"Plants that bind: Family, Ayurvedic doctors, nature, and environmental conservation in Nepal"

Introduction

Cultural research conducted with Ayurvedic doctors in Nepal from 1998 to 2005 traces the family and community- based lines of plant knowledge transmission common in the doctors' professional medical choice. Such a pattern arises from a supportive agrarian culture, one tied to the cultural recognition of a set of principles called *panchamahabuta*, which theorizes that plants are produced from the same five essential 'elements' as humans. *Panchamahabuta* is also an idea that is foundational to the organization of knowledge in Ayurvedic medicine. As a natural extension of their plant expertise, Ayurvedic medical practitioners often involve lay people in medicinal plant conservation efforts through community-based education and harvesting activities connected to local Ayurvedic health care facilities. Ayurvedic doctors – known as *acharya*, *kabiraj*, and *baidya*, based on educational level, and also commonly called *daktar* - also act as botanical consultants on conservation projects aimed at preserving Himalayan flora, for they are highly trained and well-experienced in many aspects of what we might call 'plant ecology', albeit from a Nepali and Ayurvedic perspective. In these two medical and botanical outreach capacities, working with lay community members (farmers and artisans) and professional environmentalists on non timber forest products (NTFP) sustainability initiatives, Ayurvedic doctors are agents of expansion of cultural and medical plant knowledge and use in Nepal. In this article I trace the plant connections between families, doctors and communities as they link valuable cultural resources to natural resources conservation. Though still vibrant, the links are nonetheless weakened by modernizing Ayurvedic education. I also ask about the dynamics of people's knowledge of human-nature relationship, their prevalent concepts of nature, if you will. One might assume that when the doctors approach human-nature relationships within the frame of Ayurvedic theory, their actions around plant conservation would be different from academic and professional environmentalists' actions and assumptions, which tend to see people as causes of flora depletion and the decline of genetic biodiversity, and as potential barriers to sustainability if not intervened. Relatedly, the research also suggests that the doctors' knowledge of human-nature relationships shares features more closely with farmers and artisans who live in environments like those that many of the doctors grew up in, than with environmentalist discourse derived from modernist and western academic sources. When one approach encounters the other, people must work to make sense of the other's position. Through these interactions initiated by Ayurvedic doctors, medically-based botanical knowledge, I suggest, reaches expansively beyond the kind of 'technical expertise'

outsiders possess and that many scholars have found can impede development (Brower 1991; Ojha, Cameron, Bhattarai 2005; Peet and Watts 1996), to engage communities and environmentalists in potentially even broader conservation partnerships. Application of the research findings would include exploring ways to further incorporate the botanical knowledge of Ayurvedic practitioners and the values with which plant-based Ayurvedic medicine culturally inscribes natural environments.

In tracing the links between family, Ayurvedic medical practitioners, and plant awareness, on the one hand, and environmental development and emerging new hybrid nature-culture ideologies, on the other, I draw on Tim Ingold's dwelling perspective as an approach to understanding human-nature relationships. The dwelling perspective begins with the assumption that people always exist in an environment of humans and non humans, that they are committed to the relationships entailed therein and thus develop orientations to and experience subjective states resulting from the human-environment context, and continually reproduce the conditions of their existence in interaction with their environment (Ingold 2000). Cutting across the barrier between human and non human, the model implies openness to the world parallel to the fluid, dynamic and referential qualities described for South Asian culture (Daniel 1987; Marriott 1989). Regarding practitioners, most of my conversations with them occurred in the context of medicine and health and their views reflect that context. None considered nature to be a realm dominated and controlled by humans, and many believe the human is a microcosm of the living environment and within nature – one part of biodiversity, as it were.

The analysis here of the social uses of local plant knowledge is based on ethnographic research undertaken in urban and rural Nepal during which observations were made on family farms and in community forests, in Ayurvedic hospitals, clinics, health posts, classrooms, and pharmacies, and in the Ministries of Health and Education and their satellite organizations and institutions. Interviews were conducted with female and male practitioners, health administrators, and patients and their families, primarily in the three cities of Kathmandu Valley (Kathmandu, Bhaktapur, and Patan), in Dang District Ayurvedic Hospital, and in rural communities in the western districts of Dailekh and Bajhang. The findings presented here on family origins of plant knowledge and practitioners' role in community sustainable cultivation are part of a larger study examining modernizing Ayurveda in Nepal.

