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The Seed and the Shaman:  
Encountering Diversity in Development

Indigenous Knowledge Production among the  
Lohorung Rai of Eastern Nepal

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## Acronyms

**AAA** American Anthropological Association

**ACC** Auction Contracts for Conservation

**FAO** Food and Agriculture Organization

**GATT** General Agreements on Trade and Tariffs

**GRP** a modern rice variety

**IPR** intellectual property rights

**LI-BIRD** Local Initiatives for Biodiversity Research and Development

**MSSRF** M.S. Swaminathan Research Foundation

**NGO** Non-Governmental Organization

**OECD** Organization for Economic Cooperation and Development

**PPB** participatory plant breeding

**P(R)ES** Payments or Rewards for Environmental Services

**RUPES** Rewarding Upland Poor for Environmental Services

**TDR** Transferable Development Rights

**UNDP** United Nations Development Programme

**UNESCO** United Nations Education Scientific and Cultural Organization

## Glossary

**atey marshi** (N) a rice landrace

**bangerey** (N) a rice landrace

**belkuti** a modern rice variety

**bokla** (L) a large of bottle gourd used by yatangpa

**bwipali** (N) a recently introduced finger millet variety

**chama** (L) meal

**chigaphu** (L) a type of chestnut tree

**dibu** (L) millet beer

**dokrey** (N) a traditional finger millet variety

**dolley** (N) a traditional finger millet variety

**dung-dung-wara** (L) a type of tree found in Lohorung home gardens

**ghorey** (N) type of legume

**Gorkha** (N) a district in central Nepal and origin of the Nepali Shah dynasty

**Gurung** (N) an ethnic group of Nepal

**halkoda** a modern rice variety

**homphu** (L) tiger's milk spruce

**janajati** (N) indigenous

**jimidar** (L) land owner

**kakrangma** (L) hyacinth bean

**kali banmara** (N) purple orchid tree

**kham** (L) earth

**khim** (L) a traditional Lohorung house

**khimpie** (L) a bi-annual ritual ritual honouring the house ancestors

**khowangphu** (L) a type of chestnut tree

**Kiranti** (N) indigenous peoples of eastern Nepal

**Kirata** (N) an ancient Kiranti kingdom in the Kathmandu Valley

**kong-la** (L) a vine used in yeast production

**kumaltar** a modern rice variety

**leiwei** (L) thatch grass

**Licahavis** (N) an ancient kingdom of Nepal, which ruled the Kathmandu Valley from approximately 400 AD to 750 AD

**lingam** (L) a small bottle gourd used by mangpa

**lung** (L) stone

**madeley** (N) a rice landrace

**Magar** (N) an ethnic group of Nepal

**mangpa** (L) shaman  
**mansara** (N) a rice landrace  
**manipuri** (N) a rice landrace  
**mansuk** (L) house shrine  
**matwali** (N) derogatory term meaning ‘alcohol drinkers’  
**meeribung** (L) a chestnut tree pole placed in the front yard during Lohorung weddings  
**Muluki Ain** (N) an 1854 legal code instituted by Jang Bahadur Kunwar  
**mitthingma** (L) winged prickly ash

**nalfernu** (N) ‘stem-change’ (a regular seed exchange)  
**nankartua** (N) a traditional finger millet variety  
**nibhara** (N) elephant ear fig tree  
**nuagi** (L) the yearly renewal of the house shrine  
**nunumeshi** (L) Himalayan mulberry

**pahenle marshi** a modern rice variety  
**pangdur** (N) a traditional finger millet variety  
**pe lam** (L) a body of Lohorung ancestral lore  
**pilunghey** (N) a flower pressed for oil

**Rai** (N) an ethnic classification within Kirant

**sabajey** (L) a type of tuber  
**sammang** (L) ancestor spirits  
**sarindo** (L) a type of edible flower  
**saya** (L) ancestral power  
**semphu** (L) tiger grass  
**shawaghansa** (L) a type of fodder tree  
**shing-sa-wa** (L) ‘field-earth-people’ (agriculturalists)  
**suphu** (L) sal tree  
**Shah** (N) the Hindu kingdom of Nepal, which ruled from 1768 to 2008

**Tamang** (N) an ethnic group of Nepal  
**tong-pa** (L) a bamboo vessel used in serving dibu  
**towli** (L) an upland rice variety

**waiphu** (L) a type of chestnut tree

**yakshi** (L) taro  
**yatangpa** (L) ritual priest

## 1.0 Introduction

Developing countries are often host to some of the highest levels of both biological and cultural diversity globally (Loh Harman 2004), a fact that is of no minor concern for linguists, anthropologists and ecologists alike. That the processes of development are concomitant with a certain degree of cultural homogenization and environmental degradation is a difficult fact to deny. It is this recognition that has caused post-development thinkers such as Wolfgang Sachs to claim, “it's not the failure of development that has to be feared but its success” (1992: 3). While there is a certain measure of hyperbole in Sachs' statement, it should still give the average development practitioner pause to critically consider what role development should play in diversity retention. Complicating this consideration is an increasing awareness that cultural and biological diversities are extensively interconnected, broadening the potential impact of any development intervention. Of course, this is not an entirely new revelation, as anthropologists have been exploring the human-nature interface as mediated by indigenous knowledge, through sub disciplines such as ethnoecology, for the better part of the 20<sup>th</sup> Century. The past two decades have seen increasing recognition that an appreciation and engagement of local and cultural perspectives is integral to the success and sustainability of development projects (Chambers 1997, Mohan and Stokke 2000).

Anthropologists, for their part, have been notoriously reluctant to engage with such efforts, feeling far more comfortable critiquing development than participating in it (ex. Escobar 1995). Part of this reluctance might be traced back to a residual self-consciousness within the discipline regarding the colonial origins of applied anthropology, indeed in this era it was a key tool in the administration of British colonies through indirect rule (Grillo 2002).

In spite of this insidious history, some claim that anthropologists can and should have an instrumental role in crafting culturally appropriate and environmentally sustainable development strategies (Sillitoe 1998). Sillitoe has suggested that the study of *indigenous knowledge*, with its potential to make connections between local perspectives and those of development practitioners might represent a welcome opportunity for anthropology to

revive its applied tradition (1998: 224). He is optimistic that the incorporation of indigenous knowledge into development projects would not only engender a more equitable means of collaboration between development practitioners and local communities, but also between social and natural scientists. A deeper appreciation of cultural knowledge, especially agricultural lore, has great potential to advance understandings within the natural sciences by challenging long held assumptions. Indigenous knowledge has, however, been subject to the same postmodern criticism development itself has faced. Critics attacked what they viewed as the static, overly romanticized nature of indigenous knowledge, claiming it often revealed more about the motivations of those who championed this knowledge than the local communities who possessed it (Argawal 2002, Brosius 1999). Accusations of “green Orientalism” were leveled (Lohmann 1993), suggesting conservation advocates often represented indigenous communities with a variation on the archetypal noble savage, re-imagined as the “ecological savage,” implying a western environmental understanding and conscious stewardship in the actions of indigenous groups. Others feel, however, that this critical postmodern wave of the late 1990's had, to a great extent, missed the original intention behind the exploration of indigenous knowledge, which was simply to foreground “the cultural dimensions that conservation and development programs often overlooked” (Nazarea 2006: 322). These criticisms have in fact contributed to a fuller picture of indigenous knowledge that is dynamic, fluid, and contextual.

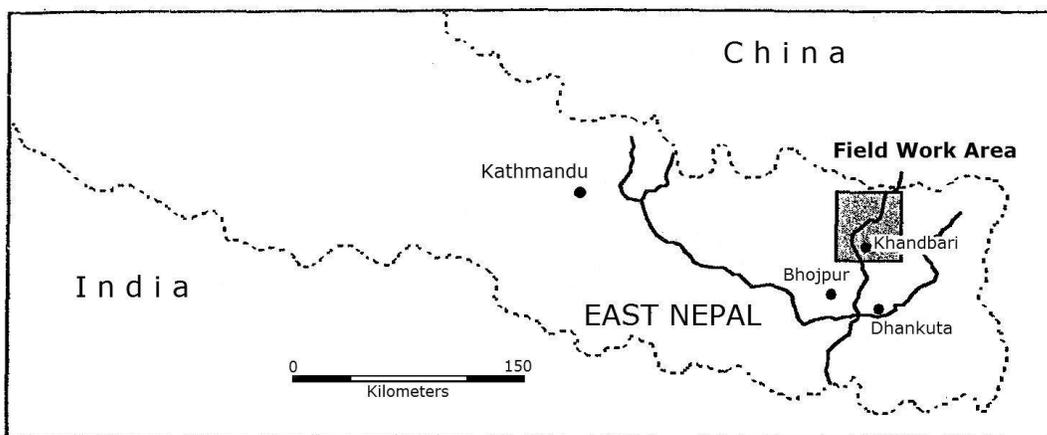


Figure 1 Field Work Area

The following is based on fieldwork carried out between November 2009 and March 2010 in and around four Lohorung Rai settlements in Sankhuwasabha district, Nepal (fig. 1). The Lohorung are a minority ethno-linguistic group numbering around 3,000, who along with related Kiranti indigenous groups are considered to be among the earliest inhabitants of what is now Nepal. This thesis supposes that in order to fully engage indigenous knowledge in development we must better understand its fluid nature. I first reflect on recent discourse on cultural memory in light of Lohorung ancestral lore and cultural identity construction. I will then embark on an exploration of the cultural spaces where indigenous knowledge is transferred. I have identified three key ‘sovereign spaces’ where this negotiation of knowledge occurs for the Lohorung: the house, the homegarden and the fields. I hope to highlight the fact that such spaces, as domains of cultural memory, serve to retain a wide array of unique and culturally significant agricultural biodiversity. An area of increasing scholarly interest, agricultural biodiversity (also often seen in its abbreviated form agrobiodiversity, which will be used herein) has been defined as the “variety and variability of living organisms that contribute to food and agriculture in the broadest sense and the knowledge associated with them” (Jackson et al. 2007: 197). In the final sections I highlight points of intersection between Lohorung conceptions of agrobiodiversity and those of the emerging discourse. I suggest expressions of indigenous knowledge are extensively interconnected and that this system might best be supported with financial incentives that reflect the true value of agrobiodiversity retention.

