It is commonly agreed that local knowledge in particular is best suited to the participative approach. Development institutions always work with people with autochthonous knowledge potentials which then have to be adequately incorporated in the projects. They were quick to recognise that the local population has a wealth of knowledge about life within specific local frame conditions and a holistic perception of their environment and moreover, that the target population has the moral right to decide the direction of their lives in the future, and at the very least that their thoughts are to be given careful attention in any development project affecting themselves and their surroundings. A prerequisite for this is to establish at the outset their life style and indigenous knowledge (largely subsistence related). This socio-cultural approach is thus asking what the target groups are able to do and what they want, not as has so often happened in the past what is expected of them from the point of view of the external 'developers'. This approach aims to create and enforce an autonomous way to act. The study of local knowledge followed by its inclusion in the development of adapted technologies is raising the consciousness of people working within development co-operation and is strengthening the dialogue between all participants involved in this process.

Although scientists have published many articles which substantiate the value of indigenous knowledge within participative development, the approach is under-represented in practice and is not without criticism. Thrupp (1987:5ff.) points to a number of political, economic and

ideological reasons why research projects exploring the potential of local knowledge are still treated as peripheral:

1. A strong belief in the science which developed in the western world and is supposed to have brought them their wealth. Western science fears the concept of indigenous knowledge because of its competition with existing theories and because indigenous knowledge does not fit existing scientific models.
2. Laboratory conditions cannot be created and this questions the scientific value of indigenous knowledge.
3. Research and development institutions are often sponsored by western industries (for example chemical industries) interested in the supply of their manufactured goods adapted to the local markets. It is therefore not in their interests to support research on indigenous knowledge.
4. Early failures have destroyed the confidence of success using this approach. There were various reasons for the failures of these projects which had nothing to do with the approach itself: top-down strategies were still practised within the new approach; it was not integrated as an overall policy; there were management difficulties, chiefly because of the lack of practical experience involving the use of indigenous knowledge; insufficient consideration of the views of the target population; a bias in favour of the landholding male population and resulting neglect of the female population; a tendency to collect many often diffuse data; an insufficient understanding of the reasons why people apply their particular existing techniques and strategies.
5. Some countries fear possible political discontent as a consequence of this approach as it strengthens the rural population enabling them to form resistance against existing power regimes. Clearly, the people in power are unlikely to be supporters of a participative approach.
6. Staff working with this approach often have difficulties proving the success and cost efficiency of projects. Many of the variables appearing in the work with indigenous knowledge cannot be measured by traditional methods (for example growing self-confidence).

As a consequence of the discussions concerning sustainability of the late eighties there have been a few projects launched in India that attempted to incorporate indigenous knowledge. Looking back on these past efforts, most are now considered failures because the specific local knowledge was treated as a concept that could be easily transferred and replicated. The intuitive knowledge and its reference to the local, socio-cultural context had been overlooked. On this point of view the approach of, for example, the World Bank (in India with the Social Forestry Programme), had no more positive effects than the already existing top-down strategies. Participation taken seriously means that the process does not follow western ideas, rather it complies with the ideas of the target population.

Development involves change. But this change should not be based as is still often the case, solely on a transfer of technology. This approach is responsible for irreparable damage done to

the local frame conditions and to a subsequent loss of the knowledge, inherited from previous generations and so well adapted to survival in a harsh, specific environment. In Sagwara which lies in a relatively remote area of Southern Rajasthan, the government plans to develop the local infrastructure. It is only a question of time before the village has electricity and until the road there is paved. I personally hope that the population of the village is given enough time to adapt to the new situations. Ideally such development should go hand in hand with a strategy to strengthen the people's belief in their own capabilities and which encourages them to take advantage of the new opportunities created by development without jeopardising their traditional cultural values. This is a big task for the local NGOs (in Sagwara chiefly Seva Mandir), which although experienced in working at a grassroots level, are now responsible for creating the frame conditions and for fostering the spirit among field work staff of thinking in the terms of the local communities and ensuring indigenous knowledge plays a significant part in every project, to enable local people to benefit most from the rapidly changing circumstances in their area.

In the eyes of the average citizen of a third world country, the development of western society appears to be a success. Thus not without reason, a member of a traditional culture might ask why I as a member of such a privileged society, am so reluctant to see his country develop in the same way. It is indeed difficult to legitimise such a viewpoint. In my opinion it largely depends on the speed of the development. A society has to have time to adapt to innovation. Development ultimately takes place in a specific place and has to be supported by the local population. These are the people who treat the environment the most carefully and control therefore should remain in their hands. When there are imbalances on the socio-cultural level the subsistence and thus the independence of the local society is threatened. They often become reliant on the help of development organisations and this dependence results in changes in their culture that are unlikely to be in their long term interests.

Finally, the success of a participative approach depends on the political will to accept and conserve indigenous knowledge and to incorporate it as a basic factor in development strategies. The process of change is accelerating rapidly and the traditional culture has to be given the chance to incorporate change into their own environment and to adapt their values accordingly. It is also important in a world which is becoming more and more uniform in terms of cultural values to keep our options open and to maintain those cultures that differ so greatly from those transformed by the supposedly successful way of development which has often proved ultimately to be so damaging. The variety of different cultures allows us to profit through a cultural exchange. This of course works only if the people in a specific culture are thriving and this again depends on how well it is able to function within its local environment. To give the members of traditional societies this opportunity it is necessary to conserve and (re)develop their freedom to live their own lifestyle.

I want to emphasise that I am not advocating that we keep local cultures as they are or that we treat indigenous knowledge like a collector's piece in a museum. A culture is always involved in

a dynamic process. But it has to be considered that in our culture we have had time to adapt to the technological process which has evolved over centuries. Every effort should be made to provide societies in developing countries with the same opportunities that are available to us, if it is not to end in chaos. The main objective of all future development projects should therefore be to introduce development within the existing socio-cultural, physical and historical frame. It is the responsibility of development workers to prepare and support the local population so that they are able if necessary, to make adaptations to external influences. This paper demonstrates that in order to be successful one has to learn to *listen* to the members of traditional societies and to suppress the urge to teach them. The specific needs of the people have to be taken into consideration and because indigenous knowledge is by nature, a product of a specific, local environment and belongs to a unique society, there is little potential for replication and therefore every development initiative has to start afresh.

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## **APPENDIX**

### **A1 General methods used to reveal indigenous knowledge**

In social research and in anthropology one discovers a broad variety of different research methods. At the outset of my research on indigenous knowledge it was necessary to determine the appropriate methods to be used throughout my work. In this appendix I want to show how this process of decision making influenced my final choice. This chapter therefore, begins with an introduction to some of the theories behind relevant research methods, before I reveal my own data evaluation and the methods used in this process.

The complexity surrounding the subject of indigenous knowledge demands a very careful choice of the methods to be selected during the research. Essentially, I was presented with two possibilities: One was qualitative research connected to observation techniques and different interview methods and the second, a quantitative research which is primarily based on prestructured questionnaires. I was keen to adopt an open minded and unprejudiced approach to the subject to obtain as much data as possible relating to the 'knowledge of trees and forests' in the socio-cultural context. The compilation of a questionnaire would have required an already substantial knowledge of the social and natural frame conditions in the area where the research was to be conducted. At the stage when I needed to make a decision on the research methods to be used I lacked this type of information. A pitfall of the questionnaire method is that the researcher is unable to anticipate beforehand, some of the topics that require discussion and lastly there has to be a certain logic in a questionnaire to ensure that the final analysis is well founded and reliable. This logic is created by the researcher himself and not by one of the target population. Thus, a questionnaire is in opposition to a participative approach because it ignores the indigenous way of thinking and the local perception. It is also not appropriate to work in India within a wider cultural context; for example, when the researcher asks a difficult question, a respondent is more likely to make up an answer than to 'lose face' (every answer is better than none). This makes it difficult to draw conclusions from the evaluated data and can result in a distorted image of the local 'reality', particularly if the structure of the questions and the questionnaire are not compatible with the local culture. The quantitative method of research can therefore lead to more misinterpretations than qualitative research.

Popular knowledge (table 1) which is random and fragmentary makes it impossible, at least at the beginning to use systematic methods (such as a questionnaire) in the research. It is important when having detected and discussed the key issues during an informal interview to then speak to as many people as possible about these issues, in order to reveal contradictions and to put them in the appropriate context. To make this possible, the researcher must have understood a great deal about the local context which again demands a holistic perspective. The thought process and the storage of information influenced by a specific context, differs from that of an outsider (facts cannot always be recalled instantly) and the inability in some instances to distinguish cause and effect are further points which deny the use of a prestructured research instrument.

