Turning conflicts into cooperation? The role of adaptive learning and deliberation in managing natural resources conflicts in Nepal[1]

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Abstract
Conflicts over natural resources are likely to escalate under changing socio-economic contexts and climate change. This paper tests the effectiveness of what we term Adaptive Learning and Deliberation (ALD) in understanding and addressing conflicts over the local management of forests and water, drawing on the experimental works in Nepal. Based on a three-year action research, the paper offers policy and practical insights on how complex and protracted conflicts can be addressed through researcher-facilitated inquiry and deliberative process which forms the core of ALD approach. The conflicts included in the study are not solely triggered by climate change but are a result of diverse environmental changes, diverse policy responses to local issues of resource governance, and wider political and economic factors. We analyze experimental practices of ALD implemented in two sites, where our research team facilitated the ALD process, gathering evidence in relation to conflicting institutional issues, all of which was then fed into researcher-mediated and evidence-informed deliberations on conflict management. The analysis shows that the ALD process was helpful in rearranging local institutions to accommodate the interests of the conflicting groups and, to some extent, challenge some of the underlying exclusionary provisions of forest and water institutions which have deep social roots in the Nepalese society. We also identify three key limitations of this approach – transaction costs, the need for strong research and facilitative capacity within the research team, and the acceptance of researchers' involvement among the conflicting stakeholders. Finally, we discuss some policy implications of the findings, including potential implications for building climate resilience.

Key Policy Insights
- Natural resource-based conflicts are intensifying in Nepal in recent years, due to heavy reliance of people on these resources for livelihoods, poor governance, and protection-oriented policies.
- Improved ways to facilitate cooperation among conflicting stakeholders are needed, as standard methods have often failed to address socio-environmental drivers of conflicts.
- The adaptive learning and deliberation
- approach can potentially help mitigate conflict and foster cooperation in natural resource management as shown in two pilot sites in Nepal.

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1. Introduction

Conflicts over natural resource management are growing as climate change impacts coincide with a number of social and economic changes as well as some historical continuities that privilege certain actors and particular land uses over others (Ribot, 2014). Climate change is exacerbating conflicts globally, especially in those regions already facing poverty, environmental degradation and acute natural resource scarcity (Hsiang et al., 2011; Burke et al., 2015; Mares & Moffet, 2016). While IPCC still seeks more research for stronger conclusions on direct connections between climate change and conflict, it acknowledges that climate change in combination with other socio-economic factors is already causing conflict (IPCC 2014). Scholars have pointed to extreme poverty, weak or insecure tenure, weak governance and poor public services that determine the relation between climate change and conflict (Scheffran et al., 2012; Hsiang et al., 2011). Apart from climate change itself, research has shown that policy and institutional responses to climate change such as mitigation and adaptation actions have also posed risks of increased conflicts (Fairhead et al., 2012). Even prior to the realisation of climate change impact, natural resources were highly contested, as increasing numbers of actors claim their stakes (Leach et al., 1999). Such conflicts are further compounded by persistent trade-offs between poverty and the environment and associated challenges (Casillas & Kammen, 2010).

In Nepal, increasing cases of conflicts over forest and water have been reported in the past decade (Satyal-Parvat & Humpreys, 2012; Domènech et al. 2013). Most of these conflicts are the result of poorly defined resource tenure and poor governance, in the context of changing patterns of local livelihoods and shifting political regimes (Shrestha and Conway 1996; Upreti 2004; Lawoti 2007; Sharma et al. 2014). Natural resource conflicts are also likely to be exacerbated by climate change, as Nepal is one of the highly climate vulnerable countries in the world (Oxfam 2009). In the meantime, Nepal has crafted several mitigation and adaptation responses to climate change[i], often without fully considering conflicting voices of diverse actors (Ojha et al., 2016). What is worse, climate mitigation initiatives, including REDD+ have induced conflicts at different levels of resource governance (Yasmi et al., 2011; Patel et al., 2013). As a result, managing conflicts in the context of increasing climate change impacts has emerged as a critical issue across developing countries (IPCC, 2014). However, little is understood on how such conflicts can be reduced or turned into cooperation (Jensen & Lonergan, 2013). In fact, evidence shows that reducing conflicts requires rearrangement of institutions underpinning management and distribution of benefits from natural resources (Jensen & Lonergan, 2013). What remains unexplored is the approaches and strategies that can help transform these management and distributional aspects.

