



# Institutional development for sustainable rangeland resource and ecosystem management in mountainous areas of northern Nepal

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## ABSTRACT

Rangelands represent one of the most important natural resources in mountainous regions of northern Nepal. However, a poor understanding of the social dimensions of rangeland use has limited their proper management and sustainable development, which represent major challenges for Nepal's resource managers. Institutional development is thought to be a viable solution to this problem and may ultimately lead to improved rangeland management in Nepal. Based on this hypothesis, a study was conducted in the Rasuwa district of northern Nepal to examine the effectiveness of institutional development at the local and national levels in mitigating the problems facing sustainable rangeland management by using an institutional analysis and development (IAD) framework. The information and data were mainly collected from different stakeholders, farmers, professionals and practitioners using a toolkit of participatory rural appraisal (PRA), workshops and literature review. It can be concluded from this case study that a number of institutional development efforts are needed to promote sustainable rangeland management in this region. First, local herders represent a repository of rich indigenous knowledge essential to sustaining sound rangeland management practices; hence, indigenous practices need to be integrated into modern technologies. Second, public services and technical support are currently unavailable or inaccessible to local herders; hence, research, development and extension interventions need to be initiated for marginalized pastoral communities. Third, rangeland institutions are incomplete and ill-organized, so institutional development of various organizations is necessary for promoting sustainable rangeland management. Fourth, the policies and governance necessary for promoting rangeland management are not well-designed; hence, governance reform and policy development need to be formulated through internal and external agencies and organizations.

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## 1. Introduction

Rangeland ecosystems are one of Nepal's most important resources, especially those in northern mountainous regions of the country. About 11% of Nepal's territory constitutes rangelands and most of it lies above the tree-line (Shrestha, 2001). Rangeland ecosystems and their biological resources play a critical role in the region's overall economic development and in people's well being (Miller, 1997a). First, the livelihoods of pastoralists depend greatly on plants, water, animals and other natural resources found in the rangelands. Other people, residing either in rangeland environments or adjacent areas, also are directly or indirectly dependent on

rangeland resources. Second, rangelands provide habitats for a variety of wildlife, especially ungulates and large grazing animals, which share rangelands with a host of birds and other mammals (including some endangered species like snow leopards). Third, the rich genetic diversity of wild and domesticated plants and animals found in these areas is a valuable resource for improving livestock, developing new crop varieties, curing disease and providing numerous other benefits as yet discovered. Finally, the tourist industry in Nepal is based, in part, on the attractiveness of its rangelands' wildlife and surrounding magnificent mountain landscapes.

Sustainable development of rangeland resources and ecosystems in Nepal like other countries in the Hindu Kush Himalayan (HKH) region in Asia is presently confronted with a number of problems (Miller, 1997b; Nepal, 2003). Declining wildlife populations associated with loss and degradation of habitats is becoming a serious problem, as rangelands simply can no longer support certain wildlife species. Overgrazing by livestock is a serious issue

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in some areas where most of the original vegetation has disappeared as a result of heavy disturbance by pastoralists and live-stock. Overexploitation of medicinal plants, especially in alpine regions, is eroding biological diversity and limiting the sustainable rangeland development. Excessive tourism associated with a lack of planning has resulted in decreased biodiversity and environmental degradation in some areas, posing serious problems and handicapping sustainable development. Promoting the sustainability of rangelands in Nepal under these current pressures has challenged scientists and officials to improve management strategies to insure a viable future of this important resource.

Biological dynamics, such as vegetation structure and biomass, ecological and economic values and biodiversity loss have been studied in rangelands in Nepal's national parks and protected areas (Lehmkuhl et al., 1988; Carpenter and Klein, 1995; Katrina, 1997). However, sociological studies are scarce, and the lack of understanding of social dimensions of rangeland resource use has limited the proper management and sustainable development of rangeland ecosystems (Miller, 1997b; Gurung, 1998). Several researchers have noted that promoting sustainable management of rangeland resources without supporting related social dimensions represents a major challenge for Nepal's future (Richard et al., 2000; Chetri and Gurung, 2004). Worldwide researchers have revealed that the sustainable management of natural resources requires not only technical support, but also social dimensions such as indigenous practices, institutional design and socio-economic capital assessment (Altman and Cochrane, 2005; Vella et al., 2005; Plummer and FitzGibbon, 2006). Sustainable rangeland management will not be possible without the involvement of all stakeholders including local governments (Banks et al., 2003), and changes in policies and schemes related to natural resources management that affect rangeland management systems (Wu and Camille, 1999; Li, 2002). Clearly, social aspects must be emphasized for promoting sustainable development of important rangeland resources and ecosystems in Nepal.

Among social factors, institutional development is appealing and may ultimately lead to the improved management of natural resources, because whether formal or informal, institutions gain their social significance by constraining social action and shaping expectations about social interactions (Poteete and Welch, 2004). The role of institutions in natural resource management and rural development has received increased attention in recent times and has been widely discussed (Uphoff, 1992; Boesen et al., 1999; Hinchcliffe et al., 1999; Shah and Shah, 1999; Koku and Gustafsson, 2001). Experiences gathered from research and development work show that in most rural areas the governing (regulatory) mechanisms of institutions have often influenced sustainable natural resource use (Koku and Gustafsson, 2003). The role of institutions in rangeland resource management is of particular interest to discussions concerning mountainous areas in northern Nepal, where local livelihoods are mostly dependent on the use of rangeland resources. In this context, this study uses an institutional analysis and development (IAD) framework to examine the problems facing institutional development for sustainable rangeland management at the local and national levels and proposes possible approaches to resolving these problems in mountainous areas in northern Nepal. In addition, the study will provide insights into the social dimensions of sustainable rangeland resource and ecosystem management that may be useful elsewhere in Nepal and neighboring areas across the HKH region.