We widely recognize that people from societies directly dependent on plants economically, medically, and otherwise, often apply local knowledge of sustainable plant harvesting to regional forms of environmental stewardship, and in ways occasionally transferable to formal, institutional environmentalism. Nepal is an interesting and important example of such a country, with a model of human-plant relationship that is tied to an ancient medical system. The ethnically diverse people of Nepal have practiced and evolved two major traditional medical systems – Amchi from the Tibetan north, and Ayurveda, with strong connections to the southern Indian subcontinent - that use plants as medicines, supported within a subsistence agrarian economy. In the case of Ayurveda, practitioners and lay people cultivate, prepare and consume a wide variety of plants to alleviate illness suffering by way of readjusting the body's vital substances, the humors or *dosa*.[1] Lay people in Nepal acknowledge and actualize a love for "their" medicinal plants (*hamro jadibuti*, "our 'healing entities from roots'").[2] However, the medicinal plant diversity in Nepal is effected by population increase and land takeover, by rural poverty that motivates unregulated plant trade, and by ineffective government monitoring of resources and trade and incompletely enacted forest use policy (Pandit and Thapa 2004). Although indigenous knowledge does not necessarily mitigate non sustainable extraction (McSweeney 2004), and the breadth of such knowledge is not at this point reliably known (in spite of being widely represented in environmentalism discourse; see Wohling 2009 on this point), the medical anthropology research findings presented here do show that important and unique stakeholders in medicinal plant viability, namely Ayurvedic doctors, use their professional in-depth botanical knowledge to reinforce local indigenous plant knowledge and reduce non sustainable extraction. This connection between people and plants that extends across generations, castes, classes and genders is a good example of how local knowledge is learned, shared, and reshaped. The historical and cultural analysis provided here is intended to contribute to the position that support for an ancient yet modern and popular medical system is a form of social capital (Arnold and Fernandez-Gimenez 2007) that produces benefit to people through well-informed and participatory health care and environmental conservation development.

Ayurveda in Nepal

Traditional medicine comprises the main source of health care for nearly 80% of the world's population in developing countries, according to the World Health Organization (Chaudhury

[1] The raising of animals and the consumption of meat also have economic, medical and ethnic importance but are not addressed here.
[2] Ayurvedic medicines also may contain minute amounts of animal materials and metals, but are not discussed here.

2001). Reflecting that importance regionally, Ayurvedic medicine is integrated into most South Asian countries' medical bureaucracies, and has for hundreds of years been a popular system of healing throughout the region (Dixit 1995; Himalayan Ayurveda Research Institute 1996), with lofty estimates claiming it to be a 5000 year old eclectic mix of medical practices. A great deal has been written about Ayurveda in India during its colonial and postcolonial period; Ayurveda in Nepal has received less scholarly attention in contrast to Himalayan shamanism or to Indian Ayurveda, despite important distinctions for Ayurveda in Nepal with its own unique historical independence from colonialism and its current post revolutionary period.

Up through the contemporary period, Ayurveda and its variants – for there is not one true or pure Ayurveda, but a group of therapies evolved from a unifying theory and transmitted in formal and non formal ways - have been common and popular forms of healthcare in Nepal, for Ayurveda provides a fundamentally sound theory of maintaining health and well-being, preventing 'humoral disturbances' and illness, and healing disease and discomfort. It is a medical system that is supported by people's extensive knowledge of plants and their medicinal uses. Indeed, the recording of formal botanical information dates back to at least 1802 and includes the use of plants for medicinal purposes by Nepal's ethnically and ecologically diverse communities (from high altitude yak herders to rice and wheat farmers on endlessly terraced Himalayan foothills to subtropical forest foragers; see Manandhar 2002). In the contemporary period, medicinal plant use has been noted in numerous studies and reports on Nepal's people and culture, though the link to Ayurveda has not always been made by scholars. In fact, from oral histories we learn that knowledge of herbal medicinal preparations is common among Nepalis – particularly but not exclusively by the elderly, who can identify numerous common medicinal plants (Cameron 1996, 2009b; Himalayan Ayurveda Research Institute 1996). Importantly, medicinal plants are part of social networks; lay Nepalis generously share their knowledge of plants with others – family, neighbors, and foreigners. They honor healing plants as gifts from the Hindu gods, for which they express gratitude in a variety of ways. Thus, the broad integration of Ayurvedic ideas into Nepali culture supports people's application of indigenous medical principles that emphasize adjusting the three bodily humors (*tridosa*) to heal physical and mental suffering.

Ayurvedic medicine's institutional centrality before the middle of the last century in Nepal is evident in several historical facts. The Rana courts in Kathmandu maintained a hierarchy of Ayurvedic family doctors and they established important Ayurvedic institutions including clinics,

pharmacies, and research units during their reign in the 18th and 19th centuries. Additionally, Gurkha military units took *baidya* to England in the first decades of their British employment. King Chandra Shamshere Rana established an educational fund in 1928 for students to study Ayurvedic medicine in India – which had itself recently begun formal structuring of Ayurvedic education in the swelling tide of Indian nationalism (Langford 2002) - marking the beginning of formal Ayurvedic education in Nepal. The students completed their studies in five years and returned to Nepal to inaugurate the teaching hospital at Naradevi in Kathmandu, with its mission to teach Ayurvedic medicine and serve patients free of charge.[3] When Nepal opened its borders to the world in the 1950s following the removal of the Rana rulers and the re-ascension of the Shah ruling family, the contemporary era of development (*bikas*) began. The Shah rulers strongly supported modern biomedicine and gradually weakened the palace's historical connection to Ayurveda. According to former royal Ayurvedic doctors, King Birendra replaced Ayurvedic practitioners with allopathic doctors and introduced a retirement age of sixty. Euro-western health care development was introduced in the form of immunization programs, western-based science and health courses required in secondary and higher education, the establishment of a world-class biomedical college and auxiliary schools, and a rapidly expanding pharmaceutical industry (Dixit 1995; Justice 1986). Today, in the newly democratic country, the plural medical landscape includes home based medicine, faith healing, traditional medicine like Ayurveda, and, modern biomedicine, with its vast network of hospitals, clinics, medical and nursing schools, pharmacies, and practitioners.