## **2.0 Research Problem: Diversity and Poverty in Rural Nepal**

### *2.1 Diversity in Nepal: What's at Stake*

One of the most striking features of Nepal is the sheer diversity of life extant within its borders. This small sliver of the Himalaya, due in large part to its varied topography and multiple climatic zones, supports over 5,400 higher plant species and 850 avian species, respectively constituting 2.2% and 9.4% of the world's total numbers (Shrestha and Gupta 1993: 3); this on less than a tenth of a percent of the earth's land surface. Nepal's biological mélange is perhaps outdone only by the diversity of its human inhabitants. The

country boasts 123 living languages (Ethnologue 2005) and 100 state-recognized ethnic or caste groups (the lack of a one-to-one correlation here is noteworthy and will be explored in section 6.1). Belief systems are also highly heterogeneous. While large segments of the population adhere to major world religions including Hinduism, Buddhism and Islam, there remains a vast range of traditional belief systems practiced by the country's many indigenous communities. This correlation between biological and socio-cultural diversity in countries such as Nepal has been the subject of much attention among biocultural diversity scholars, who suggest that both are products of the same geophysical conditions and are threatened by the same homogenizing forces (Maffi 2006, Harmon 2002). Indeed there is a growing trend for linguists, alarmed at the rapid loss of languages globally, to draw correlations between endangered languages and endangered species. They warn as a language becomes extinct so goes the linguistically encoded indigenous knowledge of that particular culture. The implication of language loss for biodiversity, it is claimed, is the loss of intimate ecological knowledge bound up in the terminology and metaphors of language itself. Graver still, the loss of a language is said to spell the loss of an entire *way* of knowing, the closing of a unique window on the world. From this perspective, there is much at risk in Nepal: Lohorung is but one of 71 languages presently listed as endangered (UNESCO 2009).

The realms of culture and nature have countless points of intersection and might best be thought as a continuum of mutual influence. Certainly the most visible product of this culture/nature interface is agriculture. In Nepal, those same forces which have shaped cultural and biological diversity have also contributed to a vast array of agricultural practices that maintain a large number of traditional crop varieties or *landraces*. Rice (*Oryza sativa*) stands out in terms of economic and social importance as well as in area planted at 1.5 million hectares (Rana et al. 2007: 462). It is estimated that due to both agro-climatic and socio-cultural factors some 2,000 rice landraces are currently cultivated. Nepal is also an important center of diversity for other minor cereals, notably barley, buckwheat and finger millet. Homegardens in rural communities are host to diverse range of cultivars in taro, pigeonpea, cowpea, chayote, sponge gourd and cucumber (Gauchan et al. 2002). Homegardens also sustain a variety of other species

maintained for their cultural significance. These are used in regional or cultural cuisine, in rituals and ceremony or for ethnomedical use (Gautam et al. 2008).

## *2.2 Deconstructing Rural Poverty and Agricultural Development in Nepal*

For all its cultural and biological richness, Nepal is by all conventional standards “underdeveloped” ranking 144th out of the 182 countries measured on UNDP's Human Development Index for 2009 (UNDP 2009). Material poverty is extensive with 77.6% of Nepal's population living on less than 2 dollars a day (UNDP 2009). Nepal remains a predominantly rural country with nearly 88% of the population living in rural areas; 71% of those engaged in subsistence farming (Bardsley et al. 2005: 28). It follows, unsurprisingly, that the vast majority of the country's poverty is concentrated in rural regions, a phenomenon illustrative of a broader global trend. According to the World Bank, 1.3 billion people are estimated to live in conditions of “extreme poverty” and, of those, three-quarters are based in rural areas (World Bank 2000). A classic tenet of rural development discourse has been that agricultural initiatives are the key to poverty reduction (Ashley and Maxwell 2001). The “Green Revolution” paradigm with strong emphasis on monocultures of hybrid (or in some cases genetically modified) crop varieties has typified a top-down agricultural development strategy over the past half century. Modern crop varieties promise greatly increased yield but require regular applications of purchased inputs such as artificial fertilizers and pesticides as well as dependable irrigation systems to thrive (Chapman 2002). The Green Revolution's legacy in Nepal, as in other parts of the world, is of dubious virtue. The Green Revolution's narrow technical focus neglects the social and environmental consequences of its own implementation (Norgaard 2004). The model has been criticized by agronomists, ecologists and anthropologists alike, on grounds including its inherent ecological instability (Altieri 2004), its neglect or active destruction of indigenous knowledge (Koochafkan 2006) and its role in the loss of traditional crop landraces, which form the genetic basis of the world's food supply (Harlan 1998).

These modern crop varieties and the intensive farming techniques they require were developed during an era of renewed Malthusian alarm at unsustainable population growth (particularly in the developing world), a concern exemplified by Paul Erlich's 1968 book *The Population Bomb*. In developing countries, fundamental agricultural alterations that would dramatically increase food production were thought necessary in order to avoid widespread famine. The narrative of food security, developed in this era, stubbornly persists in much development discourse. By emphasizing local deficiency and intellectual poverty, it essentially views indigenous knowledge as the root cause of the inefficiency and low productivity in small-scale traditional agricultural systems (Shepherd 2005).

Presently, only 10% of the earth's land surface is managed under modern intensive cultivation while 17% remains under what could be termed 'traditional' or extensive farming systems, which may have some degree of mixed practices or partial technology adoption (Jackson et al. 2004). Traditional farming systems tend to persist in isolated regions and among neglected communities (Orlove and Brush 1996). We often see the cultivation of landraces associated geographically with heterogeneous environments and marginal agricultural zones (Altieri 2004) and socially with the economically disadvantaged members of ethnic minorities and indigenous communities (Pfeiffer et al. 2005, Samaddar 2006). Considering that traditional farming systems remain widespread in the developing world and that they sustain some of the most marginal ecologies and marginalized communities, some have expressed shock over the lack of programs aimed at bolstering these integrated systems. Such programs are considered a fringe activity by most government and donor agencies (Koohafkan 2006).

### **3.0 Research Purpose and Questions**

The goal of this study is to explore the mutually supportive relationship between agricultural biodiversity and cultural diversity. It seeks to better understand agriculture as an expression of indigenous knowledge. By situating agricultural practice into a broader cultural context it hopes to draw attention to the consequences of narrowly focused development interventions.

Thus the goal of this study is to answer the following questions:

- How is agriculture, as an extension indigenous knowledge, supportive of other forms of cultural expression?
- How is indigenous knowledge transferred and where does this occur?
- How can development find points of synergy and reciprocity with indigenous knowledge systems and foster development by augmenting cultural agency?
- What potential to adequately value diversity retention in developing economies?

## 4.0 Study Construction

### 4.1 Study Area

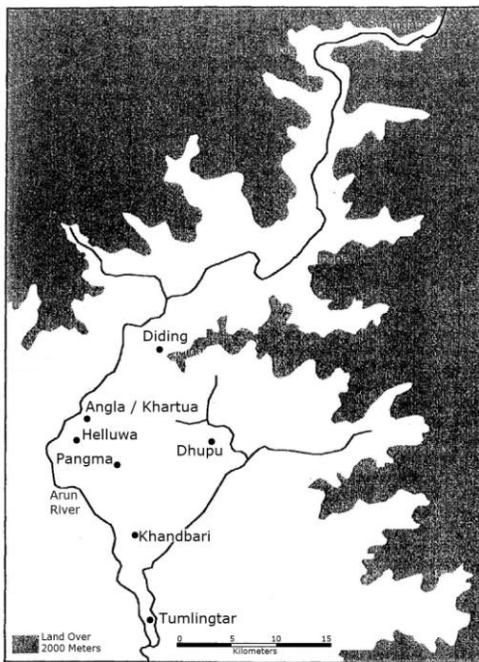


Figure 2 Lohorung Villages

Lohorung have traditionally settled on the eastern bank of the Arun river, in what is now the Sankhuwashabha district in eastern Nepal. It is a topographically diverse district that runs from the Arun at 600m up to mount Makalu at 8,345m, which lies on the country's northern boarder with Tibet. There are about six main Lohorung settlements, all lying in the middle hills to the north of the district's administrative center at Khandbari Bazaar (fig. 2). The fieldwork for this thesis has been carried out in three of these villages: Pangma, Hellua, and Angla (which I have surveyed together with

nearby Khartua). These older villages are nearly, but not entirely, culturally homogenous.

That said, Lohorung live in close proximity to a number of other ethnic groups including caste Hindus, Magar, Gurung, Tamang, and several other Kiranti groups who have immigrated to the region over the past few hundred years.

#### *4.2 Methodology and Sampling Technique*

This thesis explores the connection of agricultural practice to cultural identity by viewing it as a core expression of indigenous knowledge. Developing an adequate appreciation of any such integrated system requires maintaining a holistic perspective contextualized within a local cultural setting. An ethnographic methodology (or some variation there-of) is best able to capture contextual understandings due to a holistic emphasis on localized subjective realities and micro-level consequences of macro-level forces. Full-scale ethnographies though are notoriously intensive affairs often consisting of multiple years of immersion, which is perhaps one reason why they are rarely employed in the context of development (Bryman 1995). Indeed, for myself as well, the time frame of this study has limited me to what has been termed micro-ethnography. This strategy involves triangulating a range of qualitative methods such as semi-structured interviews, participant observation, as well secondary data analysis (Wolcott 1990). This study has not set out to test a hypothesis but rather is intended to be an inductive exploration of the subject. The intent is reflected in my choice of sampling method. I have chosen to employ here the *theoretical sampling* technique championed by Glaser and Strauss (1967). Theoretical sampling was developed with a view that probability sampling, by relying on statistical rather than theoretical criteria, is largely inappropriate for the more open nature of qualitative study. Statistical sampling techniques are well suited to determining distribution among pre-determined categories, but are quite blind to the fact that those categories may be fundamentally flawed from the outset. Theoretical sampling on the other hand, as Glaser and Strauss suggest, is employed “in order to discover categories and their properties and to suggest their interrelationships into a theory” (1967: 62). In an on-going iterative dialogue, data has been collected, analyzed in order to inform further data collection and construct an emergent theory. While this sampling method is more commonly associated with a grounded theory methodology, I have used

it in order to guide the semi-structured interviews forming the basis of my micro-ethnographic approach. Far from being a methodological contradiction, grounded theory can and should be considered a child of the ethnographic tradition.