## 2. Methods

### 2.1. Research design

The study was guided by the IAD framework developed by Ostrom (1986, 1990) and Uphoff (1986, 1993). This is a theoretical

framework that guides an analysis of an institution's structure and performance. According to this framework, institutions are defined as "enduring regularities of human action in situations structured by rules, norms, and shared strategies, as well as by the physical world" (Crawford and Ostrom, 1995). There are three sets of institutions, i.e., state, market and civil institutions, with varying scopes and operations that have evolved in response to human ideas and aspirations, while reflecting at the same time the apprehension and limited imagination of society (Uphoff, 1993). Sustainable development will depend in large part on creating positive synergy among these three sets of institutions. The IAD framework does not advocate a particular type of institutional arrangement (e.g., markets or hierarchies), nor does it rely on a single measure of institutional effectiveness. Rather, it draws attention to the various factors that influence institutional design: the physical characteristics of the ecological system and the nature of problems, the culture of the individuals (organizations) trying to solve the problem, and the institutional setting that the individuals (organizations) are embedded within (Ostrom, 1990). Institutional analysis is therefore an attempt to examine a problem that a group of individuals (or organizations) face and how the rules they adopt to address this problem, and to understand how alternative channels for raising economic, social and political productivity can be made to function better, respectively and collectively (Uphoff, 1993). Based on these IAD theories, institution's structure and performance in Nepali rangeland management was analyzed through a case study.

### 2.2. Study site

This case study was developed using a variety of data sources including research publications, reports, newsletters and a field survey. Different stakeholders (farmers and professionals) involved directly or indirectly in rangeland management were surveyed in the Rasuwa district, a high Himalayan and mountainous district of Nepal, whose name means "grazing land for sheep and cattle." It can be considered a representative pastoral area in Nepal in light of its indigenous production system, historical tradition and socio-economic importance to local people.

The Rasuwa district is situated in the northwest part of the Central Development Region (latitude 27°57'30" to 28°23'30"N, longitude 85°7'00" to 85°48'15"), about 120 km north from Kathmandu, the capital city of Nepal (Fig. 1). The district has a total area of about 1515 km<sup>2</sup>, with almost 120 km<sup>2</sup> of cultivated land, 380 km<sup>2</sup> of forest land, and 260 km<sup>2</sup> of grass- and shrub-land. There are 18 village development communities (VDCs) and 8689 households with a size 5.05 people per family. In 2001, the district had a census population of 43,900, which is about 0.2% of Nepal's population, and 64.7% of the population is Tamang people, the ethnic group of Tibetan origin (TRPAP, 2005). Pastoralism plays an important role in the livestock farming system, one of the dominant farming systems in the district. Three VDCs, Dhunche, Gatlang and Langtang were selected in this district as investigation sites for the field survey based on a consideration of their different geographic locations, climatic zones and farming systems (Fig. 1, Table 1).

### 2.3. Survey

Collected toolkit of participatory rural appraisal (PRA) including open-ended and pre-tested questionnaires, keyperson interviews and group discussion was used in the investigation. The PRA developed by McCracken et al. (1988) and modified by Cornwall and Pratt (2004) and Netherlands Development Organization (SNV/Nepal, 2004) is a good toolkit to encourage farmers to give their knowledge, ideas and opinions freely. Farmers were interviewed face-to-face as this is the most accurate method for surveying

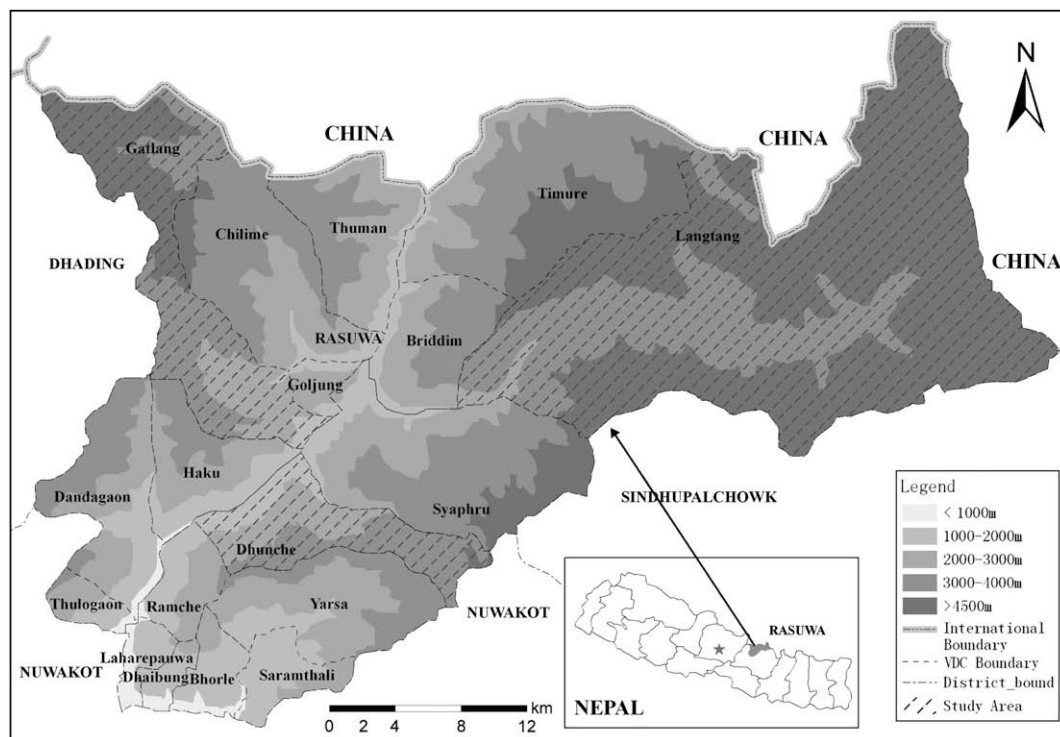


Fig. 1. Location of Rasuwa district and study sites.