Thus, I looked for qualitative methods which involved the multidimensional and holistic systems of data, symbols and values of the local rural population. Above all, anthropology and the applied research in development co-operation offer some techniques which attempt to solve the problems mentioned above. I was conscious of the fact that the use of qualitative methods is considered suspect in terms of its scientific value and critics who are sceptical of these methods question its reliability and the possibility that results will be generalised. I hope I have been able to demonstrate that quantitative methods if used alone, cannot reveal suitable data within a traditional setting. Kleining (1991:16) also supports this, saying that the researcher has to choose qualitative methods if the research issues revealed through general knowledge, or through the knowledge (or opinion) of the researcher, are complex, if they differ, or are dispersed and contradictory or when it is likely that what at first appears straightforward is actually much more complex. One disadvantage of the qualitative method in reaching its objectives is that it is relatively time consuming (Richards 1979:30) and is therefore not always feasible for development projects for whom more time means greater financial expenditure. Development experts therefore rely more on techniques such as 'Rapid Rural Appraisal' (RRA) or 'Participatory Relaxed/Rapid Appraisal' (PRA).

## **A2 PRA and anthropology and the relevant methods**

The holistic approach is highlighted in the methods I finally used to conduct my research. I was wary of concentrating on just one method, preferring instead to work with a number of methods and which subsequently proved their use in my fieldwork. This pluralism of methods provided me with some security. If for various reasons (time constraint, my own lack of experience or failure to win the confidence of the target population) one method had failed, I could rely on the success of another method running simultaneously. The research was based on different observation and interview techniques. Observation largely reveals different ways of acting within the community and supplements the information gained during an interview. This uncovers different aspects of answers which can be cross checked in another interview. The final aim of this amalgamation of methods is to analyse the world in which the target population exists and to understand the sense of typical phenomena, processes and events. I wanted to interpret and reconstruct the life of the people in Sagwara as competently as possible and to highlight the key issues brought up by the local people within their natural frame conditions, which bore relevance to the focus of my research i.e. 'knowledge of trees'.

Qualitative research demands strength of personality and character in a researcher. For myself as a member of western society, research in a remote area of a developing country was a test for the body and the intellect. Endurance, creativity and adaptability, plus a great deal of dedication to the aims of the work are the qualities necessary to perform this particular method of research.

I have described here my personal decision making process that influenced my choice and use of research methods. However, to the staff of Indian NGOs who have been working in rural areas perhaps for many years and therefore know an area well, some of the issues may

appear superfluous. Ultimately, a researcher has to make up his own mind which research methods he wants to use and how he wants to use them, according to his own experience. What I describe in the following paragraphs may give some hints on how to (re)consider the situation as a researcher in a specific rural area.

*a) PRA*

RRA and PRA have developed within the practical work of development co-operation. I want at this stage to give a short introduction to PRA because this method emphasises the inclusion of the target population in the research process. Schönhuth/Kievelitz (1993:5) defines PRA as 'a way to animate and support the members of a research group to reveal, analyse and evaluate the hindrances and chances of development within a reasonably short time and to make decisions as to whether development projects are feasible within the short time specified.' My own approach to PRA within the context of my research did not have any direct implications for future development initiatives. My aim was merely to provide the findings of my research and my experiences connected with a participative approach for the benefit of development institutions. I must further emphasise that I conducted the research alone in contrast to the RRA and PRA which generally involves an interdisciplinary team effort. I used different aspects of the methods to obtain a complete picture of the situation in my research area.

The methods used within PRA are largely borrowed from anthropology, which has a wealth of experience in monographic research since the studies of Malinowski (Trobriand Islands; 1940's). With the advent of the participative approach, development co-operation recognised the proven skills of anthropological methods. PRA concentrates more on the understanding of complex facts than on an evaluation of quantitative data and variables. It looks at local circumstances from a wider angle and uses flexible and informal methods. Furthermore, it demands a high degree of participation, uses a whole set of research methods (but no statistical analysis or questionnaires), and highlights the individuality of case studies and results in qualitative description (Schönhuth/ Kievelitz 1993:7).

PRA is a bottom-up approach and demands a different attitude from the researcher towards the target population than has usually been witnessed in development co-operation until now. This change emphasises participation (learning from and with the people), a general term which incorporates respect for the people one is working with, an awareness that one's own criteria for success is relative (no answer is also an answer), the capacity to listen and to be patient and to show modesty in respect to one's own knowledge. The researcher may face problems of legitimising his presence in the area and may raise the suspicions of the local community by following these principles (listening and asking but rarely give any advice). In my experience this has not proved to be the case. I made efforts from the very beginning to clarify the reason for my stay and the meaning of my work. My motives appeared honourable in the eyes of the population who quickly surmised that I meant them no harm. I had the impression that the local population were proud of their own capabilities and the fact that they were the subject of my research.

### *b) Anthropology*

It is the aim of anthropological field research to reveal the relation of (tribal) people to their own specific living area by the recognition of the anatomy of the culture, an analysis of the natural surroundings and the collection of documents and stories that help to characterise their thoughts and beliefs. The methods used include the documentation (ethnographic diary) and close observation of the interaction with their environment and the rhythms of life of the culture.

Anthropological methods are particularly suitable when there is enough time to do a more comprehensive study. I was aware of the time restriction at the outset but saw the advantages of the methods in terms of their suitability to the local culture and knowledge. Anthropological studies help to detect social structures which are not obvious (for example power structures, the role of women in the society, social security systems, functional survival strategies, different systems of perception, reasoning and decision making processes particular to the local culture, etc.). In the next chapter I reveal the tools I finally selected for my research.

## **A3 Methods used**

### *a) Observation*

My observational perspective can be defined as unstructured (not standardised), open, not participatory, direct and conducted in the field (Lamnek 1993:254f.). This approach closely resembles the standard form of observation, the only difference being that I was not actively participating, though even this has to be seen relatively. In the early stages of my visits to Sagwara, I had the opportunity to live with a local family and participate in the social daily life and in the cultural activities. However, on the whole I remained an observant outside the social context. It was soon clear that there was no time to learn the local language and thus to really participate in their lives. I therefore adopted a peripheral position and did not attempt to gain a participative status. My method of working was unstructured due to the reasons mentioned above, because I was unable to plan ahead and because I needed to concentrate primarily on aspects of one subject (i.e. knowledge of trees). My approach was open because I informed the inhabitants of Sagwara of the purpose of my work in order to gain their confidence. By doing this I felt I would achieve more than by appearing secretive. Finally, the direct way of observation refers to my physical presence in the village. I mainly observed the immediate and obvious events and occurrences and in doing so, I observed the environment in the same way that it was perceived by the local population. This phenomenological view was therefore particularly appropriate because I was restricted in terms of access, to the apparent as opposed to the unseen i.e. largely spiritual beliefs. My understanding or queries regarding my observations were explained and clarified during the interviews.

The observation method has certain advantages over other methods. In particular, it helps to have an insight into the dynamism and organisation of the group (informal structures). Furthermore, it facilitates the detection of certain occurrences or events that may otherwise go unnoticed but which also demands considerable flexibility in the researcher. I aimed to develop a 'feeling for the culture'; to be involved and to understand and I expressed this to the local population who appreciated this and whose trust in me grew as a result.

This approach is not without its weaknesses, connected to the fact that I worked alone in the village. This meant that my research lacked the input of others; their different opinions, points of view and additional experience which may have resulted in profitable discussions concerning their observations. Thus, there is a danger that the experiences and results are very subjective. I tried to counteract this by employing a very competent Indian interpreter living in Udaipur, with whom I discussed the results of the interviews and observations. Furthermore, I had many opportunities in Udaipur to exchange views and reflect on aspects of my research with highly experienced people (i.e. generally the staff of Seva Mandir). Although again one has to bear in mind the fact that such discussions can again be described as subjective because they involve people (politicians, staff of NGOs, civil servants, members of a certain caste etc.) whose social background is very different from that of the rural population of Sagwara.

### *b) Interviews*

The main characteristic of a qualitative interview is that the questions are not composed and structured beforehand. An open interview technique is employed in which the researcher is encouraging but passive, largely leaving the direction of the dialogue to the person interviewed. These were the guidelines I followed throughout my field research interviews. However, occasionally a more 'focused interview' (Lamnek 1993:79f.) was required due to the structure of the research, the combination of methods used and some main considerations of the research that I had established in advance. On the basis of my observations I identified several issues which were particularly important and which I wanted to refer to during an interview. These topics were introduced with open questions which required a detailed response. 'The aim of the interview is ultimately to combine the subjective experiences of the interviewed person with the observation of the researcher, in relation to certain events' (Lamnek 1993:79). Therefore the most important point is to clarify and if necessary, to modify a hypothesis which has been established through observation. With this combination of observation and interview technique I was able to reveal a great deal about the ways in which the local population thinks and acts and without restricting other subjects which arose during the course of the conversation. In this way I gained a very definite picture of the situation from the point of view of the local population. This procedure (observing and asking) is very similar to the socialisation of children within a cultural setting and enabled me to experience as much as possible within the limits of my time frame. I further intensified this learning process by discussing the same topics with different people and then filtering the different subjective views to obtain an overall valid picture.