In total 40 interviews were conducted with household agricultural decision makers: nine in Pangma, eleven between Angla and Khartua, and twenty in Hellsuwa. I sampled household adults, male or female, as long as the individual played a role in agricultural decision-making. Whenever possible, I encouraged multiple adults to contribute to the discussion. As change over time is of particular concern to the study, I was eager to engage with older individuals, whose memory could span multiple generations. Thus the median age for respondents was 60. The youngest respondent was a newly married 22 year-old head of household while the oldest was a nonagenarian at 98. Through these interviews 11 key knowledge holders were identified for more in-depth discussions; they included village elders, ritual priests (*yatangpa*), and shaman (*mangpa*). My research assistant Santa Rai was an invaluable resource in brokering access to these respondents. As the first Lohorung to receive a Master's degree, he was highly respected. This contributed to a very comfortable and open dialogue. My limited grasp of the Lohorung language, however, has meant that he also mediated all information collected.

Through the interviews seven representative Lohorung home gardens were chosen for a detailed species cataloging accompanied by the garden's owner. The names and uses of all plants found in each home garden were recorded along with any associated anecdotes or memories. The data gleaned from these methods has been supplemented and contrasted with participant observation. I do owe a great debt to the insights of Charlotte Hardman (2000) in her ethnography *Other Worlds*, which recounts her fieldwork among the same Lohorung communities in the late 1970s. This key resource will also serve to add a longitudinal element to the study.

#### 4.3 *Reliability, Validity and Ethical Considerations*

Reliability and validity have traditionally been important concepts for ensuring quality and transparency in quantitative research but their utility to the qualitative researcher has been a subject of much debate. Categories such as external validity will have little bearing on this study, where contextuality and local ways of understanding are main preoccupations. Rather than attempting to graft these largely incongruous ideals onto this study, I will utilize Lincoln and Guba's (1985) qualitative criteria of *trustworthiness* and *authenticity*; concepts that stress scholarly duty, fair representation, and respondent validation. Perhaps more importantly concepts that recognize the wider political impact of research, particularly in terms of empowering the community studied by way of contributing to a better understanding of social milieu.

Research is fraught with ethical dilemmas resulting from overlapping layers of moral obligations to various professions, institutions, cultures and communities. To as great an extent as possible, this study has conformed to the American Anthropological Association's code of ethics adopted June 1998 (AAA 1998). The code stresses that a researcher's primary obligation is to the individuals of the communities studied. I recognize the tremendous debt owed to my informants and I take it as my duty to ensure that the information contained in this paper will be utilized in a way that is beneficial to them and in line with their wishes. I hope to draw attention to the intrinsic value of Lohorung cultural expressions from ancestral lore to holistic agricultural practices, which demand recognition for their wisdom and insight. I understand too, that for want of greater economic freedom and broader social inclusion, younger generations of Lohorung are distancing themselves from this rich history. I therefore draw attention to points of reconciliation between indigenous knowledge retention and economic empowerment (when coupled with other strategies to increase cultural agency i.e. mother tongue education ).

## **5.0 Local Perspectives in Development: The Role of Indigenous Knowledge**

### *5.1 Anthropological Perspectives on Indigenous Knowledge*

Over the past half century there has been a profusion of anthropological sub-fields seeking to understand the relationship of culture and environment, and the agricultural systems that are a product of this interface. Cultural ecology, associated most often with Julian Stewart (1955), explored the ways in which the biophysical realm influenced culture and social organization. Ecological anthropology took the same line of questioning but shifted the unit of analysis from culture to ecological populations (Rappaport 1968). The main preoccupation of scholars such as Stewart and Rappaport was to make sense of culture based on an understanding of the natural environment. With scholars who focus on indigenous knowledge, however, the preoccupation is quite the opposite; their goal is to make sense of the natural environment through an understanding of culture. While anthropologists have long been interested in “the utilization of plant and animal life by primitive peoples” (Castetter 1944 qtd in Berlin 1992: 4), it wasn’t until Harold Conklin’s 1954 Ph.D. thesis on Hanunoo folk taxonomy in the Philippines that they began to explore how cultures conceptualize and classify the natural world. Conklin’s work laid the foundation for the discipline of ethnoecology, which works to grasp indigenous ecological understandings. Several other disciplines have recently converged on the study of indigenous knowledge. Linguists within the new concentration of biocultural diversity (Harmon 2002, Maffi 2006) have focused on language as a vehicle for and repository of indigenous knowledge. Agronomists and ecologists are likewise becoming increasingly interested in the cultural dimension of plant utilization, particularly in the areas of agrobiodiversity and agroecology, recognizing the insight that indigenous knowledge can provide studies in sustainability (Nazarea 2006, Pfiffer et al. 2006).

Early inquiries into indigenous knowledge systems, particularly within ethnoecology, focused largely on content, comparing and contrasting methods of categorizing the natural world. Debate ensued between the cognitive/universal (Berlin 1992) and the

utilitarian/adaptationist (Hunn 1982) perspectives on folk taxonomy systems – that is, whether traditional naming systems are driven by universals in human cognition or specificities of cultural utility. While these inquires did succeed in drawing attention to indigenous knowledge, such discord has precluded the formulation of a fuller depiction of its multiple expressions. As Nazarea states, “an inordinate amount of energy has already been spent in arguing for the best possible answer - to get the story right” (Nazarea 2006: 6). In her opinion, there may not be one definitive position, suggesting that Berlin and Hunn may simply be forwarding answers to fundamentally different questions and that these viewpoints are not necessarily mutually exclusive (Nazarea 2006).

Much of our difficulty in understanding and utilizing indigenous knowledge systems emerges from a tendency among scholars to make indigenous knowledge out to be *something* when in many ways it is *everything*, at least in its context. In many ways indigenous knowledge is part and parcel of cultural identity. The only means by which we come to know the nebulous entity that is indigenous knowledge is through its more tangible manifestations, such as folk taxonomies or traditional cultivation strategies. These componential expressions larger systems have themselves become what many researchers term indigenous knowledge. Abstracting these elements for cross-cultural comparison or scientific validation is not nearly as revealing as developing a contextual understanding of their deeper meanings and localized importance. As Nazarea (2006) adeptly points out, the former approach can only come from a misunderstanding of the dynamic nature of indigenous knowledge, its importance to local communities and ecologies. She asserts that divorcing indigenous knowledge from cultural agency reduces it to little more than “political currency or intellectual fodder” (2006: 323).

### *5.2 Indigenous Knowledge and the Domains of Cultural Memory*

In a recent article, Nazarea suggests local knowledge and cultural memory “serve as repositories of alternative choices that keep cultural and biological diversity flourishing” (2006: 318). While it is not surprising that she highlights the importance of these two

critical areas, the fact that she keeps them largely separated in her analysis is curious. Although they have maintained distinct scholarly trajectories, it seems clear to me that indigenous knowledge and cultural memory are intimately connected. Cultural memory to a great extent informs indigenous knowledge. Hardman suggests that individuals in Lohorung society often act based on what they know to have been true in their ancestral past, often understood by a body of ancestral lore known as *pe lam*, what she labels “knowledge of the past for the present” (2000: 103). Truly, there can be no way to obtain a fuller picture of indigenous knowledge systems without an adequate understanding of how the individual negotiates cultural memory. If the goal is affirming and augmenting cultural agency, then this negotiation should be of central concern.

According to Rigney, fluidity and social process are key features of cultural memory creation (2005). Cultural memory, he suggests, is “constructed and reconstructed in public acts of remembrance and evolves according to distinctly cultural mechanisms” (2005: 11). The fact that cultural memory is continuously being negotiated is a crucial recognition. Just as important as recognizing the on-going nature of cultural memory construction is an exploration of the arenas in which it takes place. When Rigney refers to “public acts of remembrance” he may mischaracterize the nature of the spaces where these acts occur. In Nepal, as elsewhere, such acts can rarely if ever be witnessed in town halls or legislative chambers, in public squares or on television. For many marginalized communities including the Lohorung there exists a great reluctance to engage in cultural expression in such public spaces. Lohorung have for the past 200 years lived in a society that has devalued their language and culture and despite renewed state commitment to cultural plurality, self-consciousness among Lohorung is still disturbingly common. This has pushed many of these expressions into places of assured cultural sovereignty. Marginalized social groups such as subsistence farmers and indigenous peoples “nurture memory in private, more sovereign spaces such as sacred groves, tangled plots and steaming kitchens” (Nazarea 2006: 327).

It is in these *sovereign spaces* where a connection to the past exists not as a vague recollection but as tangible reality. These are the places where cultural memory is

formulated and indigenous knowledge is transferred. Indeed, it became clear to me very early on in the research process that there were certain places central to a Lohorung's understanding of their past and to the formulation of cultural identity and personhood for their present, places that were decidedly Lohorung. What I will refer to as sovereign spaces might easily be overlooked. However, as I came to understand, sovereign spaces are refuges of diversity, where an endangered language is freely spoken, a traditional meal savored, or an heirloom variety allowed to thrive. These are, for the Lohorung, the house, the fields, and the homegarden. My findings are organized as an exploration of these three spaces.

## **6.0 Indigenous Knowledge and the Construction of Lohorung Identity**

### *6.1 Public Labels*

In Nepal, ethnicity can be a complex construction with many nuanced layers of identity applied in shifting combinations depending on social context. While mother tongue and village of origin can be important factors, they are just part of this equation. For minority ethnic groups such as the Lohorung, their name may bring little recognition outside of a very local context, though for purposes of asserting indigenous identity there are several designations at their disposal. *Janajati* is the term, which translates most literally as 'indigenous' in Nepali, referring to those communities that are not caste Hindus. More locally, however, the term *jimidar* or 'land owner' is often used by Lohorung to differentiate themselves from more recent migrants to the area, whatever their ethnic background (Hardman 2000, Russell 1997). Lohorung too, fall under another indigenous moniker; that of *Kirant*, which unites several indigenous groups of eastern Nepal under a single origin narrative (Gaenszle 1997) The *Kiranti* label is a potent symbol for some, with present day implications both for social status and political autonomy. Indeed, many in Kirant communities believe themselves descended from the ancient *Kirata* kingdom, the first recorded rulers of the Kathmandu Valley before the Licchavis conquered in 400 A.D. These associations of the Kirant past with royalty and sovereignty, as the original people of Nepal, have been instrumental notions in cultural resilience during the social

and political subjugation of indigenous communities experienced after the 'unification' of Nepal by King Pritvi Narayan Shah of Gorkha in the late eighteenth century.