people who cannot read and write (Salant and Dillman, 1994). The sample farmer households were randomly selected from a VDC based on the household numbers in the village. In sum, 10, 14 and 11 households were surveyed with a questionnaire, 6, 6 and 8 keypersons (older and experienced people who have lived in the VDC for a long time) were interviewed and 21, 14 and 12

participants were involved in group discussion in Dhunche, Gatlang and Langtang, respectively. The sampled interviewees were from different families and accounted for approximately 16%, 14% and 50% of the total households in the individual village (Table 1). The information about indigenous practices and strategies used in grazing/feeding management, problems and barriers in pastoral

**Table 1**  
General information about case study sites and farmer interviewees

Items	Dhunche VDCs	Gatlang VDCs	Langtang VDCs
Information about case study sites			
Geographic location (elevation)	Lowland (1900 m)	Middleland (2200 m)	High mountain (3300 m)
Climatic zone	Subtropical-temperature transition zone	Temperature zone	Subalpine zone
Farming systems	Multiple farming of livestock, crop, fodder and vegetables	Crop-livestock mixture farming	Livestock farming (tourism)
Total households	164	223	61
Livestock composition in individual household	Cattle (1–2), buffalo (2–3), sheep and goats (4–5), yak and chauri (10–15) (only 10% of households keep yak farming)	Cattle (1–2), sheep and goats (10–20), yak and chauri (10–15) (half of households keep yak farming)	Sheep (20–30), horses (2–3), yak and chauri (10–15) (80% of households keep yak farming)
Information about interviewees			
Numbers			
Questionnaire survey	10	14	11
Keyperson interview	6	6	8
Group discussion	21	14	12
Average age			
Questionnaire survey	41.5	36.5	33.2
Keyperson interview	54.5	55.4	57.2
Group discussion	34.7	37.1	38.4
Average education level			
Questionnaire survey	Primary school	Primary school	Primary school
Keyperson interview	Illiteracy	Illiteracy	Illiteracy
Group discussion	Primary school	Primary school	Primary school
Female participants' proportion			
Questionnaire survey (%)	60	21.4	27.2
Keyperson interview (%)	33.3	16.7	37.5
Group discussion (%)	61.9	28.6	33.3

economies and livelihoods, land tenure and ownership, rangeland institution and governance were gathered through questionnaire surveys of households and interviews with keypersons. Additional information on the problems, constraints, challenges, opportunities and changes in indigenous rangeland management systems, external public supports and partnerships were collected and recorded through group discussion and communication with farmers. Secondary information was obtained from central and district offices, professional researchers and officials to cross-check the primary data (Sedhain, 1993). Information missed in PRA investigation was supplemented by personal observations and guided transect/mapping walks. In addition, literature, reports and documents related to this study were reviewed to help verify the information collected in the field.

For the questionnaire surveys, more than 100 well-designed questions were asked to each interviewee either to select their answers from 3 to 5 options or to give their own ideas in 1 remark blank. The majority or primary responses were assumed to be the dominant practices or knowledge in rangeland resource management. In this way, a large amount of quantitative data from the questionnaires was summarized. The quality of the results of the questionnaires was controlled through careful checks on the errors in the completed questionnaires. For the keyperson interviews, the key points of information were collected from the original records. The information from all interviewees was then combined to provide a summary of the results. For the group discussion, the primary information was recorded during discussions and the key points were selected by post-meeting reviewing. Some data from group discussion were re-checked by keyperson interviews if there appeared to be conflicts between interview results and group discussions.

Open-ended and pre-tested questionnaires, face-to-face interviews and group discussions were used also to survey 29 professionals with different age, education level and position randomly selected from different fields (livestock, natural resource, wildlife, land management, etc.) and organizations (Table 2). The pre-tested, mail questionnaire survey for professionals was designed and administered following the Total Design method (Dillman, 1978) by asking 80 well-designed questions (with 1 remark blank out of 3–5 optional answers) to collect information about public service, policy-making, land tenure and ownership, institution and governance related to rangeland management. A stamped return envelope, a cover letter indicating the importance of their involvement and the protection of their privacy and

a survey questionnaire was mailed to each survey participant, who was asked to complete the questionnaire and return it by mail. Within 1–2 weeks a reminder call was sent and those who did not return their questionnaire in a timely fashion were contacted again by telephone (Salant and Dillman, 1994). We carefully checked all returned questionnaires for possible errors, and corrected unclear responses as needed by contacting the corresponding respondent by telephone. The majority or primary responses were assumed to be the reflection of realities in rangeland resource management. At the same time, we conducted face-to-face interviews with most of these resource persons to get their experiences, opinions and suggestions about sustainable rangeland resources and ecosystem management. The key information from all interviewees was then combined to provide a summary of the results. We also facilitated 5 group discussions on related topics at the host institute, ICIMOD, during 3 workshops, which supplemented information obtained from the questionnaires. The key points were summarized and cross-checked with data from face-to-face interviews of professionals.