The main points of interest were the roles played by trees and forests in the local culture, their perception of the environment, the shaping of the immediate environment by the local culture, external contacts of the culture, the historical dimension (change, adaptation), common sense knowledge (every day knowledge) and the professional knowledge, paying particular attention to the ways in which these have been influenced by locality. I did not refer to these categories directly during the interviews, instead I aimed to accumulate as much material and data from

which I could make analysis. Hence, the focused interviews concentrated largely on the above objectives with occasional reference to other issues that arose during my stay in Sagwara.

### *c) Checklist*

During previous research, Dr. Seeland developed a 'cultural ecological checklist' (Seeland 1989, unpublished) for use in field research which proved very helpful. It is a questionnaire which the researcher himself is required to answer and which functions as an 'eye opener' to raise his awareness of issues in terms of the socio-cultural aspects and to the relation of people to their environment. The checklist helps the researcher to structure and analyse the observations and interviews while keeping in mind the other relevant aspects of the research topic. The aim is not to answer the questions as such, rather it should encourage a thought process and prompt the user to ask his own, more specific questions which arise during the research process. The structure of the checklist is also of use when analysing the data collated during a field study. In five steps, the researcher is able to redefine the facts relevant to the subject and use the frame of the checklist as a guideline for the final report.

The first step outlines the social field, i.e. the different relations and shapes within the society, which is in a constant, regulated cultural exchange. The second step describes the cultural field, i.e. customs, traditions (unwritten laws, behaviour, common laws), religious lore and social taboos. The third step looks at the social and cultural field as a whole; the natural surroundings as space shaped by culture, restrictions on the use of natural resources based on socio-cultural factors (traditions, customs, perception of local regulations and local power structures) and also studies and explains the uses of the important wild and domestic plants. The fourth step deals with the relation of the spatial context to the research topic (in my case: the rural-forested area). A particularly important aspect in my field research was the recognition of the social relations between human beings and trees. This last step introduces the practical use of the data for development issues. Potential problems can be identified and explained and data can also highlight the sensitive areas where culture and ecology may clash.

This checklist was especially helpful during the analysis of the data and I recommend that anyone conducting a study should develop such a tool beforehand. It is particularly useful for providing the qualitative methods with a certain structure.

### *d) The tree list as a systematic element*

Although my research topic was very broad and open, my initial focus was 'the indigenous knowledge of trees' which was always one key element to be developed during the research process. The holistic approach involved placing the evaluated knowledge of trees in the proper local context. In addition to the evaluation of different uses of the different locally found tree species it also entailed an in-depth study of the social, cultural and natural frame conditions, which is as one can imagine, a huge task. I went to great lengths to speak to many different members of society, of varying ages and both and both sexes to gain an overview of the whole situation. I frequently visited the nearby wooded area with different people who indicated the various species and explained their uses. It was particularly important to make an accurate recording of these facts. While preparing my stay in India I discovered the book 'Local trees,

local uses' a study by a research team from Dungarpur of the uses of different tree species among the Bhil in South Rajasthan. Soon after I had begun my field research I discovered that many tree species mentioned in this publication could also be found in Sagwara. Furthermore, as Sagwara was only 50 kilometres away from the study area (Bicchiwara Block) of the Dungarpur research team, the natural, social and cultural conditions were very similar. A comparison between the two sets of data was therefore necessary, with some interesting results. On the basis of my experiences, involving the data of the comparative study and interviews with many experts of the local flora I developed a tree list. It includes 90 tree species that can still be found around Sagwara which I then compared with the trees appearing in 'Local trees, local uses'. The results of this quantitative analysis are summarised in table 2. In my report I used this comparison mainly to answer questions about the effect of locality on the knowledge of trees and forests to establish their value and the ways they are perceived by the local culture and it helped me to filter out the common sense knowledge which is valid in a wider context (I was also able to put the case study of Sagwara in the appropriate frame).

I aim to make available my comprehensive, basic data of the tree list accessible to all those who are interested, but chiefly to the staff of NGOs in India, particularly Rajasthan to give them the opportunity to use this as a starting point for a whole pool of information about the local knowledge of trees which can be introduced in participatory development projects, notably afforestation programmes.

*e) Secondary sources*

The completion of my primary data back in Udaipur involved collecting as many secondary sources of information as possible about the subject, the people, the natural setting, the village and the history of the region. This included books, scientific documentation, maps, statistics and so on. This is not always the easiest of tasks for a foreigner who frequently requires permission to obtain access to documentation, particularly maps which are often withheld for strategical reasons. I was able to contact very helpful people on several occasions, at Seva Mandir itself and also in Udaipur at the Tribal Research Institute, at the University, at the Ayurvedic College, at the Forestry Department and at the National Informatic Centre (NIC). Furthermore, I located several good book shops where I found additional relevant literature.

This was a short introduction about the ways and methods I used to achieve my research goals. Please consult the introduction (ch. 1) of this paper to obtain more information about the selection of the village for the research, my approach to the people and the selection and the role of the interpreter in the field.

Tab. 2: A Comparison of my personal data with that of the publication 'Local trees, local uses' (Sharma/Sarin 1989)

How to use the table:

-  $\Sigma$ : Number of references to medicinal uses of trees appearing in my data and in 'Local trees, local uses'

- 'Qty.': Subjective estimation by the population of Sagwara of the numbers of individual tree species within their area. The scale is covers 1 to 6, i.e. 1 'very rare', 2 'rare', ... and 5 'common', 6 'very common'.
- In alphabetical order of the most frequently used local names for the trees. The figure before the local name refers to the tree list you find at the end of this table. The figure in brackets after the local name refers to the one which is given in 'Local Trees, local uses'. The botanical names which are unknown to myself are left blank.
- Informants: the explicitly mentioned persons and groups are 'Maharaj' (= Group of men mainly between 30 and 50 with an above-average interest and knowledge of the subject. 'Women' (= Group of more than 20 women of different age). 'Amratlal' (= intellectual und political leader figure in the village). 'Tavra' (= local healer of about 80 years, travelled a lot). 'Various' means that the data's has been mentioned by at least three different groups within the village.
- Column 'Total': 67 species common to both sets of data, 'w.' = species without indicated medicinal value. 21 trees species have been found with the same medicinal uses in Sagwara and in 'Local trees, local uses'.

Tree Species	Medicinal Uses		Medicinal uses mentioned in Sagwara and in 'Local trees...'		Qty.	Informant
	My Data	Local trees	$\Sigma$	Part of the tree used; illness		
1. Aakra (39) ( <i>Calotropis procera</i> )	6	5	-		3	
2. Aam (1) ( <i>Mangifera indica</i> )	8	4	3	Seed, heated + water; digestion Bark, powdered + water; dysentery Unripe fruit, paste + water; sunstroke	3	Maharaj Women Various
3. Adu (28) ( <i>Adina cordifolia</i> )	2	-	-		-	
5. Amla (5) ( <i>Embllica officinalis</i> )	3	-	-		2	
6. Ankla (4) ( <i>Gardenia turgida</i> )	-	1	-		-	
9. Areethi (6) ( <i>Sapindus muko-rossi</i> )	-	-	-		3	
11. Arua (7) ( <i>Ailanthus excelsa</i> )	3	4	3	Leaf heated; swellings Bark, crushed + water; snake bites, cough and cold Bark, crushed + water; cattle: sick, weak and more	3	Maharaj Various Maharaj
12. Badaliya (77) ( <i>Ficus bengalensis</i> )	5	2	1	Latex, applied; cures cuts on feet and hands	2	Various
14. Bagda (9)	1	2	1	Leaf heated and placed; internal wounds and more	-	Various
16. Bans (11) ( <i>Dendrocalamus strictus</i> )	2	1	-		3	
17. Beda (10) ( <i>Terminalia belerica</i> )	1	-	-		4	
18. Bil Patta (8) ( <i>Aegle marmelos</i> )	4	2	-		1	
19. Bio (12) ( <i>Pterocarpus mar-supium</i> )	5	2	1	Bark, crushed + water; regulates menstrual bleeding	1	Various
20. Ber (14) ( <i>Zizyphus mauri-tania</i> )	5	2	-		5	
22. Desi Babool (16) ( <i>Acacia arabica</i> )	3	-	-		2	
23. Desi Kanjdi (17) ( <i>Holoptelea integri-foia</i> )	1	4	-		4	