Since democratization, *janajanti* and Kiranti have become important self-designations in gaining political voice. However, the term that ascribes 'ethnicity' to Lohorung, in more pragmatic social and legal interactions, is the ethnonym *Rai*. Of relatively recent inception, Rai is derived from *rajan* or 'king' in Sanskrit and was a term used by Shah rulers to identify local clan headman who served as tax functionaries for the crown. Over time it has come to be applied to the whole of these communities (Gaenzle 1997). The group now designated Rai is actually a composite of some 25 distinct ethno-linguistic groups. Cultural misrepresentation aside, many ethnic designations are a point of contention in Nepal, still carrying strong associations with the social inequities of the Hindu caste system. Rai, for instance, was first legally encoded in the *Muluki Ain* dictates of 1854, which was an attempt by the Shah rulers to integrate the indigenous groups of Nepal into the caste system as a means of extending and legitimating their control. The *Rai* as a group were newly classed as “enslavable alcohol drinkers” (Russell 1997). Long after this designation's legal meaning expired, Rai continued to be denigrated within Nepali society as 'alcohol drinkers' or *matwali* (Hardman 2000). Despite the fact that many Lohorung find contention with the Rai label, each is still legally required to bear it as their surname.

## 6.2 *Private Knowledge*

Much is written on the malleable nature of ethnicity in broader social and political contexts in Nepal (ex. Allen 1997, Gaenzel 1997). While the work has certainly shed light on the manipulation of ethnicity both for purposes of empowerment and repression, it has provided little insight into the way identity is maintained and reinterpreted in more sovereign spaces. In conversations with village elders, I often inquired as to what made Lohorung unique, what defined them as a group. More often than not, I was enthusiastically presented with one of the many tales from the *pe lam*, which recounted the ancient founding of Lohorung society. One related how the Lohorung came to occupy

their present lands as one of ten original Kiranti brothers who migrated northward from their homeland on the Jamuna River. These ten slowly separated from each other as each followed the banks of different river branches. I was told a tale of how every Lohorung is descended from a marriage between the first shaman *Khapchrupa* and a beautiful woman *Ghekchikwa* who was trapped in a stone he found repeatedly snagged in his fishing net. The body of lore to which these tales belong are, according to Hardman, “one of the key ways Lohorung maintain their boundaries and express and experience their own distinctiveness in relation to other groups”(2000: 104).

*Pe lam* can be said to include not only ancestral myths but also the language and knowledge that in many ways are part and parcel of the Lohorung spiritual system. The Lohorung have traditionally maintained a way of knowing their world that does not draw a hard and fast line between the human and non-human or the living and the dead. Hardman aptly describes “the Lohorung idea, which lies at the core of their rituals and their understandings of themselves and their environment, is the notion that every human being is closely bound to the natural world and to a world of spiritual beings” (2000: 58). These “spiritual beings” are primarily *sammang* or ancestor spirits and are often intimately involved in the day-to-day life of the Lohorung. In fact, the *sammang*’s influence on traditional Lohorung life is so great Hardman describes it as the “skeleton articulating Lohorung society” (2000: 62). As it was explained to me, maintaining a present-day connection to the ancestral order is a principle goal of Lohorung ritual. Agriculture plays a prominent role in establishing this ancestral connection. At the most basic level, fields and homegardens source a wide array of natural materials required for Lohorung rites and ritual: from the rice, sacrificed during the *nuagi* celebration, to the calabash of millet beer required in the performance of virtually every important ritual from birth to death. It is essential that ancestors recognize such ritual objects, that they took pleasure in the objects while they were alive. Without these, one village elder told me, “we cannot do anything, we cannot move forward.” This statement supports another of Hardman’s observations: “the ancestral past for the Lohorung is neither myth nor history [but] that part of the past that is intrinsic and ever living in the present” (2000: 105).

The perseverance of this unique knowledge system (and the biological and cultural diversity it helps sustain) is contingent on the continued salience of sovereign spaces in Lohorung life. Lohorung communities are moving, if slowly, towards a dominant global narrative of 'modernity' that at best discourages diversity and at worst actively engages in its destruction. A perceived lack of alternatives deprives minority ethnic groups of cultural agency and contributes to fatalism and a general ambivalence towards the future, particularly amongst key knowledge holders. Development institutions, if they have any role to play here, should seek points of intersection with indigenous knowledge, where sovereign spaces might locate points for dialogue in crafting alternative development paradigms. In the sections that follow, I will explore sovereign spaces as the sites of mutually reinforcing diversities, steeped in Lohorung cultural memory. I hope to illustrate the ways in which agricultural practice is an extension of this memory and point to potential cognates in current agricultural biodiversity and sustainability discourses.

## 7.0 Sovereign Spaces of the Lohorung

### 7.1 Houses

An exploration of the Lohorung house or *khim* (fig. 3) highlights how a simple dwelling links its occupants to a broader existential system of cultural memory. The Lohorung build houses quite unlike those of their neighbors. They are raised on Sal wood stilts whereas their neighbors' are built on the ground. The floor and walls are constructed of mud and bamboo lattice whereas their neighbors use stone. Lohorung homes are long and rectangular with woven bamboo verandas. The long arching roofs are made from *leiwei* thatch grass, occasionally supplemented with rice stalk. One farmer who grew *leiwei* told me that if constructed properly these roofs can last for over 30 years, but



Figure 3: Typical Lohorung Khim

that knowledge on roof making was fast being lost. Indeed, houses are changing, and each village now contains several modern stone and mortar homes with corrugated iron roofing, most often built by those families receiving remittances from a son in the British Army. As I was told, corrugated iron roofs are somewhat of a status symbol among Lohorung, an important sign of upward mobility.

Despite these new developments, the vast majority of Lohorung still reside in traditional *khim*. Hardman writes that understanding the house is key to understanding Lohorung notions of personhood, going so far as to suggest that we might view “the house rather than the person as the central unit of agency” (2000: 137). According to Hardman, the home locates the Lohorung’s position in the natural and ancestral order. Through the materials used in their construction and the rituals they host, houses preserve living memory of a time when the Lohorung were closer to the power of the natural world, an abstract quality (possessed by all things ancestral) called *saya*. As I was told, Lohorung could communicate with all natural things possessing *saya* (i.e. bamboo) but over time they have lost this ability. Only *yantangpa* (ritual priests) retain some of the original ancestral language known as *samek*, many rituals must be conducted in *samek*. A *yatangpa* from Khatua said, referring to the earthen walls and floor of the Lohorung house, “We originally called the earth *kham and kham* became *khim*: our home. We are born from the earth and when we die we go back into the earth...if we live in a stone house we will die ten years earlier. It doesn't match.”

The building of the first Lohorung home is also a prominent aspect of *pe lam* mythology.

As the tale goes, *Khakchrupa* and his new wife *Ngagelungma* set about building a house but did not know how to cut pillars. *Ngagelungma* then saw a crow with a forked tail and suggested using forked pillars (like the tail of the crow) to support floor joists (fig. 4). The construction of this first home is a key event during the founding of



Figure 4: Forked Support Pillars

Lohorung civilization and the house itself stands as a symbol of this important ancestral event. Lohorung ancestors still exert control over the home, particularly in the case of the house shrine *mangsuk* and the three hearthstones where food is prepared. These are thought to be common places where *sammang* spirits rest and therefore many expressed concern that non-Lohorung might fall sick if they come into contact with these objects. As an observer, I recognized the importance of such beliefs in preserving cultural sovereignty over these spaces. Indeed, Lohorung-ness is imbued into the house particularly through these defining features. The *mangsuk* is by far the most important of several ritual shrines constructed by Lohorung. Its yearly renewal (a reaffirmation of ancestral connection) known as *nuagi* marks the most important occasion in the Lohorung calendar. During a 15-day festival each household performs their own *nuagi* to coincide with the day of the last death in the family.

*Nuagi* also represents an important link between the Lohorung spiritual system and agricultural practice. I was told that during the *nuagi* performance new crops must first be offered to the ancestors, and only after this offering, can the members of the household eat. This offering occurs after a new *mangsuk* is constructed from the branches of the chestnut *waiphu* (*Castanopsis tribuloides*) and leaves from the sal tree *suphu* (*Shorea robusta*). A few of the more essential items included in this sacrifice are rice, lentils, chickens, millet beer or *dibu*, and ginger. Of vital importance here is that the ancestors recognize these offerings: Hardman quotes an informant, “we give them what they used to like to eat, the first things, the things they used to eat when they were alive” (2000: 151). Cultural memory, reconstructed through household ritual, promotes the preservation of crops that constitute these offerings.

## 7.2 Homegardens

A thriving homegarden is perhaps as vital to a proper Lohorung home as its *mangsuk*. These gardens are often loosely bounded areas teeming with a wide array of annual and perennial plant species. Homegardens are an area of recent interest for scholars in agrobiodiversity and anthropology alike. They are often touted as reservoirs of

biodiversity, retaining important species/varieties that are underrepresented in main fields or beyond a local area (Jackson et al. 2007). Anthropologists are concerned with homegardens as socially constructed spaces where cultural memory is nurtured alongside those plants vital to the reproduction of cultural identity (Nazarea 2006: Eyzaguirre and Linares 2004). Homegardens are also emblematic of the food sovereignty movement. While they occupy a negligible proportion of total land, they often provide over 60% of household requirements for fruits, vegetables and spices (Gautam et al. 2005). These important dietary components are a vital contribution to household nutrition (Gauchan et al. 2008).