## 2.4. Data analysis

Original data from the surveys were grouped separately for the interviewees representing farmer households from different VDCs, and professionals from district and central organizations. The quantitative data (from questionnaire survey) were statistically summarized by calculating response rates. The qualitative data (from face-to-face interviews, group discussions and workshop) were analyzed using systematic qualitative techniques, the descriptive analysis and the cross-case analysis (Patton, 1990; Miles and Huberman, 1994). In addition, literature, reports and documents related to this study were reviewed to help verify all the information collected. A literature review was undertaken to cover current issues in relation to rangeland resource and ecosystem management.

## 3. Results

### 3.1. State institutional arrangements in rangeland management

Rangelands, together with community forests, leasehold forests, private forests and religious forests comprise community managed forest resources in Nepal. There are no institutions specifically focused on rangelands, and all policies related to their management are covered by community forest agencies. The Ministry of Forests and Soil Conservation (MOFSC) is the lead agency working jointly with the Ministry of Agriculture and Cooperative (MOAC) in rangeland management at the national level. Four MOFSC departments, Department of National Park and Wildlife (DNPW), Department of Soil Conservation and Watershed Management (DSCWM), Department of Forest Research and Survey (DFRS) and Department of Forest Services (DFS) are responsible for managing land and resources within national parks, and for land reclamation and erosion control, land and resource survey, research and management of land and resources outside national park. Two units in MOAC, the Department of Livestock Service (DLS) and National Agriculture Research Council (NARC) are responsible for development and research on livestock and pasture, respectively. Although there are five administrative regions in Nepal, resource management institutions do not seem to exist at the regional level. Instead, there are corresponding district rangeland institutions responsible for rangeland resource and livestock management (Fig. 2).

The interviews with professionals found that four departments of MOFSC primarily work together on rangeland management planning and decision-making, but rarely cooperate with the two

**Table 2**  
General information about professional interviewees

Items	District level	State level
Numbers (persons)	13	16
Working organizations		
Government offices (%)	38.5	43.7
Universities and institutions (%)	38.5	18.8
Non-government organization (%)	23.0	37.5
Positions		
Division head/chief (%)	38.5	43.7
Ordinary staff (%)	61.5	56.3
Ages		
<20 yrs (%)	0	0
21–30 yrs (%)	15.4	0
31–40 yrs (%)	53.8	0
41–50 yrs (%)	23.1	31.3
>51 yrs (%)	7.7	43.7
Education level		
High school (%)	38.5	0
College (%)	38.5	31.3
Graduate (%)	23.0	68.7



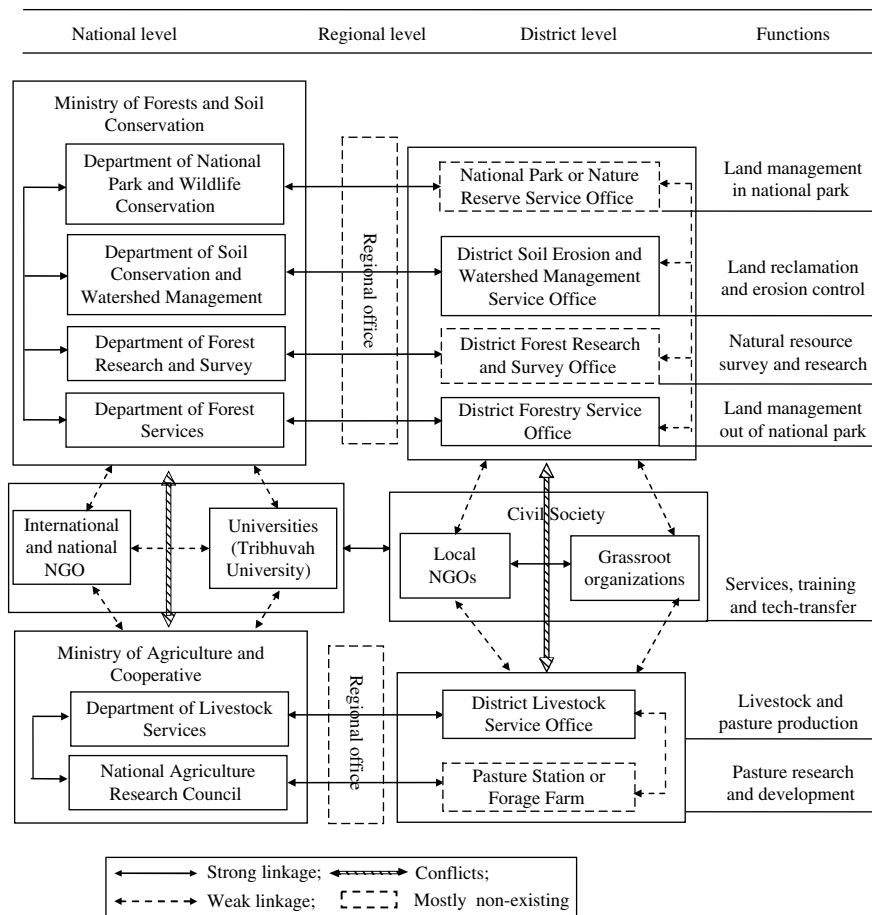


Fig. 2. Institutional arrangements in rangeland management at state level.

MOAC departments. There are often conflicts between the two ministries over land management and resource development. Some pasture development programs initiated by NARC or DLS may fail because their applications for land use rights are denied by DNPW or DFS. In turn, if DSCWM or other units in MOFSC attempt to restore a degraded watershed by reducing livestock numbers, they may face difficulties gaining cooperation from departments in MOAC. Some national level professionals claimed that current rangeland management problems stemmed from poor institutional cooperation in the past. Although linkages between national and district units in the same institution are quite strong, poor coordination between different district institutions has limited the improvement of rangeland management practices. Poor linkages among government organizations, NGOs and some universities and research institutes at both the national and district levels appear to further constrain improving rangeland management practices.