Tree Species	Medicinal Uses		Medicinal uses mentioned in Sagwara and in 'Local trees...'		Qty.	Informant
	My Data	Local trees	Σ	Part of the tree used; illness		
24. Desi Sagwan (63) (Tecomella undulata)	3	1	1	Bark, crushed + water; bronchitis (cough and cold)	1	Various
25. Dhamaniyo (18) (Grewia tiliaefolia)	2	-	-		3	
26. Dhawra (19) (Anogeissus latifolia)	4	-	-		4	
28. Emna (21) (Dychrostachis cinerea)	2	4	-		3	
30. Ghatobri (23)	5	2	-		2	
31. Gobra (24)	1	3	1	Leaf, heated and tied up; eye problems	2	Various
32. Gojal (27) (Lannea coroman-delica)	3	1	-		5	
34. Gundi (26) (Cordia rothili)	2	1	-		3	
35. Haler (67) (Boswellia serrata)	1	3	-		4	
36. Helpi (33) (Flueggea leuco-pyrus)	1	-	-		3	
37. Hingota (22) (Balanites egyptiaca)	5	4	-		2	
38. Hingwa (68) (Moringa oleifera)	6	4	-		2	
39. Hitri (37) (Bauhinia racemosa)	2	1	1	Bark, crushed + water; dysentery	2	Various
40. Hovan (69) (Gmelina arborea)	1	1	-		2	
41. Jambu (36) (Syzigium cumini)	3	2	-		2	
42. Kabeeti (38) (Feronia limonia)	4	1	1	Leaves, mixed with sugar + water; cools inner heat	2	Various
43. Kabra (42) (Mitragyna parvifolia)	-	-	-		-	
44. Kadaiya (40) (Sterulica urens)	3	1	1	Root, boiled in water, drunk; cold	3	Various
46. Kadu (41) (Pterospermum acerio- folium)	2	1	-		2	
48. Kalia Hero (32) (Albizia lebbek)	3	-	-		3	
49. Kamdi (43) (Pavonia indica)	2				4	
50. Kapta (44)	-	1			-	
51. Karanj (45) (Pongamia pinnata)	1	4	1	Leaves, boiled and applied; wounds of guinea worm	-	Maharaj
53. Karmela (3) (Cassia fistula)	4	3	2	Seed, crushed and water; cattle dysentery Skin of pod, powdered + water; cattle dysentery	2	Amrattal Women
55. Khair (46) (Acacia catechu)	1	1	1	Gum, eaten as laddoos; body energiser	-	Various
56. Khajur (47) (Phoenix silvestris)	2	1			3	
57. Khakra (48) (Butea monosperma)	5	6	1	Bark, crushed and water; applied on wounds	3	Maharaj
58. Khatti Imli (35) (Tamarindus indica)	3	2	1	Seed, powdered + water; dysentery	2	Various
59. Khirni (20) (Wrightia tomentosa)	3	2	1	Juice of leaf, applied on scorpion bite; negates poison	5	Various

Tree Species	Medicinal Uses		Medicinal uses mentioned in Sagwara and in 'Local trees...'		Qty.	Informant
	My Data	Local trees	$\Sigma$	Part of the tree used; illness		
60. Kiker (60) (Pithecolobium dulce)	2	-	-		2	
62. Lunia (49) (Hymenodictyon excelsum)	-	-	-		1	
63. Mahuwa (50) (Madhuca indica)	3	3	-		5	
67. Mojaal (53)	1	3	1	Leaf, boiled and tied up; sprains, wounds, swellings	1	Various
68. Mokha (54) (Schrebera swietenoides)	-	2	-		2	
69. Neem (55) (Azadirachta indica)	6	3	1	Leaf, crushed + water; general energiser (guinea w.)	2	Tavra
72. Pandiri (56)	3	3	1	Root, powdered + water; snake and scorpion bites	2	Various
74. Peenhi (58)	-	-	-		1	
75. Pipal (59) (Ficus religiosa)	1	1	-		2	
76. Raini (60) (Manilkara hexandra)	-	2	-		-	
77. Rijhwa (61) (Acacia leucophloea)	6	1	1	Root, burnt in front of people; get rid of bad spirits	2	Maharaj
78. Rohan (62) (Soyimida febrifuga)	2	1	1	Bark, crushed + water; restore blood circulation in case of internal wounds (esp. cattle).	3	Various
79. Sadariya (64) (Terminalia tomen-tosa)	1	-	-		3	
80. Sagwan (66) (Tectona grandis)	2	1	-		6	
81. Shisham (70) (Dalbergia sissoo)	-	-	-		1	
82. Simbel (34) (Bombax cieba)	7	2	-		2	
83. Sitaphal (71) (Amona squamosa)	1	4	-		1	
85. Tamet (73) (Nycanthes arbor-tristis)	4	-	-		5	
86. Timru (74) (Diospyros melanoxylon)	-	1	-		5	
87. Umbiya (75) (Saccopetalum tomentosa)	-	1	-		4	
88. Umra (76) (Ficus glomerata)	3	1	-		2	
89. Veeko (78)	1	-	-		1	
Total: 67 common species	166 11 w.	108 18 w.	26 21			

In my set of data are 90 tree species; while in the one of 'Local trees...' are 78. 23 of the species in my set do not appear in 'Local trees...'. In Sagwara I could not find 11 species which existed in 'Local trees...'.

## Tree list - General and medicinal uses of trees in Sagwara

Abbreviations used:

Q = Quantity found in Sagwara on a scale from 1 (very few) to 6 (dominant species)

NMV = No medicinal value indicated in Sagwara

In alphabetical order of the most used local names for the trees.

With remarks of Prof. Sharma, Head of the Ayurvedic College in Udaipur.

### 1. Aakra (*Calotropis Procera*)

Q: 3

Flower is offered in temples, it is very expensive.

Wood is very occasionally used as fuelwood, when it is dry.

Root is put in a vessel with milk: effective as a preservative of the milk.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	<ul style="list-style-type: none"> <li>- cooked together with the dried flower, eaten</li> <li>- warmed along with oil, applied</li> <li>- heated, applied</li> <li>- boiled with water, made into a paste, applied over the whole body</li> <li>- used for chara (weaving with leaf)</li> </ul>	<ul style="list-style-type: none"> <li>- cough (affected person sleeps after taking this)</li> <li>- extracts the pus from boils</li> <li>- skin diseases (pain killer)</li> <li>- keeps the body warm</li> <li>- to a sick person</li> </ul>
Latex	applied	scorpion bite

### 2. Aam (*Magnifera indica*)

Q: 3

Fruit is eaten (flowering in February, Season in May/June).

Wood is a good fuelwood, but not taken till the tree dies (because of the fruit). It is very expensive; people from outside the village sometimes come to purchase it in Sagwara. The wood is used for construction of light boxes; frames and planks for doors.

Leaves are used for decoration, religious ceremonies; eaten by cows and cattle.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Seed	<ul style="list-style-type: none"> <li>- Hard cover is put into fire, then broken and eaten</li> <li>- crushed and water</li> </ul>	<ul style="list-style-type: none"> <li>- digestion</li> <li>- sunstroke</li> </ul>
Gum/Gond	<ul style="list-style-type: none"> <li>- and other medicinal plants and water</li> <li>- eaten</li> </ul>	<ul style="list-style-type: none"> <li>- weakness</li> <li>- digestion, dysentery</li> </ul>
Bark	<ul style="list-style-type: none"> <li>- powdered and water</li> <li>- and curd and Hetri (tree) and water</li> </ul>	<ul style="list-style-type: none"> <li>- dysentery, vomiting</li> <li>- blood in stool</li> </ul>
Leaves	are burnt, crushed and applied	on burn for soothing
Fruit	not fully ripe and wheat (top portion) made into paste and water	sunstroke (given twice a day to children)

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Unripe fruit boiled in water, diluted in cold water + sugar + salt against sunstroke.

### 3. Atru (*Adina Cordifolia*)

Wood is very good for construction of household items (chakla, belen: for roti, vessels) and timber for beams, cross beams (kobi). It is also used as fuelwood.

Leaves are mainly eaten by goats, sometimes by cattle.

Fruits are not used.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed and water	cold, headache, applied on wounds
Leaf	heated and applied	swellings, body pain, wounds, chest, pneumonia

### 4. Agnera (?)

Q: 2

Fruit (sweet) is eaten.

Wood is a construction timber.

Leaves are fodder for cattle.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed and water	cough and cold

### 5. Amla (*Emblica officinalis*)

Q: 2

Young fruits and soft leaves are used as vegetable. Leaves are fodder for goats.

Wood is used as fuelwood, sometimes for furniture and construction.

Seed is sold for Rs.5/kg. The oil is very expensive.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Fruit	- dried and eaten - dried and powdered	- health in general (esp. eyes), cooling effect, if inner heat or sunstroke - stomach ache
Seed	oil extracted	massage of swollen joints, body massage, hair oil, helps to maintain good blood circulation, avoids heart disease

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Richest source of Vitamin C; it increases the resistance of the body and aids longevity. 'It's the power of humanity'. Exported from India.

### 6. Ankla (*Gardenia Turgida*)

This tree does not exist in Sagwara, but people know it because it exists in neighbouring areas.

Leaves used as fodder.

Twigs used as dhatun (to clean the teeth).

NMV.

**7. Aral (?)**

Thick climber.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	powdered and water	cures menstrual problems

**8. Arandi (?)**

Q: 2

Lives for 8-10 years. Grows in and around fields.

People extract oil from the seed, which is used for lubrication, to soften leather, for the parts of the plough that has direct contact with the bull, for fuel in lamps, to produce soap. The seed is sold for Rs.5-10/kg; Oil for Rs.40/kg.