As mentioned, seven representative homegardens were inventoried between the Pangma, Angla, and Helluwa villages. Our inventories reveal a great extent of diversity in Lohorung homegardens, yet the vegetables listed reflect a single season in which the surveys took place. In Pangma the homegardens had 37, 33 and 22 species present; in Angla, 29 and 46; and in Helluwa, 32 and 20. A total of 111 species were recorded across all seven homegardens. These species fulfill an equally wide range of household needs. Vegetable production is of course a key function of the homegarden, where multiple beds are often found tucked into the tangle of trees and shrubs. Broadleaf mustard, eggplant, tomato, onion, chayote, hyacinth bean, cowpea, pumpkin and sugarcane were all commonly found. Many species are multi-functional, having an assortment of utilitarian purposes. The *khowangphu* (*Sterculia villosa*) for instance, provides fuelwood and fodder, while the bark is prized for rope making. Similarly, the *nibhara* (N) (*Ficus auriculata*) yields fruit (often given to pigs) and fuelwood, and its large leaves are crafted into plates. Species such as *homphu* (*Sapium insigne*) and *mitthingma* (*Zanthoxylum armatum*) are used as natural pesticides both in the main fields and during seed storage. Others have medicinal functions: shrubs such as *kali banmara* (N) (*Eupatorium adenophorum*) are used to treat small cuts, while *semphu* (*Thysanolaena maxima*) root is used to for skin sores. The utility of such species is sometimes bound up in Lohorung taxonomy: the tree *shawaghansa* (*Litsea monopelata*), for instance, translates literally as “buffalo fodder.”

Of the 111 species recorded overall, 36 had commonly used Lohorung names (though there was variation between individuals in the retention of Lohorung plant vocabulary). Lohorung use Nepali loan words to refer to the remainder, indicating, for the most part, that these species arrived only after the Gorkha conquest of the region in the late eighteenth century. Lohorung names for hyacinth bean *kakrangma*, taro *yakshi*, and another tuber called *sabajey*, indicate that these crops have a significantly longer history in Lohorung communities. Varietal differences, such as red and yellow *sabajey*, preserve important genetic diversity in globally underutilized crop species. The respondents were not aware of Nepali classifications for some culturally significant species (thus, I was unable to determine their scientific names). The *sarindo* flower, for example, is used in a special curry unique to the Lohorung, while the creeper *kong-la*, which produces yeast, is used in the fermentation of the millet beer *dibu*.



Figure 5 Bokla and Lingma

For many Lohorung, possessing a name for plant varieties in their own language is a clear indication of ancestralness. As I have articulated, ancestral objects have special significance in cultural life, often figuring prominently into rituals. Several tree species are maintained in homegardens for such purposes. The chestnut *waiphu* is raw material for many ritual structures including the *mangsuk* and the *meeribung* pole, which is placed in the front yard during weddings. *Chigaphu* (*Castanopsis indica*), another chestnut, is also used in shrines and various other ritual objects. The fronds of *semphu* (*Thysanolaena maxima*) are an important feature in the *khimpie* ceremony honoring the house ancestor, as is the root of *nunumeshi* (*Morus serrata*). Many individuals suggested that one particular tree, *dung-dung-wara*, has no Nepali classification. They believe the *dung-dung-wara* is rare in the wild, therefore households in each community keep a tree in their garden. *Dung-dung-wara* branches are crafted into bracelets, an offering required in several ceremonies. I was told by a *yatangpa* from Khartua that the ancestors used to wear similar bracelets and now (“much like a child with a new watch”) they are pleased

by the offerings. The bottle gourd provides ceremonial receptacles for *dibu* during many auspicious occasions. Two varieties are grown for this purpose (fig. 5): *bokla* with its short stocky neck is used by *yatangpa*, while those with a longer thinner neck, called *lingma*, are used by *mangpa*. These ritually important species embody a cultural memory that contributes to the retention of language and identity, which in turn contribute to biological diversity.

Much like the beliefs that protect cultural sovereignty over the household shrine and hearthstones, it is said to be a danger for non-Lohorung to stray too close to certain areas of the homegarden; particularly around ginger, which plays a critical role in ritual and divination.

### 7.3 Fields

The Lohorung often refer to themselves as *shing-sa-wa* or 'field-earth-people' (Hardman 2000: 36), and indeed, agriculture has long been a fundamental component of cultural identity. However, of the three sovereign spaces, the fields are unique in that they are the most public. The past fifteen years have seen new roads constructed and the region opened up to broader networks of trade. As a result, new crop varieties and agricultural technologies have found their way onto the fields and into the vocabularies of many Lohorung farmers. The fields, as the primary source of livelihood for a rural household, do have the most salient link with rural development strategies, often undertaken with the goal to increase production of a limited number of commercially viable crops. In Nepal, this strategy has already fundamentally transforming cultivation patterns in the more fertile southern Terai plains (Gauchan et al. 2002). Agroecologists, however, have recently pointed out the disadvantages in utilizing such strategies for pro-poor interventions, particularly for those living in marginal ecologies. Benefits derived from the adoption of modern agricultural technology are not scale neutral and can, in many cases, accentuate the economic disparities already present within the country. By harnessing economies of scale, those farmers possessing larger lands in more fertile areas

stand to benefit far more than farmers tending small plots in marginal ecologies (Altieri 2002).

Rapid production increases for key crops also leads to a drop in overall commodity prices and indeed cereal prices have dropped more than 50 percent in real terms since 1970 with little hope of recovery (Ashley and Maxwell 2001: 404). While this certainly benefits the urban poor, by way of reducing food cost, in rural areas it means that only the largest farms have the potential of remaining commercially viable. In most cases the poor are barred from credit that would allow them to purchase inputs such as the artificial fertilizers, pesticides and irrigation systems, which most modern varieties require. As a result of such financial constraints new technologies are often adopted in a piecemeal fashion in these communities, reducing the cost-to-benefit ratio and threatening the delicate ecologies of the marginal lands they farm (Altieri 2002, Upreti et al. 2002).

The fact that this modern agricultural paradigm has been proven ill-suited to serve the rural poor (socially, economically, and environmentally) necessitates a new approach that supports whole farm systems rather than focusing on the production of certain commodities (Altieri 2002, Koohafkan 2006, Pfeiffer et al. 2006, Pimbert 2006, Sheppard 2005). Any approach that seeks to support whole farm systems must recognize the role of indigenous knowledge in shaping traditional agricultural practice. Indigenous knowledge in agriculture takes many forms, from cropping systems to harvest rituals or from folktales to retention of ancestral varieties. In the sections that follow I will explore the function of indigenous knowledge in Lohorung agriculture.

## **8.0 Agricultural Knowledge from the Past for the Future**

### *8.1 The Origin of Agriculture*

It should not be surprising, given the centrality of agriculture to the Lohorung experience, that its discovery figures prominently into *pe lam* mythology as one of the key civilizing acts of the Lohorung ancestors. I asked a village elder in Hellsuwa whether Lohorung

were always farmers and was presented with another tale of *Khakchrupa*, the first Lohorung shaman and perhaps the most important of the 'original beings.' The story begins when *Khakchrupa* was young and the Lohorung roamed the forests as hunter gatherers. As he told me, “at the time game in the forest was becoming scarce. *Khakchrupa* shot a dove with an arrow. The arrow pierced the dove's crop (a small food store in the throat). The crop contained seeds of rice and millet, but he did not know these things. The seeds fell to the earth and grew in the ground. Rice and millet were there in the beginning.” He went on to explain that other crops such as maize were not present at the time of the original beings and this is why it does not have a Lohorung name. This story enshrines the privileged position both rice and millet still hold in Lohorung fields and begins to give some indication of their cultural value. In the following sections I'll explore Lohorung farming systems through these key ancestral crops.

## 8.2 Rice

Rice is the core component of the Lohorung diet, as it is for many Nepalis, providing the majority of their daily caloric intake. Its gastronomic preeminence is etymologically illustrated in the Lohorung word for meal, *chama*, which means literally 'to eat rice.' Judging by the many rice varieties now present in the fields of my study area, the seeds *Khachurupa's* dove carried were surely not the last introduced into these communities. Through interviews I was able to establish at least 22 varieties that were cultivated in recent memory. Five of these *belkuti*, *halkoda*, *GRP*, *kumaltar* and *pahenle marshi* are modern varieties that have been introduced within the last 15 years. Unsurprisingly, they represent the majority of the seven varieties now commonly planted in the field, though each has a certain agro-ecological stronghold. *Pahenle marshi* is predominating in Angla while *belkuti* is the most common in Upper Helluwa and Pangma. *Halkoda* and *GRP* require more fertile lands and are grown mostly on new fields by the bank of the Arun river (a region which opened up for farming with the eradication of malaria in the 1960s). *Kumalchar* is spread throughout all three villages. The other two varieties that are still commonly planted are *atey marshi* and *towli*, both of which have a much longer history in the region. *Atey Marshi*, according to informants, was brought some 80 years prior by

a Damai tailor named Atey, while *towli*, was said to be the oldest variety still grown. *Atey marshi* and *towli*, however, are just two of the 14 landraces informants recalled being cultivated by their parents. The only other two landraces still extant are *manipuri* and *mansara*, grown by one respondent each in Pangma. A single informant in Angla had recently abandoned another two additional landraces, *madeley* and *bangerey*.

Many of the informants pointed out the importance of a practice called *nalfernu*, which is Nepali for “stem change.” It is a generally held belief that yields would decline if one lot of seeds were reused for several years in the same fields. Through barter with close neighbors or relatives, seeds are regularly exchanged. Similar systems can be seen in a variety of traditional farming systems such those in certain regions of Peru (Shepard 2005), Mexico (Brush 1991) and Thailand (Dennis 1987). For Lohorung communities, an influx of new higher yielding rice varieties over the past generation combined with regular seed exchange through *nalfernu* has exacerbated the significant erosion of traditional rice varieties. These findings, though, run contrary to those of Brush in his overview of the adoption of modern varieties of maize in Chiapas Mexico and rice in Chiang Mai Thailand. There, Brush found that the spread of modern varieties did not displace traditional varieties, but that new varieties were often incorporated into pre-existing farming systems: different varieties were maintained for use in various agro-ecological niches with certain areas set aside for culturally significant varieties (Brush 1991: 159). Brush downplays the potential for some varieties to become ecologically redundant or for certain cultural functions to wane in importance. In my study area for instance, one rice landrace *mansara* was often described as having an extremely long soft stalk, excellent for weaving into mats or for use as roof thatch. The recent introduction of manufactured blankets and corrugated iron roofing has lessened the cultural utility of this variety to the extent that it is maintained by only a single individual.