According to the professionals interviewed, state institutions have provided some public services such as technology transfer, consultation, training and subsidies at both national and district levels, but the sustainability of these services is rarely guaranteed due to several limitations, including lack of funding, poor infrastructure and farmer illiteracy (Table 3). Development and research projects are not successful over the long term as they are either fail to meet farmer expectations or are unsustainable and instable. Poor communication with farmers is another barrier to smooth implementation of research and development projects. According to state professionals, lack of funding, poor research and development projects. According to state professionals, lack of funding, poor infrastructure and illiteracy are major limits in

research, extension and management interventions. Furthermore, a shortage of human resources also seems to be a problem based on responses from district professionals (e.g., there is only one college-trained animal and forage scientist out of five officers and 12 technicians at the National Agriculture/Pasture Research Station of NARC in the Rasuwa district). The development of more practical projects, and enhanced human and funding resources were suggested by both state and district professionals as means for improving the implementation of rangeland projects. In addition, capacity-building is stressed by district professionals and literacy improvement is emphasized by state professionals. Low salary, a lack of incentives and poor group cooperation were addressed by both district and state professionals to be constraints in improving their work efficiencies in rangeland management. Improved motivation strategies for rangeland or related professionals should be considered in institutional improvement.

### 3.1.1. Market institution arrangement in rangeland management

Milk, dairy products (butter and cheese), wool, hides and meats are staple pastoral products for home-consumption as well as for generating family incomes in mountainous areas of northern Nepal (Table 4). In addition to pastoral products, cash crops and vegetables, cash crops, and tourism account for 60%, 10% and 70% of household family incomes in Dhunche, Gatlang and Langtang VDCs, respectively. As pastoral productivity at the household level is very low, the agro-pastoral trading economy in this area is minor and fragile. Historically, bartering and micro-trading have dominated pastoral marketing in mountainous areas of northern Nepal, local farmers bartered their commodities such as grain, potatoes and

**Table 3**

Problems and solutions in institutional development at state level

Items	Professionals' response at different importance order	
	District	State
Public services provided for farmers		
1st priority response	Technology transfer	Training and education
2nd priority response	Consultation and demonstration	Subside and income-generation
3rd priority response	Policy and planning	Technology transfer
Limits in improving public services		
1st priority response	Poor infrastructure	Lack of funding
2nd priority response	Lack of funding	Poor infrastructure
3rd priority response	Illiteracy	Illiteracy
Mitigation of limits in public services		
1st priority response	Creating financial resources	Increasing financial incentives
2nd priority response	Capacity-building	Capacity-building
3rd priority response	Involving multi-stakeholder	Mitigating illiteracy
Causes of failure in project and policy implementations		
1st priority response	Gap between professionals' efforts and farmers' needs	Instability and discontinue of the project and policy
2nd priority response	Poor communication with farmers	Gap between professionals' efforts and farmers' needs
3rd priority response	Instability and discontinue of the project	Poor communication with farmers
Problems in extension and supervision		
1st priority response	Poor infrastructure	Lack of funding
2nd priority response	Lack of funding	Poor infrastructure
3rd priority response	Shortage of human resource	Illiteracy
Solutions to overcome problems in research, extension and management		
1st priority response	More practical projects	More practical projects
2nd priority response	More financial and human resource	More resources persons and incentive
3rd priority response	Strengthening capacity-building	Illiteracy mitigation
Factors limiting professionals' work efficiency		
1st priority response	Low salary	No incentives
2nd priority response	No incentives	Poor group cooperation
3rd priority response	Poor group cooperation	Low salary

dairy products for Tibetan salt, wool and ritual goods. Presently, border trading for daily necessities, clothes and electric utilities from the Tibetan Autonomous Region of China and selling pastoral products, cash crops and other products to local markets, contracted companies or middlemen (retailers) are dominating the pastoral marketing system. Both government organizations and

NGOs are not involved in pastoral marketing, and producers, consumers and sometimes investors/tradesmen maintain all the systems.

Although the current trading system is more flexible and diverse than that of the past, local herders report many problems with the pastoral economy and marketing systems (Table 4). The pastoral

**Table 4**

Pastoral economy and market systems in mountain areas of northern Nepal

Queries	Pastoral economy systems and market institutions		
	Dhunge	Gatlang	Langtang
Major pastoral products	Dairy, wool, culling livestock	Wool, culling livestock	Dairy, wool, culling livestock
Uses of pastoral production	Family income, home-consumption	Home-consumption, family income	Home-consumption, family income
Proportion of pastoral product to total family income (%)	40	90	30
Non-pastoral products	Crops and vegetables	Crops	–
Uses of non-pastoral products	Home-consumption, family income	Home-consumption	–
Other source of family income	Business	Labor	Tourism
Non-pastoral product and others' contributions to total family income (%)	60	10	70
Major market	Local market, contracted company	Middlemen, retailers	Tourists, hotel, contracted company
Major decision-makers in pastoral market	Producer, consumers, investor	Producer, middleman	Producer, consumers, investor
NGOs' involvement in pastoral market	Rare	Rare	Never
Public invest in pastoral economy	No	No	No
Public control on pastoral market	No	No	No
Queries	Problems and solutions in pastoral market institutions		
Major limits for pastoral economy	Poor pasture management, poor animal feeding and malnutrition, poor animal health care, etc.		
Farmers' measures to overcome the limits in pastoral productions	Sometimes consulting professionals (local livestock or pasture service officers, researchers and extensionists, etc.)		
Professional's suggestions to improve pastoral economy	Increasing public supports/services (rangeland improvement, fodder production, livestock feeding, animal health care, etc.)		
Problems in pastoral market	Poor access to market, no market, unstable and single market system, lack of marketing information		
Farmers' suggestions to overcome problems in pastoral market	Public support/investment in pastoral economy, multi-market development, NGOs' involvement in pastoral market		