This paper presents some insights from Nepal case studies experimenting with adaptive learning and deliberation (ALD) in managing natural resources conflicts, with a focus on local management of forests and water. Conflict in this paper is defined as a state of overlapping claims over resources, including the lack of essential institutional mechanisms to resolve overlapping claims. A key question we tackled through ALD is how situations of

conflict could be changed into a situation of collaboration. The aim here is not to provide a comprehensive assessment of how climate change is inducing natural resources conflicts, but to explore the potential and limitations of the ALD approach in understanding and addressing conflicts related to natural resource management, regardless of underlying causes of such conflicts. The ALD work included systematic efforts in developing collaborative understanding of the nature of conflicts in the two sites, as well as catalyzing planning and implementation of more productive and equitable resource management arrangements that could help mitigate conflicts in these two sites. In the reminder of the paper, we present the conceptual framework of ALD, followed by a description of how we applied this in Nepal, and then a discussion of the results and relevance of the ALD approach in relation to managing conflicts in natural resources management in general and in the particular context of climate change.

2. Conceptual framework

Over the past few decades, a variety of conceptual approaches have been espoused for defining and applying learning and deliberation across a variety of disciplines and application contexts. The field of social and organizational learning (Argyris, 1993; Schon, 2010) has emphasised on how human groups learn in formal organisational settings. Facilitators of change across organisations often emerge as a 'community of practice' (Wenger, 1996) when they get involved in the process of learning and catalysing change. Seminal works in the field of international development around participatory research and participatory rural appraisals emphasise researchers working with people (Chambers 1983; 1997). In the study of democratic governance, human society is primarily seen as a deliberative learning system through communication and discursive practices (Dryzek,2000; 2009). Public policy is seen as social learning systems, beyond the command and control view (Hall, 1993), involving human interactions at multiple scales of time and space. In natural resources management, learning processes have been recognised as an integral aspect of society and natural systems, and concepts of adaptive management of socio-ecological systems have been popularised to advance this view (Lee, 1993). These approaches consider learning not just at the level of resource management or a particular organization, but at the level of socio-ecological system (Berkes & Turner, 2006). In this research, we paid close attention to the process through which actors can negotiate and learn their way in the face of ongoing conflicts and future uncertainty. This also builds on our work and that of researchers working within and in collaboration with ForestAction Nepal over the past 15 years (Ojha, 2013; Banjade, 2013; McDugall, 2010).