In support of Ayurvedic and culturally-based uses of plant medicines, the government of Nepal operates a company that conducts research, and cultivates, harvests, packages, and distributes medicinal and aromatic plants wholesale for use inside the country and for export. Established in 1981 under the Ministry of Forestry, the Herbs Production and Processing Company's exports are comprised approximately of 20% medicinal plants of which a majority is sold in Europe.[4] It operates medicinal plant farms in the southern tarai as well as collecting raw materials regionally from private companies and individuals. HPPCL supplies raw plant materials to Singh Durbar Vaidyakhana, a semi-autonomous Ayurvedic manufacturing and distribution center established over 300 years ago. Additionally, the government of Nepal grows medicinal plants under controlled conditions on several large pieces of land. Finally, private Ayurvedic drug production companies in Nepal include Gorkha Ayurveda and Dabur Nepal, as well as hundreds of small

[3] Interview with Shesh Raj Acharya, Superintendent of Naradevi Teaching Hospital.
[4] Interview with Mr. Bhattarai, Managing Director of HPPCL, Koteshwor, 8-9-2000.

family Ayurvedic businesses that produce primarily for their communities, all of which are monitored and regulated by the Department of Drug Administration.

Ayurvedic Doctors Today

Practitioners of Ayurvedic medicine in Nepal come from different economic and geographical backgrounds, though most are upper caste males. Still, lower caste and female healers who have demonstrated a particular skill and knowledge in diagnosis and plant-based healing are also sought by villagers.[5] Colleagues I have worked with include non literate rural *baidya* who have extensive knowledge of local medicinal plants and live on the margins of poverty like many of their rural neighbors, and urban physicians with advanced Ayurvedic degrees from India who are successful proprietors of clinics for foreigners during the day and healers at community Nepali clinics during the early morning and evening hours. There are those who work primarily in administration in the Ministry of Health, and those who see patients throughout the day at family-based clinics that may be hundreds of years old. What is common among them, though, is the role of family and community in engendering an original interest in the healing power of plants. As they grow, young sons and daughters learn alongside their relatives, they inquire about *jadibuti* from their neighbors, and many will later develop their botanical knowledge in formal Ayurvedic medical colleges. In turn, a large number of these formally trained professional doctors involve their communities in plant identification, sustainable harvesting, and proper collection of valuable medicinal plants, thus returning medicinal plant knowledge back to their communities (ESON 2008; Kanal 2000).

In addition to the formally trained Ayurvedic practitioners is the largest group of healers, the non formally trained. There are no national data on the number of traditional Ayurvedic healers in Nepal, but one can distinguish two main groups. The first are people trained by family members with practices going back many generations. These families tend to be high caste Newari and urban-based, and many have had family members appointed to Nepal's royal families as doctors. The families often have extensive genealogies of their Ayurvedic practice, with manuscripts on diagnosis, treatment, and medicinal plant pharmacology going back hundreds of years. Some of them prescribe only medicines that they produce. The professional stature of this exclusive group of *baidya* is based on their success as doctors and the reputation of their ancestral practitioners. A second group of non formally educated *baidya* consists of people with apprentice roots that are

[5] Gender differences in understanding nature, environment, science and health are discussed by Cameron 2009c.

contemporary, having been trained in families without long histories of Ayurvedic healing, or by non family members such as seers and renowned religious figures. The professional stature of this group of *baidya*, which meets the healthcare needs of the majority of the Nepali people and is more diversified by caste practice in rural and urban communities throughout Nepal, is based on their knowledge of locally available medicinal plants, their healing success, and their teachers' eminence.

What is the view of such practitioners on ideas about nature, environment, and the conservation of medicinal plants? Do they see human culture as a cause of environmental degradation and a barrier to biodiversity conservation, as environmentalists often do? Or do Ayurvedic practitioners and lay Nepalis alike instead regard human-nature relations as an on-going *engagement* - rather than a fixed set of concepts – along the lines of Tim Ingold's dwelling perspective? Even for those educated in formal institutions, their views on nature from a medical perspective may synthesize modern knowledge and ancient Ayurvedic theory described below, to produce explanations that are fundamentally Ayurvedic with supporting evidence from biomedicine. Their first assumption, though, is that the human is a microcosm of the living and non living world and therefore inseparably engaged with nature. Let us look more closely at Nepali understandings of human-nature relationships.