economy cannot be improved due to low pastoral production rates related to poor pasture management, poor animal feeding and malnutrition and poor animal health care. Even though some herders can consult professionals for solutions to overcome these problems, public services are not practically available for most. Small economic margins result from a pastoral production system characterized by low input and low output. Both poor public supports and low inputs limit the improvement of pastoral production and the development of a stronger pastoral economy. Poor access to markets, lack of marketing information and unstable or absent markets are major problems facing the pastoral marketing system. Herders in Gatlang VDCs have to sell their pastoral products to middlemen at low prices because they do not have other options because they live in remote and isolated villages. People in Langtang VDCs cannot sell their pastoral products to tourists or hotels during the off-season (monsoon season) or when tourism declines because of political disruptions. Farmers in Dhunche VDCs cannot reap large profits due to poor marketing information dissemination and sharing, even though they can trade their pastoral products at local markets. A Dairy Development Centre (DDC) has been developed recently as the contract company for some chauri and yak herders in Langtang and Dhunche VDCs, but the efficiency of this system is still under investigation.

The survey indicated that market institutions supporting rangeland management in northern Nepal are often poorly developed. Local farmers claim that the pastoral economy and marketing system can be improved if more public support and investment are provided and if there is more involvement by NGOs. Professionals stress that institutional development and cooperation, infrastructure development and illiteracy alleviation are needed to improve the pastoral economy and marketing system.

### 3.1.2. Civil institutional arrangements in rangeland management

There are basically two sets of local organizations involved in rangeland management, community committees at the community level and civil associations at the group level (Table 5). A community committee is normally made-up of about 12 people elected by all community members, and it acts as the leader, decision-maker and representative for whole community. Civil associations are self-identified groups of households with common interests or the same resource pools, for example livestock, vegetables, crops and forests. These two sets of grassroot (local) organizations have more social content and function compared to administrative and political institutions. Usually, community committees are responsible for major decision-making for all community members' concerns, while associations make decisions about the specific affairs of self-organized groups. The community committee can decentralize the decision-making process to the associations, and the associations will ask for help from the community committee to solve the conflicts and problems between or within associations. When the question "Who decides the grazing time, livestock number and campsite-building on rangelands?" was asked, most farmers interviewed replied "both livestock association and community committee." When the question "How do you mitigate conflicts over the sharing pastures for grazing?" was asked, most interviewees replied "first get arbitration from the livestock association, if this fails, we ask for help from the community committee." It seems that grassroot organizations work well supporting the community-based management of important public resources, like rangelands, whose use rights are controlled by local communities.

The structures and relations of grassroot organizations are summarized in Fig. 3. The community committee plays a very important role in spreading governmental policies (both state and district) related to rangeland management to community members through user groups (associations). Research institutions, universities, NGOs and other professional organizations at the national

**Table 5**

Local institutions in rangeland management

Items	Components	Attributes
<b>Grassroots organizations</b>		
Community level	Community committee	Elected body
Group level	Livestock (e.g., yak) association (all VDCs)	Self-identified group
	Vegetable association (Dhunche)	
	Crop association (Dhunche and Gatlang)	
	Forest association (Gatlang)	
	Hotel and guide association (Langtang)	
Non-government organizations	Women association (Dhunche)	Voluntary organization
	Paldor peak youth club (Gatlang)	
Decision-makers	Government officials or committee members	Community meeting
	Household representatives (mostly male)	Dialogue or negotiation
Guides for behaviors	Traditions or rules	Oral or documented
	Agreements	Mostly oral
Criteria for decisions	Policy and best implementation means	Formal
	Interests of members	Informal
Land tenure	Public/government (over 95%)	Native rangeland
	Private (less than 5%)	Fodder filed
Sanctions	Authority coercion	External
	Social pressure	Internal

level can transfer technical support, professional consultations or other public services to the community members either through local NGOs or directly to specific associations. Farmers' associations contribute greatly to helping guide local people to access, understand and apply the policies and techniques designed by policy-makers and professional resource managers. Although the effects of such "top-down" policies and techniques on sustainable rangeland management and livelihood improvement have not been investigated, these civil institutions do play important roles bridge-building between government organizations and civil society in promoting sustainable rangeland management. Aside from providing good organizational structures, community committees and farmer associations understand there are well-designed civil regulations and rules evolved from tradition or developed from reality. These civil regulations and rules bring local organizations into being and maintain their sustainable development.

### 3.1.3. Interrelation of state institution and civil society

In general, the linkage between state institutions and civil society (local institutions and NGOs) is very poor. Few farmer households in this study have been involved in the decision-making process related to rangeland management. When involved, it seems that few of their suggestions have been accepted by the authorities. In other words, farmers' voices have not been heard or considered by policy-makers in the process of initiating and implementing natural resource policies, especially those related to rangeland management. Similarly, the involvement of local communities in research and development projects promoted by district or central governments is very limited. Even for the farmers involved in some projects, they are generally not satisfied with their passive roles and resulting inability to contribute their ideas and suggestions about better rangeland management. Although community involvement in technical training is more common, the targets and contents of most training activities are often far from those required and anticipated by local community members. It seems indigenous knowledge of rangeland management is normally ignored by policy-makers and professional practitioners. Involvement by NGOs in developing rangeland programs and in