Figure 1. Conceptual framework of adaptive learning and deliberation
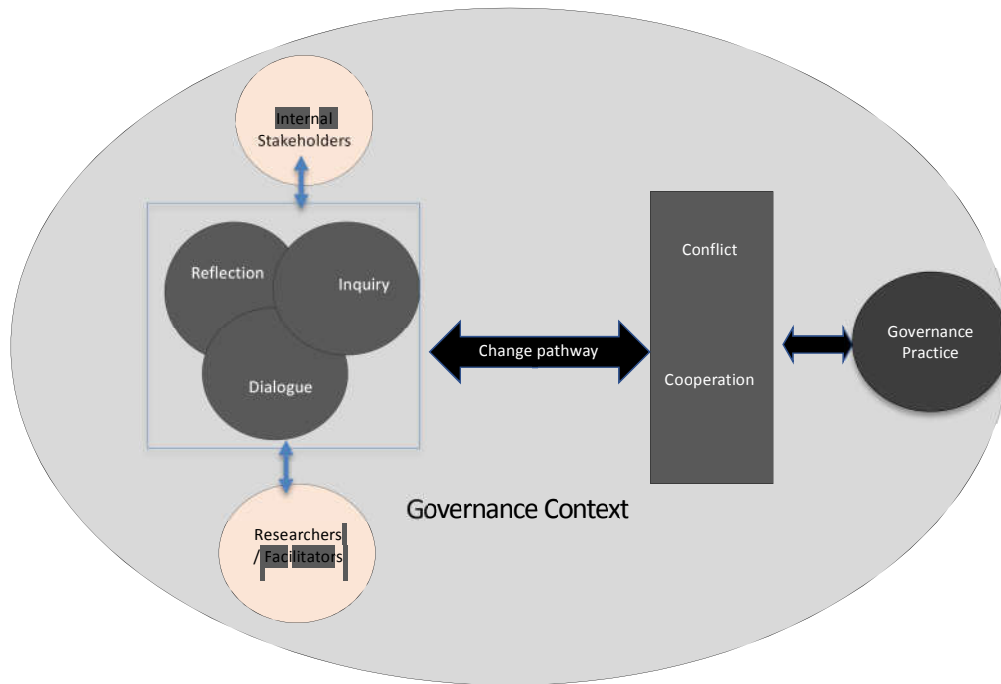
We define ALD as an approach to facilitate learning and deliberation among actors so as to minimise conflicts and enhance cooperation in a governance situation. It allows for learning while contesting as well as contesting while learning, through which actors can arguably move ahead with conflicts, and in times of uncertainty and ambiguity. While ALD is primarily an action strategy used by facilitators outside of the problem situation, it also includes strategies employed by actors internal to the problem situation to learn and muddle through (Lindblom, 1959) complex socio-environmental systems (Cote et al. 2012) to negotiate power and benefits. As such, the ALD approach recognises the need to develop a more integrated view of 'complex adaptive systems' to foster collaborative governance under situations of conflicts (Hall et al., 2001; Hall & Clark, 2010). Any knowledge is inevitably linked to power (Foucault 2000), and ALD also recognises the political inequality and power relations that must be confronted in the practice of ALD. While applying ALD, we were concerned with harnessing the potential of productive interaction and collaboration among social actors with contesting claims over natural resources or having diverse visions about how things should change. In other words, we used ALD to search for ways to fully establish communicative and reflective learning processes challenging the multiple world-views and power relations in natural resource management (Ojha et al., 2013).

ALD combines three key conceptual elements: a) reflective practice to allow new insights, world views and perspectives to emerge; b) collaborative inquiry between the research group and actors internal to a governance problem; and c) evidence informed dialogues to explore ways to overcome conflicts and foster cooperation in governance. In our ALD application, we were concerned with multiple domains of learning – learning about the natural systems, social systems, socio-ecological systems - as well as learning beyond existing limits of socio-cultural codes. Yet our focus was primarily at the local level, and our involvement at the non-local domains was supportive.

While social learning perspectives have greatly informed how learning and collaboration emerge (Schusler et al., 2003), we acknowledge that an emphasis on actor-centric learning sometimes misses the other modes of change. In many situations, social changes and innovations result not from conscious learning and collaboration, but through sudden and spontaneous political and economic crisis, and often chaotic situations are not conducive to learning based approaches. Bourdieu's (Bourdieu, 1989) conception of social agent – as culturally inscribed and operating in structural harmony with social systems (conceptualized as 'social fields') – also prompt us to see how crisis and dissonance parallel with learning and collaborative processes. Our focus in this paper is on the conscious learning faculty of actors, and not so much on structural dynamics of change. We recognise that any frameworks of adaptive learning and collaboration should be analytically linked with the theory of lack of leaning and non-cooperation or conflicts.