Ayurveda and Other's Nature

Social science in the 'environmentalist age' (Campbell 2005a, p. 285) has found itself returning to the nature-culture paradigm once thought to be too essentializing and Eurocentric for cross-cultural comparison (MacCormack and Strathern 1980). Now, the global circulation of environmental discourse and development, exemplified in the Nepal case with the rise in conservation actors, agencies, and projects, finds anthropologists and other scholars of culture and nature working in communities being persuaded from many sides to protect their biophysical resources. For social scientists the important problem here is how culture is being leveraged to achieve certain objectives related to a presumed kind of nature; the old paradigm of 'culture' as an obstacle to economic, educational, health care and other kinds of improvements is reincarnated as potentially useful 'indigenous knowledge' and 'local knowledge' in global conservation efforts. More so than in prior development eras, though, nature is explicitly rendered as the development objective, a more perfect nature, best adjusted through Euro-American expert knowledge of

technocrats, bureaucrats, and development planners. Yet the environmentalist's nature is often unrecognizable from the perspective of Nepali communities.

Ayurvedic medicine provides a relevant starting point from which to examine human-plant relationships because it presents an elegant and simple application of the philosophical idea of *prakriti*, nature, to the human body that leads one conceptually to the terrain of people's lived orientations to plants and to embodied subjectivities of human-environment interactions. Ayurveda draws its therapeutic language from a set of natural images by which to situate humans within the phenomenal world, to further Ayurveda's 'natural' typologies of people, and to advance its theories of illness causation, progression, prognosis and cure. Classical Ayurvedic medicine detailed in the ancient medical texts (*Carakasamhita*, *Susrutasamhita*, *Astangahrdayasamhita*) derives from Samkhya natural philosophy in theorizing that the living body is comprised of natural characteristics in the form of three humors, *dosa/tridosa*: wind (*vata*), bile (*pitta*), and phlegm (*kapha*), biodynamic substances that flow throughout the body and exhibit perceptible qualities (Wujastyk 2003). The *dosas* are formed from five ubiquitous elements, *panchamahabuta*, found in the phenomenal world – ether/space, fire, air, water, and earth. *Tridosa* in humans have identifiable qualities, *guna*, and are theorized to be in dynamic equilibrium with internal and external phenomena (food, water, plants, animals, seasons, planets) that possess the same perceptible *gunas* as the *tridosa* (Zimmermann 1987), a physical environment constituted by the *panchamahabuta*. The two main causes of illness are faulty daily regimen and diet, that disturb the 'cooking' or 'ripening' of *rasa*, the food-juice of life within the body (White 1996), and that are read by the physician as excess, absence, or dislocation of one or more humors; hence *dosa* also means 'fault'. To rebalance the humor(s), the patient adjusts dietary and daily activities and consumes plant-based medicines; *jadibutis* work not because of biochemical properties but because their natural *gunas* can readjust the patient's own imbalanced *dosas*. Ayurveda considers the person to be a microcosm of the biophysical world and suggests that health is an embodied state best achieved from an experiential orientation to the plant world that is protective but also potentially disruptive. To that purpose upwards of 1500 plant species are used in Nepal for medicinal purposes.

Ayurvedic medicine employs a theoretical paradigm in organizing knowledge based on centuries of experimentation and observation, and has both formal and non formal systems of training, cooperatively preserves and revises a recorded *materia medica* that is increasingly maintained in

government offices, and a clinical tradition with a diverse range of therapeutic treatments. As scientists, Ayurvedic doctors believe that it is possible to make steady progress in the sphere of human knowledge; that methods and goals are, or should be, ultimately identical throughout the sphere; and, that it is possible to derive the structure of the laws of nature from a single set of clear, abstract principles and concepts, if applied correctly (Berlin 1981). Like their modern counterparts, practitioners consider Ayurvedic principles to be universal, and they apply a method of diagnosis and treatment consistent with those principles.

The 'ecology' and 'economy' of the body and person in Ayurveda asserts that health is maintained by the subject's congruent daily practices, social relationships and environmental surroundings (Sharma 1983; Nichter 2001; Zimmermann 1987). Though this might suggest that health is best achieved and derived from a 'natural' and rural kind of environment, rather than an overpopulated and less 'natural' urban one, cultural and medical history indicate that an urban-rural or nature-culture dichotomy with which to classify illness and health may be overly simplistic, as there are three – not one - distinct rural areas, the wild jungle or *ban*, the *jangal*, and the *araniya* (Dove 2003; Zimmermann 1987), delineated ecologies that nourish particular medicinal plants and contribute to the distinguishable types of human *prakritis*. As Dr. N. N. Tiwari, widely regarded as one of Nepal's leading botanists and an Ayurvedic doctor, described the different South Asian ecologies as follows: *ban* is the "wild forest" where tribes called *banbasi* cultivate the land. The *ban* may be species specific such as *sal ban* where *sal* trees grow, or *shleshmatak ban* where the Siva temple Pasupati in Kathmandu is, though the trees are no longer there. *Jangal* is a place where foraging ethnic groups like the Raute live (Fortier 2009). In contrast to the habitable ban and jangal, *araniya* is a place where only non human animals live, an ecology that is "too wild" for humans.