Fodder trees dotting the terraced landscape (fig. 6) are a reminder of the importance of animal husbandry to these communities, but as Siltoe points out, these trees also shade significant portions of the fields requiring rice varieties that can tolerate such conditions (1998: 224). However, he suggests that this has limited the adoption of modern varieties, which are often developed for full-sun conditions. Again, I



Figure 6: Rice Terraces and Fodder Trees

found this not to be the case, as many informants claimed they grew *kumaltar*, a modern variety in the shaded areas. In many cases, it supplanted the versatile *atey marshi* (grown in both sunny and shady areas). Those who retain *atey marshi*, almost exclusively in Pangma, claimed to do so for its ability to yield at higher altitude.

Modern varieties have not displaced *towli*, often suggested as the region's oldest variety. *Towli* is an upland rice variety, grown in dry rain-fed fields rather than irrigated paddy. As *towli* does require flooded paddy fields, it can be grown during the dry season. It was explained that *towli* continues to be cultivated at such a high rate in Lohorung communities due to its role in the *nuagi* ceremony. *Nuagi* is a tradition shared with several Kirant groups. While other groups perform *nuagi* during the main rice harvest in December, Lohorung carried it out earlier, during the flowering season, for them symbolic of the renewal process. *Towli's* earlier harvest, in correspondence with Lohorung, *nuagi* has given it particular cultural importance, contributing to its retention.

### 8.3 Millet

Millet, the other seed contained in the mythical dove's crop, is actually a generic term for a diverse group of small-grained grasses. In using it here, I refer to varieties of finger millet (*Eleusine coracana*). Minor millets, as they are known, are an underutilized crop globally accounting for less than one percent of food grain produced worldwide (Weber

et al. 2006: 2). Despite their importance to many marginalized communities and the fact that they possess nutritional profiles more complete than most major cereals, they have garnered little attention from modern breeders (2006: 4). This is very much unlike rice, which has perhaps been the most targeted grain of Green Revolution breeding programs. Due to the absence of modern varieties in millet, those grown in the study area have not changed to the memory of any respondents. These are *dolley*, *dokrey*, *nankartua* and *pangdur*. Another landrace, *bwipali*, was recently introduced to Angla from a neighboring district. *Dolley* and *nankatua* were the most commonly planted.

Millet is not part of the Lohorung staple diet, although it is occasionally consumed in the form of bread and does have an important role as a 'famine grain,' taking the place of rice during periods of shortage. Despite its limited dietary role, when informants were asked which crop they consider most important, millet was the unanimous answer. This emphasizes the fact that cultural significance can in many cases supercede concerns such as food security and economic potential. Millet's privileged position in Lohorung society



Figure 7: Dibu served in a *Tong-pa*

stems from its use in the production of *dibu*, a millet beer. Indeed, *dibu* is the primary use for millet grown by Lohorung. As I came to understand, *dibu's* importance to the Lohorung cannot be overstated. In more prosaic situations, it is provided to guests as an important way of showing respect and hospitality, a gesture I became all too familiar with (and an unexpected hazard of fieldwork). Respect is further emphasized when this beverage is served in a *tong-pa* (fig. 7) a large bamboo vessel with a thin bamboo straw. As one informant explained, *tong-pa* is a compound term; *tong* 'connection' and *pa* 'grandfather.' In the mind of another informant, however, *tong-pa* was translated as "by our own hand," Both interpretations though emphasize that, particularly in this vessel, *dibu* acts as an affirmation of ancestral connection. *Dibu*, either in a *tong-pa* or in a calabash (*bokla* or *lingma*), must be present at each and every ritual and rite the Lohorung

perform. As one village elder told me, “from birth to death we must have this.” Again, as an offering, *dibu* is intended to please the ancestors as something they remember and enjoy.

#### *8.4 Farming Systems*

Of course, traditional crop varieties themselves are only one aspect of indigenous agricultural knowledge. The farming systems in which they are cultivated not only keep these varieties viable, but are also the means through which complex 'agroecosystems' are constructed (Altieri 2002, Brookfield and Padoch 1994). The ecological function of such systems is critically important in maintaining productivity on small farms, particularly those located in delicate ecologies such as the Nepalese hills. The insurance hypothesis of biodiversity holds that landscapes supporting higher numbers of species are more resilient and reorganize faster after disturbances (Loreau et al. 2003). This observation might understate the complex ecological interactions that contribute to resilience and the diverse indigenous strategies that encourage them. Lohorung demonstrate a range of farming strategies that often, due to the nature of knowledge dissemination, vary from household to household. I found numerous intercropping combinations, a variety of pest deterrent and fertilization regimes, and fodder tree retention throughout the study area. While many ecologists have come to champion related land management methods, we must be wary of conferring western ecological understandings onto the world's vast and variable traditional agricultural strategies, in substance essentializing them – a pitfall of utilizing the term 'traditional' (Argawal 2002, Brosius 1999). The motivations Lohorung farmers have for adopting, adjusting or retaining agricultural strategies are manifold, they might be cultural or utilitarian in nature, but they spawn from a very different conception of the natural world than that of an ecologist engaged in analyzing their methods. These alternative perceptions, rather than invalidating a farmer's knowledge, have potential to deepen our ecological understandings and, in so doing, are arguably just as important as the actions themselves.

When I asked one elder why she chooses to intercrop millet, lentils, and *pilunghey* (a flower pressed for cooking oil) in one field, she responded with a chuckle at my naiveté, “they compete with each other,” suggesting each is engaged in a struggle to outgrow its neighbor. Her explanation, which implies a certain degree of agency in the actions of these cultivars, might be better understood in the context of *saya*, the vital natural energy possessed by all things ancestral (plant, animal or human). However, from an agro-ecological perspective, legume/grain intercropping methods are proven to encourage complementary plant nutrient cycles and nitrogen fixation, significantly boosting productivity (Drinkwater et al. 1998). This is particularly important for finger millet, which is known to be nutrient depleting (Webber et al. 2006: 6) In Lohorong communities intercropping was common practice in both millet fields and rice paddy though the species composition of these systems did vary. Millet was most commonly combined with one of several varieties of lentil and soya bean as well as *pilunghey*. Lima bean was often substituted for one the pulses previously mentioned. While *dolley* seems to be particularly prized, many farmers maintain two or three millet varieties simultaneously. Their staggered ripening times are a means of managing harvest labor and assuring a steady supply of millet. Rice too had a variable intercropping regime that took advantage of otherwise unused space on the wall and ridges of the field terraces. *Ghorey*, yet another pulse, was often grown on terrace walls, while lentils were grown along the ridges. In some cases soya beans were added as an additional pulse in the walls. Unlike millet, harvest times for rice were typically not staggered (aside from *towli*); rather, multiple varieties were maintained for different field altitudes and sun conditions.

## **9.0 Battlefields of Knowledge: Reconciling Ways of Knowing for Development**

### *9.1 Towards a Dynamic Integrated View of Indigenous Knowledge*

In the preceding sections I've attempted to outline how sovereign spaces constitute forums for the expression, reproduction, and negotiation of indigenous knowledge in Lohorong communities. By understanding the situatedness of indigenous knowledge in these spaces two important observations can be made:

- o Indigenous knowledge is not fixed

Indigenous knowledge, as a result of the many private spaces in which it is transferred, is not a consistent entity, neither in time nor space. Each individual forms cultural memory from a unique compositional exposure to this knowledge. This was a fact underappreciated by the early ethnoscientists (Berlin 1992, Hunn 1982) who were often baffled by the inconsistencies in knowledge between individuals. They attempted to eticize the emic, crafting a hard science of soft understandings. For Lohorung, indigenous knowledge is a balance: spiritual and practical, cultural and individual. The shared body of ancestral lore, *pe lam*, does impact individual knowledge and how knowledge is operationalized, not least in agriculture. This is a crucial recognition for outsiders attempting to understand Lohorung farming systems. However, agricultural knowledge is also experiential; it is learned by doing and through observation. The fluid nature of indigenous knowledge does make it resilient and adaptable, an important feature in communities that will certainly experience discernable change in the coming decades. This ‘fluidity’ should not be underestimated in broader applications of indigenous knowledge for development.

- o Expressions of indigenous knowledge are extensively interconnected

These sovereign spaces are home to the tangible expressions of indigenous knowledge, which I group into three main categories: language, ritual-lore and agriculture-lifeways (fig. 8). While many of these have been explored in isolation by linguists, ecologists and anthropologists, I wish to emphasize that not only do such expressions spring from a common source but that they help to validate, support and give meaning to one another. The Lohorung language, for example, helps to demonstrate the ancestral nature of certain crops and reaffirm mythological lore. I was often told that the word Lohorung itself was derived from *lung* or stone, substantiating the tale of cultural nascence from Khakchrupa and his wife Ngagelungma, whom he found trapped in a stone. Explanations of cultural phenomena based on etymology were commonly forwarded, as was the explanation of

*tong-pa*. While these claims might be dubious from a conventional linguistic perspective, they stand as yet another example of what makes indigenous knowledge different, and powerful in that difference. I have also illustrated that ritual is embedded in agricultural practice, particularly through demands for ancestral plants from the field and homegarden.