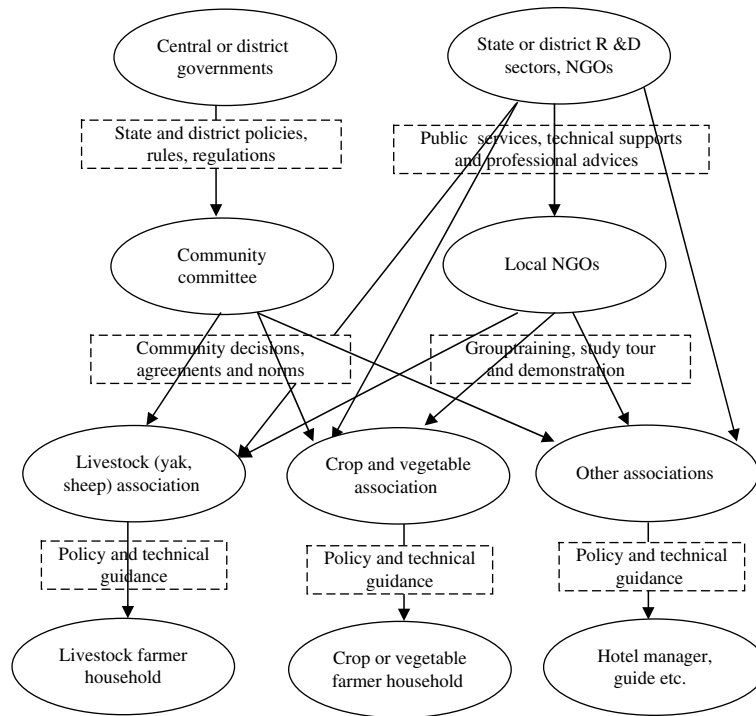


Fig. 3. Institutional arrangements in rangeland management at grassroots level.

policy-making is scarce due to poor institutional cooperation between the government and NGOs (Table 6).

Although state and district professionals think that the involvement by local communities and NGOs in policy-making, project design and project implementation are very important, they rarely invite farmers to give suggestions or to provide evaluations before and after they make decisions or implement projects. Unfortunately, policy-makers and professionals often overlook the roles of civil society in improving interventions and practices related to rangeland management. Most professionals think indigenous knowledge is very important for sustainable rangeland management, but it is not efficiently considered in a “top-down” system. Professionals think the community is more efficient than the government in terms of land tenure of rangeland, which may strengthen and improve the linkage and cooperation between state institutions and civil society (Table 6).

#### 4. Discussion and recommendations

##### 4.1. Institutional weakness and problems in rangeland management

Given the lack of attention devoted to these important institutional and administrative questions, it should not be surprising that many authors underestimate the problems associated with changing organizational arrangements and incorporating human values into decision-making processes (Grumbine, 1994; Slocombe, 1993). In Nepal, past governmental efforts on rangeland development have failed to adequately use local knowledge, recognize local institutions or base organizational sponsorship on existing use rights and management systems. Rangeland institutions at all three sectors are incomplete and ill-organized. Poor coordination and ongoing conflicts among different governmental departments involved in rangeland resource management are major barriers to institutional development. The lack of instability of markets has caused a weak marketing system in Nepal for rangeland products. A lack of rangeland policies (laws, rules and regulations) makes the institutional arrangement of this resource too

forest-oriented. Low work efficiencies by professionals associated with low salary and poor group cooperation are one of the indicators of underdeveloped institutions in rangeland management in northern Nepal. It is time to recognize that incomplete and ill-organized institution is threatening the sustainable

Table 6

Public services and institutional governance in rangeland management

Queries	Farmers' responses		
	Dhunge	Gatlang	Langtang
Herders' involvement in policy-making	Never	Sometimes	Never
Herders' suggestions to policy-makers	Ignored	Mostly Ignored	Ignored
Herders' involvement in research and development programs	Sometimes	Sometimes	Never
Herders' involvement in training programs	Sometimes	Seldom	Seldom
Availability of public service to herder community	Mostly no	Mostly no	Mostly yes
Quality of public service	Good	Good	Fair
Integration of public service and indigenous practices	Mostly no	Mostly no	Mostly no
NGOs' involvement in policy-making and public services	Sometimes	Never	Never
Queries	Professionals' responses		
	District	State	
Investigation on farmers before project design	Sometime	Sometime	
Importance of farmers' involvement in decision-making	Very important	Very important	
Farmers' involved in decision-making	Sometimes	Sometimes	
Importance of NGOs' involvement in decision-making	Very important	Very important	
Government cooperation with NGOs	Sometime	Sometime	
Importance of cooperation with NGOs	Very important	Very important	
Importance of indigenous knowledge in rangeland management	Very important	Very important	
Which land tenure would be more efficient in pastoral production	Community	Community	
Which land tenure would be more efficient in economic-social development	Community	Community	



development of rangeland resource and ecosystem and that serious public concerns should be raised to mitigate the adverse impacts of poor rangeland institution arrangement in Nepal.

National and district decision-making, policy implementation and program development are mostly “top-down” processes in Nepal where local herders’ concerns and needs are ignored. Government policies, strategies and programs related to the development of rangelands lack reliable, detailed data and information and ignore currently available information. This leads to further improper planning and legislation. The government’s land tenure policies have confused and upset local people, resulting in the erosion of farmers’ interests in the management of local natural resources. Public services and technical supports are mostly unavailable or inaccessible to local farmers, leading to marginalization and isolation of rangeland user groups from modern society. Involvement by NGOs in policy-making, technical transfer and other interventions is very limited, and their roles as liaisons between governmental agencies and local institutions are overlooked. Therefore, approaches of strengthening grassroot community and NGO are recommended to improve sustainable development of Nepali rangeland institution through enhancing farmer groups’ entitlement to a wider domain of rangeland resources, agro-ecological, socio-cultural as well as economic-political and enabling them to use such resources as needed. Efforts are needed from socio-political and economic environments to translate the enhanced understanding of rangeland management systems into a community-friendly institutional setting.