To remain vibrant and healthy the body's balanced equilibrium of humors is sustained through conscious effort by individuals to properly recognize and utilize the surrounding biophysical world. This includes the plants, and it is here that the human-nature connection is strong. For the plant world not only sustains humans, but as living entities, plants and humans are considered from the Ayurvedic perspective as different forms of the same phenomenon, the five elements of the panchamahabuta that are synthesized into the unique animal form of *dosa*/humors. This influence penetrates all spaces of the human body, and makes one predisposed through one's *prakriti*, one's nature, to respond to the physical world in distinct ways. Just as the medicinal

quality of a plant will vary according to the soil it grows in, so too individuals vary based on their nature and the environment they live in. An essential part of the person is formed from the physical environment, well-expressed in the idea of *hawa paani,* literally air-water, which are one's most basic sources of vitality and a common expression of one's physical connection to place. To perceive and comprehend all of this, the doctor must examine what is called the 'field', or the body of the patient, in the skin tone and color, in the girth and weight, the level of energy, the pulse of the heart, and other physical signs.

The human-environment orientation described above for Nepali culture and Ayurvedic medicine contrasts with scientific environmentalists working to protect Himalayan floral biodiversity. National and international conservation organizations working in countries like Nepal use language of an objectified, discrete nature set dualistically opposite human culture in trying to convince people to protect natural resources like forests, waterways, non timber forest products, and endangered animals. Nepal is a leader in experimenting with participatory systems of forest governance*,* and with the success of sustained management of *trees* in Nepal's forests environmentalists have now turned their efforts to sustaining the biodiversity of *non timber forest products* like medicinal plants and wild foods. These plants harvested for cosmetics and nutritional supplements are often over-collected and some are in danger of extinction. Here, unsatisfactory conservation outcomes are linked to poverty conditions that compel harvesters to trade outside of sustainable parameters (Adhikari 2005), to incomplete knowledge of local human-nature orientations (Campbell 2005b), to civil war (Baral et al 2005), and finally to non participation of key user groups like women and Dalit artisans (Agarwal 2001; Cameron 1996, 2009b). The differing orientations to nature in Nepal among environmentalists, Ayurvedic practitioners, and rural farmers and artisans shape self-reflexive, complementary and conflictual interactions among these communities in responding to modernizing forces and in producing change.

Ayurvedic and environmental activists' perspectives do converge on where 'balanced' nature for the one and 'wild' nature for the other exist, namely in rural locations. In contrast to a general development ethos that seeks a modern country in which rural locations often symbolize 'backwardness', Ayurvedic advocates and modernist managers of biodiversity both idealize the rural as an original source of medicinal plants and balanced life superior to crowded, polluted and imbalanced urban places (Cameron 2009b, 2009c). The convergence of doctors' and

environmentalists' ideas about the 'natural' rural ends, though, where the plants actually grow. Unlike the Ayurvedic physicians who are committed to their medical system which, widely preferred and globally popular, they believe to be modern, conservationists are committed to genetic variability and not to medical pluralism, and they would not consider Ayurveda modern. Still, they leverage the Nepali people's preference for plants in healing on behalf of biodiversity, for progress in managing nature begins with the conservationist's assumption that degraded bounded ecosystems result from human action and culturally specific practices. Averting the environment's loss of genetic diversity requires changing human actions to benefit the non human biological world. Comparing the environmentalist's nature-culture dichotomy with the human-environment orientations of Nepali doctors and lay farmers draws out important distinctions that must be recognized when interest groups join for a common cause. Nepali culture suggests that for doctors and farmers, nature is not perfectible by humans but rather the inverse; humans grow and are made healthy by plants, and the human disruption of natural forms (considered, in fact, sacred forms) is dangerous (albeit necessary), as found in concepts of impurity related to birth, smith work, and specific farming phases (Cameron 1998). Ayurvedic doctors' applied theory of the place of humans in nature engages and interfaces with lay people's daily affordances with plants, incorporating the *gunas* of food and plants into dietary and medical decisions. How do *dosa* and *guna* as entities and qualities of the phenomenal world that bring life and health to people, compare with environmentalists' categories? Ayurvedic doctors speak of degraded conditions for plant growth, particularly in urban spaces, but the air, water and soil degradation is caused by modern industry and technology, not directly by people. Doctors and villagers alike may not see the same kind of ecosystem degradation that environmentalists see and divergent human-nature paradigms end up working in both mutualistic and contradictory ways to achieve two important development goals in Nepal, health improvements and Himalayan biodiversity conservation.

Physicians Loving Plants: Ayurvedic Medical Development is Plant Conservation

Ayurvedic doctors choose their profession for different reasons, yet many express an early love for plant life. As a model for the physical and living world, Ayurvedic ideas shape people's relationship to nature and to each other in many ways – as a way to think about farming, as a way to think about making the body strong and healthy, as an inherited and realized respect for the divine on earth that powerful healing plants embody. Dr. Rishi Ram Koirala, a well-respected doctor who received his Ayurvedic medical degree from Banaras Hindu University in India, himself attributes

his knowledge of plants not to his education at the highly esteemed university but to his life with a particularly gifted aunt as a youngster in Tansen village outside of Pokhara.

> As a young farmer I had a lot of experience in these things. My elder aunt showed me so many things. She didn't have any children of her own but helped take care of six of us … When my brother was severely ill for more than fifteen days, I remember collecting some plants with her. We collected leaves of specific colors and at specific times of the day. People like her had much more knowledge than our formal knowledge in Ayurveda, knowing things like some plants are most effective during full moon but not all of them. Today's students should experience this.