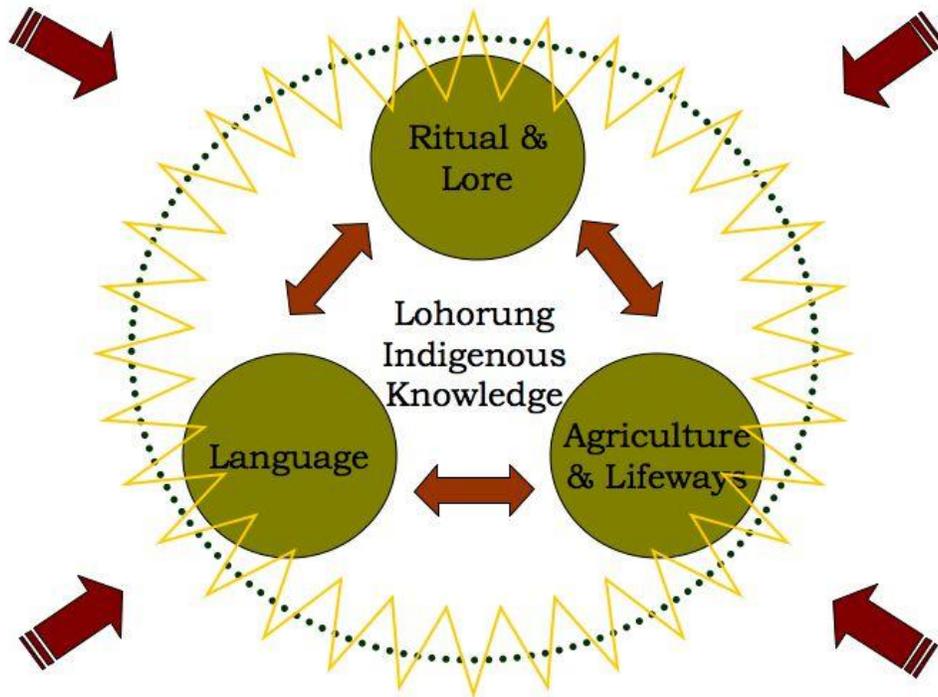


Figure 8 Lohorung Indigenous Knowledge System

These mutually supportive expressions, as a stable system, present a cohesive counter-narrative that to a great extent resists external homogenizing forces. I don't, however, wish to imply that the indigenous knowledge system of the Lohorung is somehow an insular entity. The perforated boundary represents the permeability of indigenous knowledge systems; boundaries frequently renegotiated in relation to outside influence. As Sillitoe (1998: 230) notes, with the ever increasing translocal flow of ideas, knowledge systems no longer exist in isolation (if they ever did). Indigenous communities have been incorporating and reinterpreting features of Western scientific knowledge to complement their own understandings for decades. The fact that Lohorung have selectively incorporated features of external knowledge systems into their own

without being overwhelmed in the process is a testament to the resiliency of their cultural narrative. Just as one triangulates points on a map to locate one's self spatially, it is only through the triangulation of the core expressions of indigenous knowledge that the Lohorung can locate identity. However, owing to the extensive interconnection of these expressions, a substantial disruption (for example, wholesale conversion to commercial production or the loss of Lohorung language) could precipitate the collapse of the system.

Indigenous language loss currently presents one the greatest threat to indigenous knowledge systems. About half of the world's 7,000 languages are spoken by communities with less than 10,000 speakers. These communities, despite the fact that they speak half of the world's languages, comprise only .2% of the world's population (Maffi 1998). Rapid language shift or convergence to one of a very few 'killer languages' have prompted some linguists to predict that 90% of the world's languages will not survive the 21<sup>st</sup> century (Crystal 2000). In Lohorung homes most children now generally do not speak Lohorung, though they may understand some. While this may not be ideal for most parents they expressed concern that if Lohorung was spoken at home their children may be thought of as ignorant and it is rare to find any fluent speakers under the age of 25. The lack of mother tongue education in these communities is one reason that the Lohorung language is losing a perceived link with 'legitimate' knowledge. Bringing this tongue back from the brink will be a significant challenge for the Lohorung communities.

## *9.2 Connecting Perspectives*

Post-development thinkers may not harbor much faith in the potential for western scientific and indigenous knowledge systems to find common ground, though their critiques do illuminate issues of power and ethnocentrism, which must be key considerations as we look for points of intersection and synergy. The power disparity that exists between these knowledge systems is a factor that cannot be underestimated. In the developing world the adoption of modern technology, from artificial pesticides to manufactured kitchenware, is often seen as a marker of success, even if their adoption is

less appropriate to the cultural and ecological context. In many cases, only economic constraints bar the adoption of such technology (Sillitoe 1998: 225). In Lohorung communities, for example, corrugated iron roofing is fast being established as a status symbol for upwardly mobile households. This roofing material is adopted despite the fact that it contributes to temperature extremes by forgoing the insulating properties of thatch (Jian 2001). It also severs community bonds that are reaffirmed through regular roof construction and hastens the loss of useful biodiversity in rice and *leiwei* used as thatch. It is precisely this power differential that calls for extreme empowerment or non-interventionism (Haverkort et al. 1991, Scoones and Thompson 1994) – perhaps the most morally tenable arguments, but naive in praxis. Finding *economic* incentives for biological diversity conservation based on a dialogue between indigenous knowledge systems and their western scientific counterparts, may represent the best means to support diversity retention on all levels. It is incipient upon development institutions, working as they do at this juncture of knowledges, to actively seek points of intersection and reciprocity to promote alternative development paradigms that aim to empower marginalized communities and support cultural agency. In many cases this will require attention to non-traditional development concerns such as folk mythology and ritual, uncharted territory for many development professionals.

### *9.3 Agricultural Diversity for Development*

It is important to recognize that there will be no easy win-win scenario between diversity conservation and rapid economic growth. Indeed, it will be an immense challenge to address the macroeconomic perversities that promote agricultural homogenization in developing economies. Agriculture subsidies, tax breaks and price controls favor the production of key commodities often rendering agrobiodiverse products uncompetitive, distorting farm level decision making both in developed and developing countries (Tilman 2002). In 2000, agricultural subsidies in the OECD countries alone totaled US\$ 324 billion or a third of the global value of agricultural products for that year (Pascual and Perrings 2007). At the regional level, the market connections established with the arrival of modern crop varieties often favor these at the expense of local landraces, which

cannot be produced at quantities that broader markets require, despite the fact that they may be better suited to local ecologies and may possess important cultural attributes. While undervalued in current markets, these biological resources and the knowledge systems attendant to them, may still represent the most valuable assets for rural communities such as the Lohorung. As I will explore in the following paragraphs, capturing the full value of these resources will require innovative economic schemes at the local and regional levels and significant legal reform, nationally and internationally.

The narrowing genetic base of the world's food supply has long been an area of concern for agronomists (Harlan 1998). By propagating genetically homogeneous monocultures over large geographical areas, it was said that the model could actually increase food scarcity by heightening susceptibility to epidemics of botanical disease. Historical examples of such a scenario can be seen in the outbreak of Potato Blight (*Phytophthora infestans*), which led to the Irish Potato Famine as well more recently with Southern Leaf Corn Blight (*Bipolaris maydis*) that spread across much of the Southern and Great Plains regions United States during the early 1970s (and originating in genetically homogenous corn in the Philippines). Only recently, however, has the issue garnered broader public attention from the FAO and other international bodies. Reduction in overall crop genetic diversity brought about in part by the arrival of modern crop varieties, ironically affects those very plant breeders engaged in the engineering of modern varieties by drastically reducing the availability of 'raw material' or those novel genetic traits possessed by traditional landraces. These folk varieties will be crucial to developing more sustainable forms of agriculture, increasing food production in marginal ecological zones, and responding to threats posed from climate change and evolving pests (Cleveland and Murray 1998) The focus on the preservation of genetic material represents a sort of salvage paradigm in agronomy, witnessed in the creation of dozens of seeds banks in Western countries intended to store and protect these genetic resources for future utilization by breeders. These seed banks, while lauded in the West, have prompted accusations of 'biopiracy' by indigenous rights activists in the countries where the plant material originated (ex. Shiva 1998). This *ex-situ* approach to conservation, while

founded on valid concerns, takes a very simplistic view of traditional landraces, one ignorant to the social and ecological functions that they fulfill and the rights of the farmers that act as their stewards. For several reasons, an alternative *in-situ* approach to agrobiodiversity conservation has become the favored paradigm in much recent agrobiodiversity discourse. For one, *in-situ* strategies are said not only to preserve genetic material but also the evolutionary processes whereby new genetic material is created – in essence, preserving a living system rather than a collection of inert specimens (Brush 1991). Such sterile seed collections are divorced from the indigenous knowledge systems that promote diversity. This can include cropping systems, integrated pest management regimes, seed storage techniques as well as the culinary traditions for which the varieties were selected in the first place (Pfeiffer et al. 2006). Due to the massive variability of traditional farming systems and the diverse ecologies in which they are found, we still know very little about the function of much of the world's agrobiodiversity. Losing the context of these traditional varieties would prove a significant impediment in the quest to understand sustainable agriculture. It is also suggested that an *in-situ* approach may actually cost less than *ex-situ* methods by building on what farmers are already doing (Brush 1991). Despite its privileged place in discourse, an *in-situ* approach has yet to be realized in any effective manner and there exists some substantial difference of opinion over the best means to do so.

Compensation mechanisms are a significant barrier for *in-situ* conservation. Agricultural biodiversity, traditional farming strategies, and the multiple ecological functions they sustain are public goods and like other public goods are often neglected by conventional markets. As the social and private values of agrobiodiversity are not presently aligned such markets, poor farmers have essentially become the net subsidizers of agrobiodiversity conservation. One reason why commercial crop breeding is so profitable is that corporations have been able to 'free-ride' on the services these farmers provide (Pascual and Perrings 2007). Because agrobiodiversity loss is largely a product of economic disincentives for diversity retention, any potential solution should come from the creation of new market incentives for preservation. Pascual and Perrings (2007) have recently explored the potential for agrobiodiversity conservation initiatives to be

incorporated into some of the emergent environmental conservation schemes including Payments or Rewards for Environmental Services (P(R)ES), Transferable Development Rights (TDR) and Auction Contracts for Conservation (ACC). P(R)ES is, to date, the most established of these schemes and perhaps holds the most relevance for agrobiodiversity. Agrobiodiversity conservation could theoretically fall under several of the 24 categories of ecosystem services as defined by the 2005 Millennium Ecosystem Assessment (MEA 2005). Some P(R)ES programs, including an International Fund for Agricultural Development sponsored program called Rewarding Upland Poor for Environmental Services (RUPES), have already met with some success in Nepal. This particular program, however, is largely focused on watershed maintenance where identification of local beneficiaries is relatively straightforward. The RUPES experience demonstrates that finding local buyers is substantially easier than finding buyers at regional or international levels, a realization that poses significant challenges for efforts focused on biodiversity conservation and carbon sequestration (van Noordwijk et al. 2005). The effective incorporation of agrobiodiversity conservation into P(R)ES and other such incentive schemes requires mapping valuation pathways of the diffuse benefits that arise from conservation. This is no trivial task considering the diverse range of agro-ecological systems and traditional agricultural practices.