3. Applying adaptive learning and deliberation approach

We applied ALD approaches in two experimental cases of local level forest and water management in Nepal. Two situations of conflicts have been captured. The first case is about the conflict over access to newly established community forests in Nepal's low-lying plains called Terai[2]. The region is home to some of South Asia's remaining natural forests which are inhabited by dense settlements of Madhesi[3] communities in the southern belt. The northern belt contains forest and is inhabited by new migrants from the hill region of the country. Conflicts over forest access and use emerged soon after the establishment of community forestry in the late 1990s, as this process granted use rights to people living close to forest areas in the northern region of Terai, too often ignoring the rights of the Madhesi communities. We selected a community forest user group (CFUG) called Chisapani, which had not only experienced intense "north-south" conflict over forest access, but also made some attempts to resolve it through enacting an inclusive institutional arrangement and equitable benefit sharing. Yet the conflict persisted, given the deep social, geographic, and cultural differences of the communities in relation to forest use and management. Since the 1950s, hills people began to migrate and settle along the forested northern Terai. With the introduction of community forestry in the 1990's, those living close to the forest in Chisapani received formal forest management and use rights to 495 hectares of native Sal (*Shorea robusta*) forest, a commercially valuable timber. However, the formation of CFUG and the transfer of rights from the government effectively resulted in the exclusion of over 2,000 households of Madhesi community, who were identified as 'distant users' in the community forestry discourse. Meanwhile, forest policies that are increasingly influenced by climate agendas have put restrictions on the area of community forest and its management operations (Neupane and Shrestha 2012; Poudel et al. 2014), thereby limiting the ability of CFUGs to address increasing forest product demand from the CFUG members and the distant users. Deprived of their traditional rights to access public forests, the distant users engaged in illegal/ unsustainable forest use, often in the night, to meet their urgent needs. Those who were caught by forest patrol teams were often punished heavily, resulting in intense conflicts between the two communities. Our ALD work during 2014-2016 had some positive impact on the management of conflicts, as outlined in the next section. It also shows how the conflict over accessing forest has gradually become part of wider communal and socio-political

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[2] Terai is the lowland in southern Nepal stretching from east to west, which is the extension of the Gangetic plain of northern India.
[3] The term Madhesi generally refers to the people historically living in Madhes (Terai) who also also culturally distinct from hill migrants (also called Pahade).

conflict posing threats to political stability and national unity. The case also shows that collaborative inquiry of biophysical and social dimensions of access and use of forest within a small organisation can help recognise the problem and craft more equitable benefit sharing that is fairer marginalised traditional users.

Figure 2. Map showing the research sites.
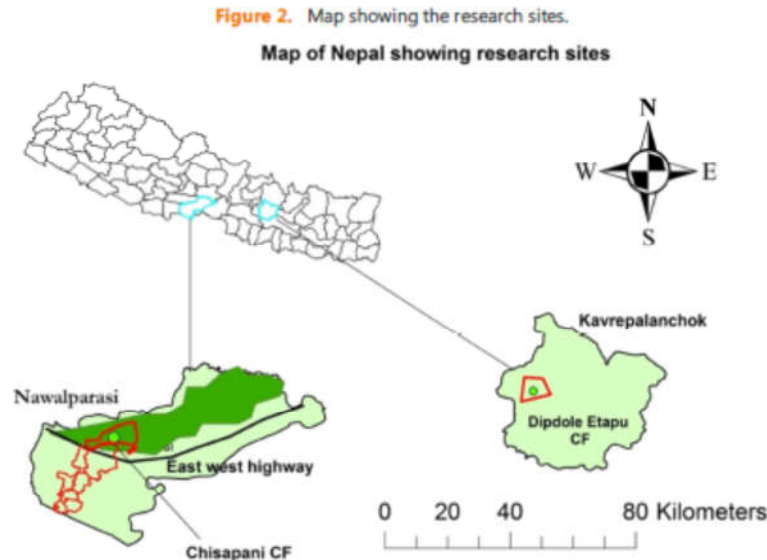
The second case captures conflicts over use of forest and water from a community forest in the mid-hills, in a rapidly urbanizing area about 25 kilometers east of Kathmandu. Here Dipdole Etapu CFUG includes households of a peri-urban area with high in-migration and growing use of water for intensive agriculture and poultry. The community has experienced conflicts over water abstraction from the community forest area, which is a source of water for eight small water supply systems. The local community has engaged in infighting over access, use, distribution, and tariffs of the water sources located inside the community forest. The conflict has been exacerbated by the legal confusion as to whether sources of water are part of community forestry rights as defined by the Forest Act 1993. This Act establishes regulatory provisions and CFUG rules over forest products, but remains unclear on water rights. In a separate water resources Act, water is regarded as state owned, and not included in the bundle of rights transferred to CFUGs. The problem of lack of regulatory clarity over water rights is compounded in this case by poor governance and marginalization of the poorer users within the CFUG, which includes 22 Dalit[4] households. During site selection for this study, we discovered that the CFUGs had been suffering from an internal rift over leadership in the executive committee. The committee members were passive and the forest was almost an open access regime. There was massive illegal felling of trees, unsustainable collection of firewood, and animal grazing both by the members as well as outsiders. Our ALD work during 2014-2016 had some positive impact on the management of conflicts, as outlined in the next section. The case presents a shift of economy away from traditional farming towards vegetable farming and off farm activities in a peri-urban context. Also due to high in-migration, changing monsoon rainfall patterns, and resource degradation there is increasing stress on available water. This is compounded by legal and institutional confusions over