Dry leaves (Kal) good fodder for cattle, mixed with cattle dung used as manure. Green leaves are not eaten by cattle or goats.

Wood is not used as firewood because it is too light.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	warmed and tied up	cattle swellings and sprains; somebody gets something in a persons eye, chest problems, wound of Guinea worm
Seed	- oil extracted and applied - crushed and water	- swellings of cattle and camels; skin diseases of people, cuts on feet - digestion problems (small doses)

Remark of Prof. Sharma (Ayurvedic College, Udaipur): The oil is internationally used.

**9. Areethi (Sapindus Mukorossi/ Sapindus Detergens)**

Q: 3

It is either a climber or a tree. The climber grows only in the rainy season and dries up in December/January. It is propagated by seeds which fall off.

Fruit is roasted, peeled and eaten. Sold in the market for 4 Rs/kg. It also can be cooked and used as a vegetable. An important use is the production of soap from the fruit. The soap is used for clothes and jewellery. The fruit powdered and thrown into water kills fish.

Leaves are eaten by goats.

Wood is used as fuelwood.

NMV.

**10. Arteri (Helicteres isora)**

Wood is used as fuelwood.

Leaves are eaten by goats.

Bark is used as fibre.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Fruit	crushed and water	vomiting, dysentery, stomach ache
Root	powdered and water	dysentery

### 11. Arua (*Ailanthus Excelsa*)

Q: 3

Wood is used as timber for construction.

Leaf is bitter and fed to goats, sometimes cattle.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	heated and tied up	swellings; local anaesthetic (Prof. Sharma)
Bark	peeled and crushed and water	snake bites, cough and cold; cattle: sick, weak, swollen throats, dribbling mouth, dysentery

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Not used in Ayurvedic medicine; more buffaloe and cattle food.

### 12. Badaliya, Badlo, Vad (*Ficus Bengalensis*)

Q: 2

This tree was there during the formation of the world. A nag (cobra) did not want to allow it to grow and would burn it with its poison. So a devi called Ambadevi had a dream about this tree. She removed it and planted it in Kalikakra (near Haldighat) as the first tree from which all other trees sprang. It is a tree of devtaas and is often possessed by their spirits. The tree is not cut, except in times of drought and famine. It is said that when a God descends he/she takes rest under this tree.

This species is found only in forests. It has always been rare. It is a good shade tree.

Wood is used as fuelwood.

Leaves are used as plates and are fodder for goats and cattle (dung is a good manure).

Latex is used to stick feathers.

Badvai (Vines) are used by the children as swings.

Seed is crushed and used as shampoo.

Fruit is eaten.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Wood	placed in cowshed (esp. before onset)	prevents infection of some hoof diseases
Stem	put in front of the stall on sunday	curbka (cattle disease: itching in the legs) goes
Bark	heated up and applied	infection, swellings
Latex	applied	cures cuts on feet and hand
Vines	crushed (when lender) and water	given to young cattle to cure them of parasites in their stomach

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Bark very good for wound healing after it has been washed with boiled water.

### 13. Badi Geski, Ghoti Geski (?)

It is a shrub.

Fruit is eaten and has a similar coolant effect to lemon.

Wood is used to make arrows.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	crushed and water	women: for abortion; helps to conceive (?); helps maintaining the heart beat, when somebody has difficulty in breathing; dysentery and vomiting

#### 14. Bagda (?)

Most of the people in Sagwara don't know about this species.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	heated and applied	internal wounds to reduce tension of muscle, restore blood circulation, reduces swellings, pain killer, accelerates healing process

#### 15. Bakan Limbdo (?)

In the village planted by Nath Kanji. Only there existing.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	crushed and water	stomach ache (also goats)

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Good blood purifier.

#### 16. Bans, Vahado, (Bamboo) (*Dendrocalamus strictus*)

Q: 3

In earlier times bamboo was very spread, but is now in severe decline. During droughts they cut and sell it.

Bamboo is used for construction of house roofs; for baskets, fencing, doors, mats, cots, bows, flutes, fishing rods, scaffolding.

Leaves eaten by goats and cattle.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Gond	taken out of joints: paste and applied	something in the eyes
Bark	made into paste and white stone, applied	stops bleeding of wounds, cuts

#### 17. Beda, Bahera (*Terminalia Belerica*)

Q: 4

The tree is found more in the forest, than in the village. It is a holy tree, spirits are supposed to reside in it sometimes.

Wood is used as fuelwood and for house construction.

Fruit is eaten by goats and cattle and is crushed and used in leather processing.

Bark together with the bark of Karmela is used to colour leather. Also one can use it to clear and strengthen the leather.

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	heated and tied up	chest pains

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Ingredient of Triphala (Ayurvedic medicine); dried powder of fruit is good for cough and cold. Seed has 45% oil is inedible, but a good tranquilizer.

**18. Bil Patta (Aegle Marmelos)**

Q: 1

Fruit is eaten (sweet and sour).

Leaves are fodder for goats. They are also used in religious ceremonies: bhopas give them in form of prasad, or they are used as malas (plant esp. flower ornaments round the neck), particularly important for prayer to Shiva (3 leaves).

Wood is used as roofing, small timber and fuelwood.

Root is poisonous, when mixed with water the fish go blind and die (does not affect people).

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Fruit	- crushed and applied - dried, powdered and water	- wounds - dysentery in children
Bark	- powdered and water - boiled and made into paste	- digestion problems - worms which entered the body via water

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Has a special effect on diabetes, controls blood sugar; five fresh leaves taken every day. Bark: for different neuroses.

**19. Bio, Bia (Pterocarpus Marsupium)**

Q: 1

Leaves fodder for cattle. They were cut for cattle fodder and as a result the tree is scarce. Earlier there were many more trees in existence.

Wood is used as firewood, for construction esp. cots (frames of beds)

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- crushed and applied - chewed and drunk with water - crushed and water - powdered and water and sugar  - burnt, powder and mustard oil, applied	- snake bite (soaks up the poison) - snake bite - improves blood circulation - menstrual cycle too long (stops blood), blood in urine, urine problems (yellow: 7 days one cup in the morning) - skin disease

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Internal part of hard wood is used to reduce weight, to control the blood cholesterol, diabetes.

**20. Bor, Ber (Zizyphus Mauritania/Jujuba)**

Q: 5

More trees in the village, than in the forest.

Leafs are fodder for goats and cattle.

Wood is used as fuelwood, construction timber (plough, fencing and more).

Fruit is eaten and sold: Large size (Kalmi bor) Rs. 5/kg, medium (Khati bor) Rs. 3-4/kg, small (Channa bor) Rs. 2-3/kg. The villagers eat the fruits and spread the seed around. Its seeds have a high productive rate.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	mixed with other medicinal ingredients, drunk	cures illness (not specified)
Bark	- crushed, mixed with boiled - powdered and water  - and bark of Hitri (tree), crushed and water	- dhat (blood in urine) - increases healing power of wounds in cattle and goats - dysentery
Leaf	juice	hangover cure

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Latex is a good wound healer.

## 21. Dantni (?)

Q: 3

It is a small plant which is only found in the forest esp. near water and in cool places.

Wood is light and not used for any purpose.

Seed and leaves not used for anything

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed and water	induces vomiting; cattle (5gr.): internal wounds (painkiller)
Root	- powdered and water - crushed and water	- sick (weak) cow - stomach problems

## 22. Desi Babool (Acacia Arabica)

Q: 2

Found mostly in Seva Mandir plantations. Not found in forests.

Wood is used as construction timber, timber for plough, furniture (chairs, tables). As hard as teak (sagwan).

Fruit and leaves is eaten by goats and camels.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Gum	mixed with other medicinal ingredients	curing illness (not specified)
Latex	applied	teeth and jaws problems
Leaf	boiled with water	skin disease

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Good blood purifier. Used as dhatun, for dental disorders.

**23. Desi Kanjdi, Kanjdi (Holoptelea Integrifolia)**

Q: 4

Grows often near water.

Fruit is eaten and sold for 4 Rs/kg.

Seed is collected for making oil for soap. The oil is used for polishing machines, to process leather, lamp fuel (diya).

Wood is used as fuelwood. It isn't good for construction as it is too light.

Leaves are not preferred fodder, although cattle may occasionally eat some if passing by. Camels eat leaves.

Twigs are used as dhatun.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Seed	extracting oil, massage	accelerates healing process

**24. Desi Sagwan (Tecomella Undulata)**

Q: 1

The tree is no longer found in the forest. The species has been cut down during drought and famine.

Wood is used for construction.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	crushed and water	cough, tuberculosis (bark same application); normal Sagwan used in the same manner
Bark	- crushed and water - applied	- cough and cold - on bleeding cut

**25. Dhamaniyo (Grewia Tiliaefolia)**

Q: 3

Tree is only found in forests.

Bark is a good fibre for tying wood.

Fruit is eaten (sweet) esp. by bhopas.

Leaves are good fodder for goats.