Surely the most potentially lucrative valuation of agrobiodiversity lies in the genetic material used by plant breeders and biotechnology institutions. There has been an intense, often-virulent, debate raging for the past two decades over national and international legal regimes governing plant genetic resources. Contention stems from the fact that genetic material, when in the fields of the world's farmers is considered to be free-access common property while that which has been manipulated by professional breeders is in many cases eligible for utility patent protection through intellectual property rights legislation (IPR) (Cleveland and Murray 1998). The United States was the first to allow utility patents on plant varieties with the Plant Patent Act of 1930 and since this landmark legislation, corporations in industrialized nations have increasingly pushed similar patent protection on the international stage. Indeed, IPR protection for crop genetic resources was a prominent discussion during the Uruguay round of the General Agreements on

Trade and Tariffs (GATT). GATT now requires all parties to adopt a system of utility patents for plant varieties or protect them with an “effective sui generis system” (GATT Section 5, Article 27.3). It is suggested that local communities may more easily protect traditional crop varieties through intellectual property rights mechanisms rather than fighting to establish new regimes (ex. Yano 1993). However, there are several factors which complicate this proposition. At a very basic level, intellectual property rights are derived from a western intellectual tradition that holds individual liberty as a key tenet and views private property as one of its core expressions (Hurlbut 1994). Western legal codes, a product of this tradition, are often fundamentally incompatible with notions of collective ownership or cultural rights. Another impediment lies in the fact that there may be little documentation to establish intellectual investment in the development of traditional varieties. While folk taxonomies such as those studied by Berlin (1992) may provide some evidence in the form of commonly applied variety names, as I’ve mentioned indigenous knowledge is not always fixed nor is it equally distributed between members of a community. Even if compensation were to occur this heterogeneity in knowledge may prove problematic. Originally, the position of the FAO in this matter was that “based on the universally accepted principle that plant genetic resources are a heritage of mankind [they] consequently should be available to all without restriction” (FAO 1987). This free-access position was amended soon afterwards as a concession to the dominance of private property regimes globally. The FAO’s *International Treaty on Plant Genetic Resources for Food and Agriculture* outlines their current position as “farmer’s rights,” intended to act as a counter weight to “breeder’s rights” or IPR. While the treaty holds that farmer’s have the “right to equitably participate in sharing benefits arising from the utilization of plant genetic material for food and agriculture,” the document does not specify who should be compensated nor does it outline the mechanisms through which this would occur. It is clear that farmer’s rights are more of a political notion than a legal tool. Since farmer’s rights are seen as “vested in the international community,” FAO has since established a farmer’s rights fund into which international seed companies can voluntarily donate a portion of their profits; though few donations have been made (Srinivasan 2003). This strategy is faulted both on grounds of violating principles of indigenous self-determination and for taking the view that genetic

resources are primarily restricted to industrial agriculture (Cleveland and Murray 1998). Despite the high level of dissatisfaction with the IPR legal regimes among indigenous groups and their advocates there has yet to be a satisfactory challenge to the dominance of IPR regimes.

Barring substantial legal reform at national and international levels, it is at farm level where the economic value of agrobiodiversity is most readily realizable. As mentioned, agrobiodiversity is essential to maintaining productivity on small farms and for mediating risk in marginal ecologies. Whether or not they appreciate the diverse ways of knowing that inspire traditional farming practices, ecologists and agronomists are increasingly recognizing their value in this regard (ex. Altieri 2002, Innis 1997, Qualset 1995). Cereal/legume intercropping systems, such as those practiced by Lohorung in both rice and millet-based systems encourage complementary nutrient cycling (Drinkwater 1998) are in many cases more stable and confer significant yield advantage over monocultural practice. Millet/cowpea intercropping systems in Nigeria have been shown to produce an 80% increase in production over millet monoculture (Andrews 1972). Agrobiodiverse farm systems are also found to be less vulnerable to outbreaks of disease due to their genetic heterogeneity (Altieri 2004) and reorganize faster after disturbances such as drought (Loreau et al. 2003). There are significant advantages to maintaining a broad portfolio of crop varieties as well. For instance the staggered ripening times of the millet varieties maintained by some Lohorung households are a means to conserve harvest labor. Likewise, certain traditional landraces are maintained for their performance at higher altitudes or in shaded areas such as *atey marshi*. Diversity in fields and homegardens also translates into more complete nutrition for households and less reliance on purchased food.

The traditional system of *nalfernu*, whereby seed stock is regularly replenished through exchange with neighbors and relatives has served to exacerbate the rate of genetic erosion of traditional varieties in Lohorung communities. Upon their arrival, modern varieties spread quickly as a result of these exchanges, the promise of higher yield meant that few households chose to replace seed with traditional varieties unless that variety served a

crucial cultural or ecological purpose. In the past few years however, new decentralized plant breeding initiatives have sought to use systems such as *nalfernu*, to promote the retention and improvement of local varieties. Though no projects have been undertaken in Sankhuwasabha district, a Nepali NGO Local Initiatives for Biodiversity Research and Development (LI-BIRD) has focused its efforts on improving traditional rice landraces through localized breeding programs, a strategy known as participatory plant breeding (PPB). LI-BIRD works closely with communities to identify promising lines in certain folk varieties. These lines are then crossed in farmer-run breeding programs, returned to replenish seed stock in farmer's fields, and the process is repeated. The strategy is intended to re-affirm farmer's rights over genetic material and build technical capacity in breeding endeavors (Witcombe et al. 2006). While the breeding of modern varieties focuses on increased yield and broad ecological adaptability, PPB seeks to increase yield while retaining localized agro-climatic adaptations, which result in less reliance on costly artificial inputs such as fertilizers and pesticides. However, increased yields in folk varieties will only translate into income generation with the establishment of market channels for these minor crop varieties. An Indian NGO, the M.S. Swaminathan Research Foundation (MSSRF), has recently coupled PPB programs for some minor millet varieties with the development of market linkages for these products. MSSRF, through micro loans, acted as the initial catalyst for the establishment of community enterprise groups engaged in a number of activities along the market chain from production, procurement, processing, and value addition (Gruere et al. 2009). Innovative relationships were forged where millet was incorporated into the meal programs at some government schools and sold in organic stores in metropolitan areas. In this scheme primary producers were able to retain between 14 and 30 percent of the retail value, substantially more than is common in processed foods (2009: 41). Retail sales of millet products with value added packaging, marketed as organic, increased 300 percent during the three year pilot project (2009: 41). The MSSRF project illustrates that by utilizing collective action and pooling resources farmers have been able to overcome some of the high transaction costs associated with niche market goods (Kruijssen et al. 2009). There is certainly some scope to replicate such efforts in Lohorung communities not only with millet, but a range of niche species maintained in homegardens.

## 10.0 Conclusion: Rural Development as Cultural Dialogue

One might characterize development scenarios as being at the juncture of different modes of understanding: those of development practitioners, based in European scientific tradition, and those of local people, based in localized knowledge systems. Vandana Shiva, however, has suggested that the dialectic between scientific and local knowledge is often misconstrued. In her mind, scientific knowledge is itself a local tradition spread far beyond its place of origin, initially by colonialism and later by globalization (1993: 10). Its perceived universality serves to “disappear” local understandings, “making space for local alternatives disappear, very much like monocultures of introduced plant varieties [which lead] to the displacement and destruction of local diversity” (1993: 12). An underappreciation of the power disparity between knowledge systems in such contexts has contributed to a developmental dialogue more akin to a lecture. In agricultural development especially we should work to broker equitable conversation.

While environmental compensation schemes such as P(R)ESS and farmer’s rights legislation (i.e. *International Treaty on Plant Genetic Resources for Food and Agriculture*), have promised to capture some of the broader social value of the agrobiodiversity, which groups such as the Lohorung maintain, they have yet to deliver. Grassroots programs run by national NGOs such as LI-BIRD and MSSRF, which utilize innovative models such as participatory plant breeding and collective marketing for minor varieties and crop species are having the greatest impact on diversity retention. There has been no such intervention in the Lohorung communities that were the subject of this thesis and, as I have illustrated, there has been a significant loss of traditional varieties particularly in rice. This represents not only the loss of locally adapted varieties for these communities but an overall reduction in genetic material that contributes to world’s food supply. However, my research has also shown that countless species were retained for cultural importance in Lohorung fields and homegardens, from the upland rice variety *towli* to minor species of finger millet. These species, which are underutilized and undervalued more broadly, represent and reaffirm the ancestral connection that is central to a distinctly Lohorung ontological outlook. Ancestral connections continue to guide

cultural activities that occur in sovereign spaces, whether it be the cultivation of an archaic plant variety or through the hospitable offering of *dibu* (millet beer). In other words, the retention of much agricultural biodiversity is a product of cultural memory reenacted in these sovereign spaces. As such, a loss of cultural sovereignty over the home, homegardens, or fields would weaken the narrative presented by indigenous knowledge systems and contribute to a further erosion of diversity. Development interventions must work to empower these spaces if they hope to capture the full expression of indigenous knowledge and ensure that the mechanisms for mutual support are maintained.

Perhaps one of the greatest utilities that an understanding of indigenous knowledge can provide development is an increased recognition of the broader cultural implications of narrowly focused technical interventions. Just as importantly, however, in the North an openness to alternative knowledge systems also serves to challenge long-held assumptions on a broad range of topics, particularly in relation to ecological sustainability. Muhlhausler has recently expressed that a convergence on dominant worldviews can contribute to “cultural blind spots” that significantly impair our ability to develop innovative and adaptive solutions to ecological crises (1995: 160). Some authors (Maffi 2006, Harmon 2002) have recently suggested that cultural diversity can essentially be thought of as a correlate of human adaptation; an assertion, which in many ways harkens back to the cultural ecology of Julian Stewart. From this perspective, any reduction of diversity “diminishes the adaptational strength of our species because it lowers the pool of knowledge from which we can draw” (Bernard 1992: 82).

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