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[4] *Dalits*, are socially marginalized groups of people under the Hindu caste system, which puts them in the lowest category. Occupational caste groups such as blacksmith, goldsmiths, tailors and the leather workers are put under this category.

access to water that induced conflict mainly between the better off g and poor and marginalized people who have weak voices in local affairs and also cannot invest in water distribution systems.

**Table 1: Summary of Adaptive Learning research and outcomes**

Variables	Chisapani case	Dipdole case
Nature of conflict	- Conflict between communities over the use and control of forest resources - Increased with community forestry as distant users were excluded from CFUG - Very small forest area compared to user population	- Elites hold monopoly on water, excluding marginalised groups - leadership and internal rift and crisis of legitimacy and accountability within CFUG - fast increasing demand for water for drinking and irrigation
collective inquiry	- forest resource survey, - calculation of demand and supply of forest resources - everyday life and scarcity of fuel and timber in the south	- assessment of existing and feasible water sources - assessment of current and projected water need - assessment of current water use practices by households
Reflective practices	- Small bilateral meeting with CFUG leaders - bilateral meeting with distant user leaders - Smaller and informal meetings between north and south members Formation of ALG and its meetings	Group of marginalised women organised and took initiatives - revitalization of CFUG executive committee and commitment to improve their governance
Deliberative dialogue	- Inception workshop with CFUGs, - series of executive meetings, -hamlet level meetings in south and north - workshops involving both communities and stakeholders (DFO, local government representatives)	- research team and EC meetings - mass meeting to discuss the water issue - collaborative meeting between water users and EC - new EC formed at General Assembly - planning workshop among new EC, local leaders, hamlet representatives
Outcomes	- Reserved quota for distant users in executive committee - Revised constitution and Operational plan that recognises distant users' rights - timely information flow - increased flow of timber and fuelwood to south - neighbouring CFUGs are learning and adopting	- new water distribution system developed so that even the marginal groups within the community now have access to drinking water - Increased compliance with CF rules including reduced illegal logging. - active participation in forest/water management and in institutional processes
Challenges experienced	- Still some level of skepticism, mistrust remains among southern community - National policies are restrictive on area of CF handover - people benefitting from status quo do not see much incentive to change the situation - CFUG often develops impractical high expectations with outsiders and projects	- shifting interest of users towards water and other recreational forest benefits resulted inlittle attention on forest management - elites/CF leaders couldn't manage substantive time for meetings as they were engaged with their own businesses and jobs in the city.