Wood is used as fuelwood; good construction timber, most of all for cots (bedframes).

Wild fruit with a lot of Vitamin C (Prof. Sharma).

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	powdered and water	heart problems
Bark	powdered and water	reduces swellings, dysentery

**26. Dhawra (Anogeissus Latifolia)**

Q: 4

Previously a plentiful tree it is now in decline.

Wood is often used to construct agricultural implements (plough).

Leaves are eaten by cattle and goats.

Gum is extracted. Most of the time gum is secreted by the tree itself. When it is sufficient the gum is sold for 30-70 Rs/kg.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Gum	- together with other ingredients, to be taken in the morning - together with Safed musli, Meeti, Coconut, Ghee and Gur to women after delivery (for 15 days, early in the morning)	- forms a healthy meal , also taken in case of digestion problems and weakness - strengthness
Latex	in laddoo	body strengthener (esp. for women in delivery period)
Bark	crushed and Gur	severe cough and cold

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Ingredient for Antidiabetic.

**27. Dhawali (Hibiscus?)**

Q: 3

It's a big shrub which in earlier times was more extensive.

Wood is used as fuelwood.

Flowers (sweet) are sucked by children.

Leaves are eaten by goats.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	crushed, eaten	by cattle and goats when they have fallen and are injured (Purification of blood)

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Root is used to clot the blood in an open wound.

**28. Emna (Dychrostachis cinerea/ Cailcea cinerea)**

Q: 3

The tree is more commonly found in the village, than in the jungle.

Leaves are eaten by goats and camels. Fruit only by goats.

Wood is strong, used to make boundaries, handle of grinders.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	crushed, mixed with water and white stone and grass, applied	wounds (skin heals nicer)
Bark	crushed, applied	snake bite (poison doesn't spread)

**29. Ghandi Sagwan (?)**

Q: 2

Leaves are similar to Hovan. They are a fodder for cattle and goats.

Wood is strong and light and used in agricultural implements (plough), back portions of guns. They used the guns in earlier times to scare tigers when they took the cattle into the forest.

NMV.

**30. Ghatobri (?)**

Q: 2

Grows near water and fields.

Wood is used as fuelwood.

Leaves are eaten by goats.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- powdered, applied - crushed and water, drunk	- skin disease of the throat - pneumonia, lung diseases, throat infections, malaria
Fruit	eaten	stomach problems (clears motion)
Root	and Dhantura root and Bio bark and Kadu bark, ground with water, drunk	against illnesses which cause weakness (?)
Twig	used as dhatun	clean teeth, gives fresh mouth in case of sickness

**31. Gobra (?)**

Q: 2

Perennial shrub, because the seeds are infrequent.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	heated and tied up	eye problems, headache, strained parts of the body, internal wounds

**32. Gojal (Lannea Coromandelica/ Odina Wodier)**

Q: 5

Seed is used to kill fish.

Wood is used to make poles in house construction and to make doors. It is also burnt and peeled and then made into ropes. The ropes are used in the persian wells (retha). It is further used to make boxes.

Bark is used as fibre for tying sticks.

Gum is used as sticking gum.

Leaves eaten by cattle and goats.

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- crushed and water - chewed	- scorpion bite; cattle: runny nose, goats: dysentery - snake bite (absorbs poison)
Leaf	warmed, applied	swellings

**33. Gorika (?)**

## Local medicinal

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	powdered and water	reduces swellings

**34. Gundi (Cordia Rothili/Garaf)**

Q: 3

Fruits are eaten in summer. Good vegetable can be prepared from them.

Buds cooked with curd water and chilli is a good vegetable.

Tender leaves are also cooked and eaten. Leaves are eaten by goats. They fall in Dec.-Jan.

Gum is sweet and eaten and is a good laxative.

Wood is used as firewood.

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- burnt, powder applied - powdered and water	- wounds - dysentery

**35. Haler (Boswellia Serrata)**

Q: 4

Name in literature also Salar

Wood is used to make planks (for doors and frames) and drums. It is also used as fuelwood. A branch (kutha) is used to make a mandap which plays an important role in a marriage ceremony.

Gum is used to make dhoop (incense sticks).

Leaves are a fodder for cattle and goats.

Candles are made out of the latex.

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Trunk	powdered, made into a paste, applied	scorpion bite

**36. Helpi (Flueggea Leucopyrus)**

Q: 3

It is an all year round shrub found in forests and in the village.

Bud comes in August and is a rain indicator. It opens 4-5 days before the rain arrives. It is not necessary that the rain falls in the actual area of the plant just close by. (Other rain indicator: Indali (Herb); it grows bigger before rain).

Fruit is eaten.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaves	applied	dry skin on the feet (usually after working in the fields during rainy season)

### 37. Hingota (*Balanites Egyptiaca*)

Q: 2

Bark is crushed and mixed with water and put into a pond - kills fish by affecting their eyes. Also used as arrow poison. The villagers told me that this liquid as a medicine has narcotic effect, but Prof. Sharma from the Ayurvedic College in Udaipur says no.

The skin of the fruit is eaten by goats.

Wood is used as fuelwood.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	warmed, applied	swollen neck and throat
Seed	- mixed with laddoos - crushed and water, drunk - crushed and - crushed and two drops water, applied	body strengthener blisters on the feet weak body, burning (acidic) stomach eye problems in animals

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Take pulp of the seed, press the oil out. This is used for skin diseases.

### 38. Hingwa (*Moringa Oleifera/ Pterygosperma*)

Q: 2

Leaves are eaten by camels and goats, but due to lack of availability it is rarely used.

Buds and fruits (ripe in February) are used as a vegetable (in south India it is an aphrodisiac).

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root and bark	crushed, boiled in water, applied	boils on the body, swellings (also swellings due to insect stings)
Bark	- crushed and water - crushed, applied	- cattle pest - cuts and wounds
Fruit	boiled	good diet (like milk)
Latex	eaten	stomach ache, dysentery
Flower	boiled with water, drunk	swellings of the body

### 39. Hitri (*Bauhinia Racemosa*)

Q: 2

Fruit is sweet and eaten esp. when dry. Monkeys also like them very much.

Leaves are eaten by goats and cattle. Used to produce bidis, but not in this region.

Wood is used for plough making, for cots (bedframes) and also as firewood.

Bark is used as a fibre for tying things.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	crushed and water	blood in urine and stool
Bark	crushed (5-10gr.) and water	digestion

#### 40. Hovan (*Gmelina Arborea*)

Q: 2

Wood is used for making instruments (very good drums), for making yokes (johra), cart wheels, doors, windows. Due to its use for yokes the species declined over the years.

Leaves are eaten by goats.

Seeds (bhatar) are eaten by goats. They are also sold to nurseries (among other tree species).

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed and water	white urine (?)

#### 41. Jambu (*Syzigium Cumini*, *Eugenia Jambolana*)

Q: 2

Tree is found near water in the village.

Wood is not strong and of no great value for construction, but used as fuelwood.

Leaves are not eaten by goats or cattle who dislike the taste.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- crushed, applied - crushed and - powdered, put in water to take bath	- snake - blood in stool, abortion (to take for 3 to 4 days) - skin diseases

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Seed, powdered, reduces the blood sugar level. Good for

#### 42. Kabeeti (*Ferionia Limonia*/ *Limonia Acidissima*)

Q: 2

Fruit is sour (similar to Bael, but bigger) and eaten. Sold for 1 Rp./piece.

Leaves are eaten by goats; used as vegetable.

Wood is used as fuelwood.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf (5-10gr)	- mixed with sugar, eaten - boiled in water, applied - cooked in water	- cools inner heat - wounds - steam reduces swellings
Seed	crushed and water	heat in stomach

**43. Kabra, Kamda (Mitragnya Parvifolia/ Stephegyne)**

Leaves are eaten by

Wood has value as a construction timber.

NMV.

**44. Kadaiya (Sterulica urens)**

Q: 3

Exists in forests.

There was some uncertainty as to whether the villagers actually described this particular type of plant. Other possibilities could be Korwa, Baysharam (with purple flowers) or botanical names: Molarhena, Ipomea or calotropis.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	- crushed, boiled, drunk - crushed, made into a paste, applied - crushed and water	- cold and runny nose, stomach ache; same application also for cattle - scorpion bite - infection in mouth

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Good jelly or icecream. Has been exported to Russia in small quantities.

**45. Kadallo (?)**

Leaves eaten by goats.

Wood is used as fuelwood.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	crushed and water	clearing urine (when blood)

**46. Kadu (Pterospermum acerifolium)**

Q: 2

Few trees are found in the forest.

Fruit (pod) is eaten.

Gond is collected and sold in market.

Wood can be used to make planks, if the tree is big enough.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed, made into a paste and sugar	avoids inner heat, provides women with a full term pregnancy (natural abortion is supposed to be due to inner heat of the woman)
Flower	ditto	ditto

**47. Kagni**

Q:

Climber.