Dr. Koirala believes that practical experience with plants is an effective way to know the theory of *panchhamahabuta*, the elegantly simple theory of matter, consciousness and synthesis at the heart of Ayurvedic medical theory, experience of which is not confined to professionals alone.

> You can feel the *panchhamahabuta* effects in plants directly if you go in the field. [For example] the students will see what the bark of trees is like in the rainy season and in the [dry] autumn.

For this teacher and doctor, direct experience with plants in their natural environment by doctors-in-training is very important in their development as they can better realize the patient's experience of illness. This may not be the current direction in modernizing Ayurvedic medical education in Nepal, however. The influence from biomedical standards in education may be inadvertently undermining skill development in medicine-based plant identification, as the increasing integration of biomedical ideas into Ayurvedic medical education has resulted in less time spent in courses on medicinal plant identification. As Ayurvedic education becomes more urban and more integrated with biomedicine – more separated from plants' natural environments - the opportunities to develop plant identification skills are limited. On this point Dr. Koirala is concerned about the lack of field experience in Ayurvedic medical curricula.

> When a student graduates he does not even know how to grind a plant … They read about beautiful plants in the books, but if they spend about a month in the field and observe how the plants grow they'll have even better knowledge.

Partnerships between the Ayurvedic community and local communities in medicinal plant conservation generate wide appeal and interest through programs designed to identify local plants that support and supplement people's knowledge of plant-based medicine. In community-based plant programs I have observed in Patan, Kathmandu, Bhaktapur, Bajhang and Dang, locally collected medicinal plants are displayed, processed and stored in home-based clinics and in larger private clinics and public hospitals. The staff at the Ayurvedic Health Home and the Dhanwantari Ayurvedic Hospital in Kathmandu, and the Devima Rural Ayurvedic Hospital in Bhaktapur maintains plant drying rooms filled with specimens collected during regular community programs. One of the oldest living traditionally trained Ayurvedic doctors in Nepal until his death four years ago, Siddhi Gopal Vaidya, was very concerned about the decline of medicinal plants in the country, and he had many discussions with high level officials, including former Prime Minister Bhattarai, about the country's need to accelerate conservation efforts around medicinal plants. He stored at his home clinic large quantities of raw plant materials harvested from his own land and received from rural collectors, and used them in his practice. Each of these Ayurvedic practitioners, formally and informally trained alike, is actively teaching the communities where they practice about medicinal plant cultivation and use, synthesizing and applying early plant knowledge with advanced medicinal plant knowledge in Ayurveda to conservation awareness and activities.

The place of plants in human-nature relations is discussed in a variety of contexts among Ayurvedic doctors and others. A particularly important one emerges from the modernizing country's desire to define the role of science and technology in their society, applied in the contexts of both health care development and environmentalism. In a region of the world that has been developing non western science for centuries, with medical science being notably at the forefront, what are knowledge relations like between people who hold divergent views of the world and of nature therein? How is science knowledge evaluated from different perspectives? The case of doctors, medicinal plants, and environmentalism gives us an opportunity to examine these questions. The Ayurvedic community claims that its millennia-old and systematically accumulated knowledge is different, more culturally relevant and as equally 'true' as the relative newcomer, post-enlightenment scientific medicine. The most commonly cited example of epistemological difference focuses on methods to prove the efficacy of medicinal plants utilizing reductionist explanatory models common to biomedicine. Ayurvedic physicians point out that contemporary experimental trials of Ayurvedic medicinal preparations seeking to isolate biochemicals and

conducted by non practitioners, are inherently flawed because they do not test the actual mixtures prescribed in the ancient texts and instead focus their search on a single active ingredient. This "titration" approach, argues Dr. Lokendra Man Singh, Nepal's most influential Ayurvedic physician until his death three years ago, fails to recognize an important principle in Ayurveda of combining several plants' parts in a single preparation, as well as the principle of *yogbai*, which is the addition of a plant that accelerates and enhances the main drug's action. Furthermore, the ecology of a plant is understood to affect its constituent parts and its efficacy, and therefore selection of plant locations would be important to any analysis. Finally, to measure efficacy is to measure a state of health that Ayurvedic doctors consider inherently subjective and not measurable by the tools of modern scientific and medical experimentation. Thus, knowledge of the "chemical basis of medicinal plants," a common catchphrase for how Ayurveda must and can become more scientific, is not accepted by all Ayurvedic doctors.

Ayurvedic physicians regularly meet to discuss the protection and development of medicinal plants. As one of their major healing resources, caring for and preserving plant life is equivalent to caring for human life. During a symposium on Ayurvedic medicine I organized in August 2000 and hosted by the American Center in Kathmandu, Dr. Tiwari addressed the issue of plant identification and its perils in an increasingly urban and formally educated profession. To illustrate his point he focused on one plant species with subspecies of three and five leaves, a distinction neither found in the texts nor acknowledged by rural practitioners. He interprets the omission as less a function of undeveloped perception and more the result of an identification system that works with equal emphasis on relevant distinguishing features and general familiarity with plants in a living environment since birth. It is the latter commonsense approach to plants – as opposed to the botanist's fine distinctions made for evolutionary argument, or, as in Dr. Tiwari's example, the urban merchant who, though highly educated, nonetheless is unable to recognize even the rice plant – that explains the lack of significance placed by the ancients and contemporary rural people on three and five leaf morphology.