#### 4.2. Institutional development for sustainable rangeland management

Improved management of an ecosystem or resource may result from changing institutional arrangements and improving interagency collaboration (Imperial, 1999; Koku and Gustafsson, 2003). Institutional cooperation must be stressed not only among different institutional sectors (state, market and civil institutions) but also among different organizations in the same sector, for example, different departments (e.g., livestock and forest departments) in the state institution (Uphoff, 1993). Governments at all levels must work in partnership with each other, and with community bodies and user groups. This will require ongoing and effective communication particularly with local communities during policy and program development, as indigenous management systems have capitalized on the physical and climatic characteristic and the plant communities of Nepal and have converted many constraints into opportunities (Tamang, 1993). It must be stressed that rangeland management in mountainous areas of Nepal will not be successful if the traditional knowledge of local farmers is ignored or overlooked (Chand et al., 1991). Nepali governments, in consultation with civil society, should introduce programs to increase understanding of indigenous peoples’ special association with the land, and the implications this has for the management and use of the rangelands, integrate appropriate plans and strategies of local representative bodies within broader regional strategies, seek the full participation of relevant NGOs and user groups in undertaking regional planning, using culturally appropriate consultation processes. Similar to the conclusions drawn from other studies worldwide (WISP, 2007), sustainable rangeland management in Nepal requires security of rights and land. Nepali governments should ensure that land tenure legislation takes into account of the rights of indigenous people with respect to rangeland management and promote relatively equitable access to resources for all members of the community, including the poor and socio-politically weak.

It has been noted that scientific adaptive management could benefit from a more explicit collaboration with flexible

community-based systems of resource management for the implementation of policies as experiments (Olsson and Folke, 2001). Therefore, dialogue mechanisms between decision-makers and local communities should be established and utilized to ensure full coordination among all spheres of stakeholders with respect to policy development supporting rangeland management practices. It has also been highlighted that recognizing the potential contributions from all knowledge systems enhances decision-making regarding natural resource management (Mitchell, 1997; Plummer and FitzGibbon, 2004). Hence, governments should actively encourage relevant research institutions and universities to direct a significant portion of their research efforts to issues facing rangeland management and to consulting with rangeland users, local communities and NGOs in setting research priorities. Research organizations should work with local communities and rangeland user groups to implement the practical outcomes of their research efforts. They should ensure that information is accessible and easy to understand. Scientists working in relevant fields should collaborate with local people to utilize their knowledge and practical experience to find optimal solutions, and vice versa.

According to Ostrom et al. (1993), polycentric institutional arrangements or market-based solutions may offer distinct advantages in some case. Policies can be well integrated and yet to be implemented through a polycentric institutional arrangement (Imperial, 1999). Development of a viable market institution is also vital to sustainable rangeland management in mountainous areas of northern Nepal. Governmental agencies and NGOs should create diverse channels for local communities to develop viable pastoral economies and marketing systems and should encourage financial institutions and other service providers to cooperate with local communities in such efforts. The government and NGOs should ensure that the commercial services they provide are sufficiently flexible to meet the needs of rangeland users. Financial institutions, in consultation with rangeland users and local communities, should develop codes of practice, which reflect sustainable rangeland management. Banking products and other financial services, while being commercially based, should be sufficiently flexible and tailored to meet the specific circumstances of rangeland production and marketing. Financial institutions should consider the overall management and planning capabilities of rangeland users and ensure that they are aware of the challenges and objectives of their client groups.

The development of institutional governance also should be taken into account by governmental authorities. A case study in Ghana showed that the activities of District Assemblies throughout the country were brought closer to rural people since the management of natural resources was decentralized in 1988 (Koku and Gustafsson, 2003). Following this shift in governance, the status of District Assemblies changed from being mere conveyers of centralized (i.e., pre-formulated) decisions and plans to one where they served to support local level bottom-up decision-makers. As a consequence, rural people throughout Ghana began seeing them as agents of change for matters related to their development. Similarly, in Nepal, it is necessary to change the centralized decision-making and planning process for rangeland management to a more “bottom-up” process, so that the voices of local people can be clearly heard by policy-makers and sound indigenous knowledge (especially rules and regulations) can be integrated into sustainable rangeland management practices. The government and NGOs should also support communities by funding locally employed facilitators to develop and promote local strategies and planning processes for enhancing sustainable rangeland management. Through such actions at all institutional levels, Nepal will be able to develop and maintain an integrated set of policies and actions that will ensure the sustainability of valuable rangeland resources in its northern mountainous region.

## 5. Conclusions

From the discussion presented above as well as others documented in the development literatures, it has been widely accepted that institutions provide one of the crucial keys to sound rangeland resource and ecosystem management. The IAD framework appears to be a useful tool that can help practitioners and researchers examine institutional arrangements for natural resource management. For a new rangeland resource management paradigm based on the principles of collaborative decision-making and knowledge sharing to flourish, practitioners and researchers and in Nepal must pay closer attention to the important institutional and inter-organizational management questions that have largely been ignored. It is required for all involved stakeholders in Nepali rangeland management to try their best to move beyond the theories and rhetoric of collaborative management into practical actions. This could be accomplished by making firm commitments to study and craft institutions that are adapted to the socio-economic and cultural conditions of local communities.

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