Fruit is collected when ripe, mixed with a little mahua to get a different type of liquor. This drink can be used to reduce weight.

Seed is used as bullet by children in a crude log gun. A hollow piece of bamboo is loaded from one end with a seed and then a stick is used as a pump.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- crushed and - powdered, applied	- proper delivery of the - wound
Seed	crushed and desi wine	blood purifier (black veins)

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Substitute for wheat.

**48. Kalia Hero (Albizzia)**

Q:

The tree is only present in the

Wood is very strong and a good construction timber. It is used to make parts of the

Leaves are eaten by goats.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed and water, drunk	snakebite
Stem	crushed and water	cattle: internal injuries
Seed	crushed and water, applied	eye problems

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Research is going on. Probably good for carcinomas.

**49. Kamdi (Pavonia)**

Q:

Fruit looks like small grapes, is very sweet and is eaten. Fruit is ripe after Holi (May, June) in the forest. Eating this fruit makes one thirsty and also let the lips stick together. The flower can be prepared as vegetable.

Leaves are fodder for goats.

Wood is only used as fuelwood.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	boiled and water	heat in stomach
Root	crushed and applied	better growth of hair

**50. Kapta**

Leaves are eaten by goats and cattle, mainly in May/June when grass is not

Wood is used for construction.

Seed is used as vegetable.

NMV.

**51. Karanj (Pongamia Pinnata/ Glabra)**

Oil is extracted out of the seeds and used to make soap, to soften leather and for ploughs.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	boiled, applied	wounds from guinea worm

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Roasted seed is a malaria

**52. Kargieski**

Local medicinal

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	crushed and water, applied	accelerates healing process in case of broken bones
Flower	crushed and water, drunk	difficulty to urinate
Bark	crushed and water	abortion up to 4 months, stomach pains, dysentery

**53. Karmela, Amaltas (Cassia Fistula)**

Q: 2

This tree species has become rare because leather workers use the bark and the fruits (baheda) for processing (pounded and boiled). Makes the leather soft and resistant. The tree dies when the bark has been removed. There were far more trees in earlier times.

Leaves are not eaten by cattle.

Wood is used to make a pounding tool for crushing juice or rice. Also used as construction wood.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Seed	crushed and water	dasta (diarrhoea), blisters on feet, cough, snake bites (5ml, 3 times a day), dysentery problems; cattle and goats dysentery
Fruit (long)	- eaten by buffaloes and - skin and seed powdered and given to goats	- digestion problems - dysentery, worms
Bark	and water, boiled and made into a paste, applied	boils on the body

**54. Kaykai**

Q:

Big shrub or small deciduous tree.

Small round leaves are fodder for

Fruits (in summer) are sweet and edible.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- crushed, - crushed and water, drunk	- burns, skin - body coolant
Root	crushed, heated up and water	cattle: swellings

**55. Khair (Acacia)**

This tree was much more common in earlier times, but until 30 years ago contractors cut the tree heavily to make katha.

Wood is used to make katha as a basic element (red stuff) for pan, plough, pounding sticks. It is very strong and it is popularly used for the wheel of the persian well because the wood doesn't rot in the water. It produces charcoal when burnt.

Leaves are eaten by goats.

Gum is eaten in the form of laddoo (gives strength).

**56. Khajur (Date palm) (Phoenix silvestris)**

Q: 3

Fruit is eaten and sold for Rs. 2.50 - 3/kg.

Wood is used for construction, but only if there is no better wood available.

Leaves used to make ropes, mats and brooms.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	15-20gr. and sugar and water	dhat (blood in urine)
Seed	crushed and water	dysentery

**57. Khakra (Butea Monosperma)**

Q:

Also called 'flame of the forest' because of the red flowers which appear in February.

Earlier the tree was plentiful, but as population increased the trees were cut and used, hence they are now in decline.

Leaves can be made into plates and cups. They are also eaten by buffaloes (but not by goats and cows). When it is fed to buffaloes the quality and quantity of the milk increases.

Roots are extracted and made into ropes. Usually not all the roots are removed. They are also used as brushes for white washing. They are cut into strips and used to make a juice which is mixed with butter milk.

Wood is only used as firewood due to its light weight.

Lac insect is found in this tree.

Bark is used for the production of desi wine.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Gum	- eaten by women - and root and bark, crushed and water	- it is supposed to be successful in helping women to conceive, dysentery, gives energy - blood in stool
Flowers	- dried, powdered and - crushed and water	- dhat (blood in - difficulty to urinate
Bark	crushed and water	body coolant, blood in stool, boils on body, digestion problems

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Raisin is a good tonic for the uterus.

**58. Khatti Imli (Tamarindus)**

Q:

Good shade tree, only found in the village. Reasons for not growing in the forest: Goats eat tender shoots and therefore the seeds are not dispersed in the jungle.

Wood is strong and used for construction, but the tree is not cut because of the value of the fruits.

Fruits are eaten and collected as a condiment and taste maker (like lemon) together with other vegetable. Not sold, because quantity is too small.

Bud is used as vegetable.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Fruit	- mixed with food (often with rice in South - boiled and water and sugar	- body - sunstroke
Seed	powdered and water	dysentery

**59. Khirni (Wrightia)**

Q:

Species is considerably reduced compared to earlier times, because it has been cut and sold.

Wood is light (substitute for metal) and is used to make household instruments (chatna = spoons, chakla = rolling pin) and furniture.

Leaves eaten by cattle.

Latex mixed with milk to make a sort of dhari (curd) is faster to prepare than normal curd and is a delicious dish.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Latex	applied	scorpion bite
Leaf	and water, eaten	weakness after leaving drinking (alcohol)
Bark	crushed and water	dysentery

**60. Kiker, Valaiti Imli (Pithecolobium)**

Q: 2-

Fruit is delicious and commonly

Leaves eaten by

Wood used as fuelwood; timber for fencing and to make

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Twigs	used as dhatun	clean teeth
Fruit	shield cut and put back (3 days), mixed with water and drunk	women prone to miscarriage

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Has a lot of tannin, tannic acid which reduces the loss of blood.

**61. Kumboi, Kaboi (?)**

Q: 1

Very rare. One or two trees are found in the surroundings of the village. Thus people don't know about the uses.

**62. Lunia (Hymenodictyon Excelsum)**

Q: 1

The tree is very rare in the village (a few in Kankan).

Wood is used as a construction timber (esp. yokes). Big trees are made into planks. An instrument called Tanpura (similar to Sitar) is made out of this wood.

Leaves are eaten by goats but are not their preferred diet.

Fruit is not used.

NMV.

**63. Mahuwa (Bassia Latifolia/ Madhuca Indica)**

Q: 5

People do not cut this tree except in times of scarcity. One reason why they respect this tree is because they produce the famous desi wine (local liquor) from the flower.

Seed (dolma) is edible and used to extract oil to make ghee or soap. The residue is fodder for cattle.

The seed is sold to traders at 5-6 Rs./kg. It can be eaten boiled, fried in oil (May-June) mixed with wheat and can be crushed and mixed with wheatflour for chapatis.

Fruit is eaten.

Leaves are fodder.

Wood is heavy and good for construction. It is very expensive.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Seed	crushed, applied	skin disease
Fruit	- given to - distilled: Desi (local) wine	- when they become - is a good medicine for everything

**64. Marua (Origanum)**

Aromatic plant (Prof.

Local medicinal

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	boiled and juiced and applied	ear problems

**65. Meeta Neem**

Leaves are used for

**66. Mendi (Lawsonia)**

Leaves are powdered and applied on hand and feet on special occasions (marriage, Holi and other festivals)

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	- powdered, made into a paste, applied - tied up	- cooler for the bottom of the feet, conditioner for hair, sunstroke - snake bite, pain in the leg

**67. Mojaal**

Q:

Fruit not eaten

Seeds are crushed and mixed with water, which blinds and kills the fish commonly found after the rains (sometimes also in summer) in the slow parts of the river. The fish are then eaten.

Leaves are not preferred fodder, goats eat them occasionally.

Wood is used as fuelwood.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	boiled, tied up	sprains of the body, wounds, swellings

**68. Mokha (Schrebera)**

Q:

Bark is used as a flour for rotis in times of famine. It hasn't been used in recent times but might be used in the future during severe famines. We hope this never happens.

Leaves are a good fodder for cattle and goats, as it is one of the few trees which remains green in summer (evergreen tree). Due to the drought 1987-89 these trees were decimated to provide fodder.

Wood is used as construction timber.

From the stem comes a liquid (not gond) which is eaten (sweet).

NMV.

**69. Neem (Azadirachta Indica, Melia Azadirachta)**

Q: 2

There are a few in the forests but they occur mainly in the village.

Leaves are eaten by camels. Therefore the camel owners cut the tree. It is an implement fodder for camels.

Wood is heavy and used for construction. Timber for beams, windows, doors. When it is hollow it is also used to make drums.