> In Ayurveda the plant is simply mentioned as *birgondi* but the classical authors have not mentioned its morphological characteristics. If you consider the time when Ayurveda originated, the socio-cultural milieu … was inextricably linked with the forests. The villagers did not need to know about the descriptive morphological characteristics of the plants in order to identify them. They are identified with it since their birth, say for example, with

> *ashuro*. They do not need to know that *ashuro* has certain types of lancelet leaves, and that they belong to such and such a family and so on. They did not have any difficulty in recognizing it. But those who are [formally] educated and live far away from the villages can not recognize *ashuro*. I still remember a merchant from Nagpur who while walking with me encountered a man carrying a load of unthreshed paddy plants. He asked me what it was. I told him that it was the plants from which rice is produced. We are very far away from the medicinal plant species that exist in the remote areas. So one of the main problems we have now is learning to recognize these plants.

To that end, plant issues are discussed in a variety of professional contexts that Ayurvedic practitioners participate in, including conferences, organization meetings, workshops, and educational seminars. One significant 2-day workshop in July 1998 was directed to initiate a current Ayurvedic essential drug list for the country. Organized and sponsored by the Ministry of Health, the Department of Ayurveda, and the WHO, the workshop was attended by fourteen practitioners. The participants established several first principles for the drug list they were creating for public health use and for future research related to Ayurvedic drugs. A lively exchange of many kinds of healing related knowledge ensued, with the centerpiece of interest being the preparation and use of plant materials. The participants first agreed not to list plants that are rare or endangered, and would include on the list plants that were easily identifiable by lay Nepalis. Finally, the list should be local and not "foreign," meaning that it would not include plants from India. The identity of the project was further established in its juxtaposition to other kinds of scientific validation. They agreed that the process of sharing medical knowledge to update the list would not be based now or in the future on proved laboratory identification of a plant's active chemical make-up, but would be based on the cumulative experience of clinicians and recommendations found in the classical medical texts.

For the doctors, Ayurveda is a 'natural' experiment that has proven efficacy in the everyday lives of South Asians – the natural laboratory of human history – and therefore needs no external verification. The environmental conservation community appears to partly share this view, rarely if ever pursuing plant conservation based on the latest medical research but rather on the use of plants by particular populations. Although the various conservation institutions tend to share a technologically and scientifically oriented approach to environmental conservation that draws from international practices and standards, and many staff members are trained in western

countries, they apply those standards to maintaining genetic biodiversity and not for subscribing to a biochemically-based set of efficacy values.

The Ayurvedic medical community's involvement in biodiversity conservation projects in Nepal is unique and pragmatic, for plant biodiversity includes the *jadibuti* vital to indigenous medicine. As the Ayurvedic community attempts to educate the public and policy makers about best practices of harvesting and preparing medicinal plants following Ayurvedic theory, the scientific community advances best practices supported by modern ecological principles that do not always mirror those of the Ayurvedic community but that do have appeal in global environmentalism. Prior research shows that what has emerged in the confluence of differing human-nature orientations is a pragmatic Ayurvedic medical development that increasingly turns on the status of medicinal and aromatic plants (MAPS) in Nepal, rather than vital institutional and personnel development (Cameron 2009a), thus placing *jadibuti* as a kind of bridge between global environmentalism and plural medicine development.

Conclusion

Nepali Ayurvedic health providers bring a unique kind of love for plants to their profession (Milton 2002). Yet it is not only a deep cultural resonance and professional relationship with plant life that motivates Ayurvedic professionals to care about environmental conservation. The medical system itself, like the more bureaucratic and governmental land and resource management system, encounters often weak and inefficient stewardship by the government in educational sectors, development policy, and medical resources distribution from raw plants to processed medicines. As a result, Ayurvedic professionals describe an intensified activism for an effective and equitable government - one well-fought for in the past decade of political transformation – that can competently manage an equitable, just, and affordable *plural* public health care system. Thus Ayurvedic health practitioners' conservationism is based not on the environmentalist's narrow attention to genetic biodiversity only but to their social integration and institutional linkages around broader issues of social justice, livelihood, good governance, and public health. Indeed, conserving plants has become a more acceptable effort to preserve medical traditions like Ayurveda than has advancing people through educational reform and professional and personnel development. A central health care dilemma for Nepal is whether the country can modernize while preserving and developing Ayurveda. In this difficult effort that often pits the 'modern' and scientific against the 'traditional' and nonscientific, the conservation of medicinal

plants bridges otherwise divergent discourses from modern environmental movements and modern indigenous medical movements, and the language of developing Ayurvedic medicine increasingly turns on the status of medicinal and aromatic plants in the country.