Source: Authors

Case 1: *Addressing the conflict between nearby and distant users over forest product access*

At the beginning of 2014, our research team initiated a dialogue with the chairperson and other key leaders of the Chisapani CFUG, and proposed to work jointly on addressing the conflict. The community leadership appreciated the idea to find ways to manage the north-south conflict. After a month, the CFUG executive committee made a formal decision to initiate collaborative enquiry (with support from the research team) to analyse the causes and consequences of the conflict and facilitate north-south dialogues. An Adaptive Learning Group (ALG) – *Sikamukhi Samihik Byabsthapan or Sisabya* in short) was formed, with 5 CFUG leaders, distant user representatives, and the research team (altogether 15 people) as members. The formation of ALG created a strong sense of ownership of the approach at the CFUG level – The EC and the ALG met regularly to reflect on the progress and need for further actions. The ALG then developed a step-by-step plan (see Figure 1 below) for collaborative inquiry, interactive visits between north and south, reflective workshops among communities from the north and south, joint planning, implementation and monitoring. These activities involved various combinations of reflection, inquiry, and dialogue, involving north and south community representatives as well as regulatory and facilitative stakeholders.

Figure 3: Adaptive learning cycle deployed in Chisapani CF
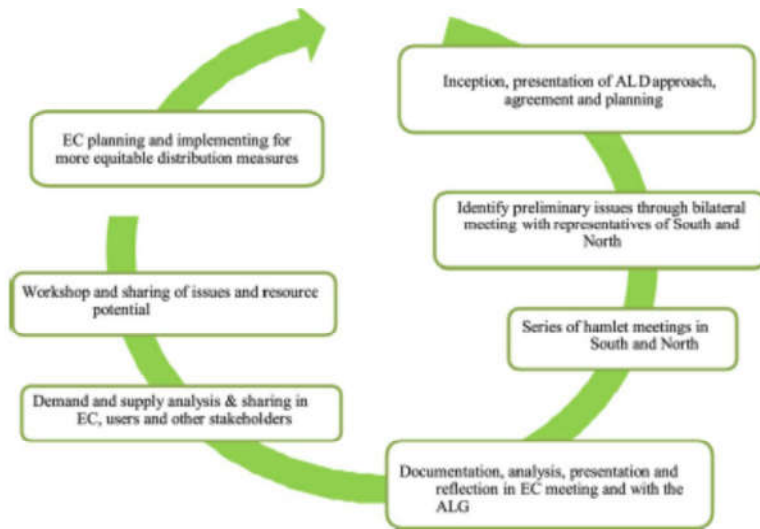
The ALG conducted a series of meetings with CFUG members, distant users and district forest office (DFO) staff (see Table 1). These meetings had two objectives; first, to assess the perceptions and realities of the rights and roles of northern and distant users in forest management, and secondly, to identify ways to negotiate resource access arrangements that could work for both communities. The northern communities claimed that they have invested their time and labor in protecting the forest from fire, illegal users and grazers and accused distant users for irresponsible and unsustainable harvesting without considering the forest stock. On the other hand, distant users complained that they could not access their traditional forests and had to rely on cow dung for cooking, and that they could not find timber even for purchase, while the northern communities were enjoying timber, fuelwood, and fodder as and when they needed.

Table 2. Summary of ALG meetings and its outcomes

Date	Participants	Agenda and outcomes of meeting
15-02-2014	ALG members	An ALG with 15 members (40% women and representation from south) formed with a mandate to consult, analyse and recommend on mitigating North –South conflict
22-05-2014	Members of ALG	First meeting of ALG; developed its own TOR, identified preliminary issues, planned for hamlet level consultation meetings in North and South,
05-10-2014	Member of ALG + North communities	Joint meeting of 3 hamlets in the North; key concerns of northern communities documented
02-11-2015	Member of ALG + South communities	Joint meeting of 4 hamlets in the South; key concerns of southern communities identified and documented
27-11-2015	ALG members + EC members + Researchers	Sharing of meeting notes with EC, received their view on it
December 2015	ALG + EC members	Analysis of CFUG Operational Plan and timber?? demand and supply status;; huge excess demand for forest products calculated
December 2015	ALG + EC + Users	Joint meeting of representatives of North and South; different views were shared, negotiated knowledge developed, points of compromise identified
January 2016	ALG	Preparation of report by the ALG
02-02-2016	EC members + ALG members+ General members + Stakeholders	The report was presented in the AGM, after intense discussion some important amendments were made in the Constitution and the Operational Plan. These were aimed at easing access of southern communities toforest products.