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Twigs	used as dhatun	clean teeth
Leaf	- eaten (7 following days in a year) - crushed and water - crushed, made into a paste, applied (or drunk with - cooked and water, drunk	- snake bites and guinea worm don't affect - body coolant, weakness, upset stomach (worms), quenches thirst - guinea worm, inner heat, skin disease - fever (malaria)
Fruit	crushing and water, wash hair and scalp	cures dandruff and lice

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Every disease can be cured with the help of Neem. In Jodhpur the Indian Government opened recently an 'International Neem Research Centre'.

**70. Nagar Mota**

Climber, often on Ber, Mango.

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Stem	paste, applied	protect women from yellow fever during pregnancy, swellings

**71. Palak, Pilak**

Tree is found near

Fruit is

Leaves are eaten by goats and

Wood is a construction

**72. Pandiri (?)**

Q: 2

Wood is used as fuelwood. It is costly.

Fruit is not eaten either by people or by cattle. The children play with it as they tend to play with most things.

Leaves are eaten by cattle.

Root is poisonous and used to kill fish.

## Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark and root	- crushed and - crushed and water, drunk by women	- neutralizes cobra - normalizes menstrual problems
Root	powdered and water	snake bite (most effective), blood in urine, menstrual cycle

**73. Panivela (Climber)**

This thick climber stores a lot of water (water runs out when the bark is cut) and people use it to quench thirst in the forest.

Local medicinal

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Stem	cut, chewed	snake bite
Bark	crushed and water	heat in the body (also for cattle)

**74. Peenhi**

Q:

Wood is used as fuelwood and as construction timber. Beds are made out of it, looks attractive (bright), hard, easy to work on.

Leaves are used as fodder.

Fruit (a thin seed) is not used.

'Not very useful'.

NMV.

**75. Pipal (Ficus religiosa)**

Q: 2

Considered a religious tree. People from outside often ask if there is a Pipal tree in the village. It is sacred because it is said to have been in existence since birth of God, hence it is also called Paras pipal (paras=god). Other people make a difference between Pipal and Paras pipal (or Paras pipli). They call the pipal species in the forest Paras pipli, the one in the village pipal. Paras pipli is not considered as holy as Pipal, further the leaves are smaller and the bark is darker. All the various practical uses are common to both species. When people do pooja and fast after holi in dasath, they walk around the tree and burn incense sticks under it. When peoples have a hava (pooja) they light four fires on four sides of the tree (same ritual with Mango tree). The wood of this tree is used in every type of pooja (religious ceremony).

The tree is not cut, but when it falls or is dry they use the wood for construction (frame of doors, planks).

Gum is present, but not used.

Leaves are considered to be a good omen and are therefore used in religious festivals. They are eaten as fodder, but only during scarcity times although people believe that cattle and buffaloes give more milk after having eaten the leaves.

Fruit is eaten.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed, made into a paste, applied	skin diseases, guinea worms

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Indicator of underground water. Releases the maximum of oxygen. Pollution control in air and soil.

**76. Raini (Manilkara Hexandra/ Mimusops Hexandra)**

'We know about the existence of the tree, but it's not in our area.'

Fruit is eaten (yellow, sweet).

**77. Rihwa (Acacia Leucophloea)**

Q: 2

Looks like babool, but is bigger.

Wood is a very good timber for construction: ploughs, bullock carts, even parts of trucks.

Leaves are eaten by goats.

Roots are crushed and added during the liquor distilling, makes the liquor stronger.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Knots	crushed and water	cattle and goats: broken bones
Root	- crushed and burnt in front of children - crushed and water	- who fell sick or are possessed by spirits (smoke drives away the - children: illness
Bark and root	crushed and water	cattle: broken bones (for 4 days; strengthening the blood and so improving the healing capacity)
Joints	boiled	cattle: broken bones
Wood	tied around the neck	when a child is afraid of something

**78. Rohan (Soymida**

Q:

Appears in the forest, but is often not cut because the wood is too heavy to transport.

Wood is a construction timber (beams, columns) and is also used as firewood.

Fruit is eaten by goats and cattle.

Leaves are a very good fodder, particularly in summer as it is an evergreen tree. The fodder improves the milk yield (about 20%) and strengthens cattle and goats.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed and water	restore blood circulation in cases of internal wounds (also for cattle)
Bark and root	crushed and water	snake bite

**79. Sadariya (Terminalia Tomentosa/**

Q:

Leaves are eaten by goats, sometimes by cattle. They are used to quicken the processing of Mahuwa

Wood is used for construction.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	crushed and water	dog bite

**80. Sagwan (Tectona**

Q:

Wood is used for construction

Leaves are eaten by cattle, camel and goats, but not as a regular fodder. Combined with Khakra leaves, cowdung and grass it makes a green manure. The green leaves are collected and put into a pit to form manure.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	crushed and water, drunk	cough, tuberculosis
Bark	crushed along with Khakra bark and water	body cooler

**81. Shisham (Dalbergia**

Q:

It's a very rare

Wood is a good construction timber. Used to make agricultural implements (plough) and cot frames (beds). The species is declining as a result of these uses.

Leaves are a good fodder for cattle and goats.

Twigs are used as dhatun. This has been denied by other people.

NMV.

**82. Simbel (Bombax Cieba/ Salmalia Malabakicum)**

Q: 2

Wood is light and used to make boxes and doors. A piece of wood is placed in Holika fire pile (?).

Seed is eaten, considered to be equal to almond.

Raw fruit is cut and eaten and is also cooked as a vegetable. It is also collected for the cotton inside the fruit.

People house the chickens in this tree, because its thorns protect them from cats.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- crushed, - tied - boiled, tied up - crushed and water	- wound - swelling of any part resulting in some sort of knot - wound of guinea worm - heat in stomach
Flower	- dried, powdered and sugar and water - crushed and water	- blood in urine - body cooler
Fruit	and water	pregnant buffaloes (pain killer)

**83. Sitaphal (Amona**

Q: 1

Only found in the village, very rare. Earlier this species did not exist in the village.

Fruit is eaten (tasty). Rich in Vitamins B and C (Prof. Sharma).

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Leaf	crushed	cattle affected by worms and insects

#### 84. Taheri

Wood used to make parts of the

Flower cooked as

Local medicinal

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	- crushed and water, drunk by women - crushed and water	- to conceive a child - dysentery (one cup only)

#### 85. Tamet (*Nycanthes*)

Q:

This species is vanishing because of lack of rain.

Wood is used to make arrows for children and to make a shield against wind and rain. It is also used as boundary for the houses. Used to make Pohara (very big basket) to store gram (up to 5 quintals).

Leaves are a very good fodder for goats and cattle.

Buds and fruits are eaten by goats and cattle.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Root	- finely crushed and water - crushed and - boiled in water, drunk by women	- cattle, buffalo, goats: fallen and injured (pain-killer) - stomach ache - abortion; if taken daily good contraceptive
Leaf	crushed and water	fever

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Used for the treatment of nerves.

#### 86. Timru, Tendu (*Diospyros melanoxylon*)

Q: 5

This tree is very drought resistant.

Leaves are used to make bidis. Sold for Rs.22/ 100 bundles of 50 leaves. Other price which has been given: 1 Rp/250 leaves. Merchants come in the village in April and May to buy the leaves. They are also sometimes eaten by cattle and goats.

Fruit is very tasty, like chikku.

Wood is a good construction timber esp. for agricultural implements (also known as ebony).

Bark is used as flour for roti in case of famine (mixed with mokha). Not in use in previous famine, but further back (Bhimraj: nearly 400 years ago).

NMV.

**87. Umbiya, Upja (Saccopetalum tomentosa/ Miliusa tomentosa)**

Q: 4

Wood is a construction timber (furniture), due to its straight bole. Implement used to plain fields. Fuelwood.

Bark is a fibre used to tie wood.

Fruit is eaten, but not very frequently.

Leaves are eaten by goats and cattle.

**88. Umra, Umre (Ficus glomerata)**

Q: 2

Fruit (all year round) are eaten. When dry it can be pounded and made into flour to make rotis (sweet).

Twigs when straight are used to make arrows.

Wood is light and used to make drums and planks.

Latex (cheek) is used to stick feathers to arrows.

This tree is an indicator of good soil moisture.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Twigs	used as dhatun (when young)	clean teeth, cures worms, refreshes the sense of taste in the mouth when continuous fever
Latex	applied	heals cracked feet
Bark	crushed and water	upset stomach (cooling effect)

Remark of Prof. Sharma (Ayurvedic College, Udaipur): Good for accelerating the healing process of

**89. Veeko, Vicus**

Q: 1 (10km)

Fruits are eaten by

Leaves are fodder esp. for

Bark (similar also root) is crushed, mixed with water and fed to cattle to improve milk productivity.

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Bark	applied	boils on body (after burning)

**90. Vetia, Vesia (?)**

Local medicinal uses

Part of the tree used	Mode of usage	Disease to be cured/ Prevention for
Fruit (black)	collected and stored in pot, put in a hole in the earth and heated up, extracts oil, which is applied	boils on the body