Bibliography

Adhikari, B. 2005. Poverty, property rights and collective action. *Environment and Development Economics*. 10(1):7-31.

Agarwal, B. 2001. Participatory exclusions, community forestry, and gender. *World Development* 29(10):1623-48

Arnold, Jennifer S. and Fernandez-Gimenez, Maria. 2007. Building social capital through participatory research. *Society & Natural Resources*. 20(6):481-95.

Baral. Nabin, Joel T. Heinen. 2005. Maoist people's war and conservation in Nepal. *Politics and the Life Sciences*. 24(1/2):2-11.

Berlin, Isaiah. 1981. *Against the current*. Princeton, NJ: Princeton University Press.

Brower, Barbara. 1991. Crisis and conservation in Sagarmatha national park, Nepal. Society & Natural Resources 4(2):151-63.

Cameron, Mary M. 1996. Biodiversity and medicinal plants in Nepal. *Human Organization* 55 (1): 84-92.

Cameron, Mary M. 1998. *On the Edge of the Auspicious*. Urbana, IL: University of Illinois Press.

Cameron, Mary M. 2009a. Modern desires, knowledge control, and physician resistance. *Asian Medicine* 4: 86–112.

Cameron, Mary M. 2009b (in press). Untouchable healing. *Medical Anthropology* August.

Cameron, Mary M. 2009c (under review). Gender, science and non western medicine. *Medical Anthropology Quarterly*.

Campbell, Ben. 2005a. Changing protection policies and ethnographies of environmental engagement. *Conservation and Society*. Vol. 3, No. 2. 280-322

Campbell, Ben. 2005b. Nature's discontents in Nepal. *Conservation and Society* 3:2323–53.

Chaudhury, R.R. 2001. *Traditional medicine*. WHO, SEARO.

Dixit, H. 1995. *The quest for health*. Kathmandu, Nepal: Educational Enterprise (P.) Ltd.

Daniels, E,V. 1987. *Fluids signs*. Berkeley: University of California Press.

Dove, Michael. Forest discourses in south and southeast Asia. In *Nature and the global south*, editors Paul Greenough and Anna Tsing, pp. 103-123. Durham, NC: Duke University Press.

ESON. 2008. Community-based conservation and sustainable utilization of potential medicinal plants in Rasuwa, Nepal Himalaya. *Final report*. prepared by Ethnobotanical Society of Nepal. Kathmandu: Nepal

Fortier, Jana. 2009 Where God's children live: Symbolizing forests in Nepal. In *Symbolic ecologies: Culture, nature and society in the Himalaya*. Ed. Arjun Guneratne. NY: Routledge

Gamborg, Christian and Rune Flemming. 2004. Economic and ecological approaches to assessing forest value in managed forests. *Society & Natural Resources* 17(9):799-815.

Himalayan Ayurveda Research Institute 1996. Project report: Medicinal plants and traditional medical practice in Gorkha District." Kathmandu, Nepal: Gorkha Development Project/GTZ.

Ingold, Timothy. 2000. *The perception of the environment*. London: Routledge.

Justice, Judith 1986. *Policies, plans and people*. Berkeley: University of California Press.

Kanel, K.R., 2000. Sustainable management of medicinal and aromatic plants in Nepal. IDRC/SARO, Medicinal and Aromatic Plants Program in Asia (MAPPA); New Delhi, India.

MacCormack, C. and M. Strathern. 1980. *Nature, culture and gender*. Cambridge University Press.

Marriott, McKim. 1989. Constructing an Indian ethnosociology. *Contributions to Indian Sociology*, n.s., 23 (1): 1-39.

Manandhar, N.P. 2002. *Plants and people of Nepal*. Portland, OR: Timber Press.

McSweeney, Kendra. 2004. Forest product sale as natural insurance. *Society and Natural Resources* 17:39–56.

Milton, Kay 2002. *Loving nature*. NY: Routledge.

Nichter, Mark 2001. The political ecology of health in India. In *Healing powers and modernity*. editors Linda H. Connor and Geoffrey Samuel, 85-108. Westport, CT: Bergin and Garvey.

Ojha, Hemant, John Cameron and Basundhara Bhattarai. 2005. Understanding development through the language of Habermas and Bourdieu. *International Development Planning Review* 27 (*4)*: 479-497.

Pandit, Bishnu Hari and Thapa, Gopal B. 2004. Poverty and resource degradation under different common forest resource management systems in the mountains of Nepal. *Society & Natural Resources* 17(1): 1-16.

Peet, R. and Watts, M. (eds). 1996. *Liberation ecologies*. New York, Routledge.

Sharma, Shiv 1983 (1929). *The system of ayurveda*. New Delhi, India: Neeraj Publishing House.

White, David 1996. *The alchemical body*. Chicago: University of Chicago Press.

Wohling, M. 2009. The problem of scale in indigenous knowledge. *Ecology and Society* 14(1): 1. [online] URL: http://www.ecologyandsociety.org/vol14/iss1/art1/

Wujastyk, D. 2003. *The roots of ayurveda*, London: Penguin Books.

Zimmerman, Francis 1987. *The jungle and the aroma of meats*. Berkeley: University of California Press.