After ascertaining these diverse and conflicting perceptions over forests, the ALG then conducted an assessment of biophysical condition of the forest, and its use patterns. An estimation of sustainable supply of forest products was made. This was followed by an analysis of the need for timber and fuelwood for the northern and southern communities. The annual fuelwood need was 1999 tons and the sustainable supply from the forest was only 508.4 tons. Similarly, timber need was estimated at 25,125 cubic feet, while the supply was only 1,300 cubic feet. Clearly, there was a huge gap between demand and supply of forest products.

Soon after the ALG assessment was completed, a workshop was organized on 28 Dec 2015, with 40 participants representing government forest officers, national level federation of CFUGs called FECOFUN, leaders of the Chisapani CFUG, and local political parties. Once the ALG presented the findings, it sparked a fruitful discussion on how the demand-supply gap could be addressed, so that even the distant users in the south could have better access to forest products. The workshop allowed for reflective revisiting of the situation and helped develop collaborative understanding and commitment to work together. Leaders of the north and south communities who had confronted openly in public over the issue took a very reflective stance on the need to ensure everyone's forest products needs are fulfilled. The data and compelling stories presented by the ALG were helpful in facilitating meaningful dialogue

and reflective interactions. At the end, three broad strategies were agreed: i) ensure adequate representation and meaningful participation of distant users in the CFUG governance; ii) revise rules of accessing forest products; and iii) support for forest development activities in the south.

On 12 February 2016, a General Assembly of the Chisapani CFUG adopted the ALG proposed action plan, and also endorsed the ALG recommendations for amending institutional arrangements. First, they changed the CFUG constitution to recognise distant users as legitimate members with full rights to participate in all institutional process including the general assembly, executive committee and sub-committees. This institutional change recognised the historical injustice to distant users so that they developed a sense of ownership. Second, they changed the procedures for accessing timber and fuelwood. These included revised opening times for harvesting in the forest, simplifying the application process, opening a fuelwood and timber depot in the south, and developing a mechanism for monitoring the implementation of these decisions. Distant users have benefitted from these measures and have received significantly higher quantities of timber and fuelwood than in the past. Third, CFUG increased the amount of investment for plantation in the south (established nursery to produce more than 100,000 seedlings each year).

Notwithstanding these achievements of the ALD process, there remained some visible challenges. The northern communities were benefitting from the status quo and therefore did not see much incentive to engage in the ALD process, that had the goal of accommodating distant users in some way. It appears that political will of the leadership is critical for the effectiveness of such process. Similarly, despite recent progress towards more inclusive institutional arrangements and equitable benefit sharing, the southern communities were skeptical of any long-term resolution of conflict being achieved. More importantly, the 495 hectares of forest has its limit in meeting the forest product demand of both northern and southern communities based on the current trend of forest products demand. A wider participatory analysis, as part of continuing ALD support, is needed to determine how best to meet fuelwood needs, and the potential for expanding forest compared with other land uses.

Case 2: Addressing water access conflicts within Dipdol Etapu CFUG

When we began our research in April 2014, the Dipdole Etapu community was facing a conflict around water. There used to be seven major water sources in the area until sometime back, but only five were existing at the time of the study. The water distribution system is uncoordinated -it occurred to us that water was an open access within a functioning system of CFUG. Nearly 80% of the households who can afford have drawn drinking water directly from water sources within the CF area through their private pipes. However, the poor and disadvantaged groups were unable to make such investment and sometimes they are not allowed to access the water sources. A settlement of 10 households of so-called untouchables (Dalit) who live close to the forest have not been able to secure water as they lacked necessary investment to deploy piped water system. As an elderly Dalit woman said: "we live close to forest and water but we have to go and collect water from farther away places as ther nearby water sources in the forest have already been tapped by the powerful people". As the scarcity of water intensified, conflicting claims over the water sources proliferated. The adjoining villages also began claiming their rights and using some of the Dipdole Etapu water sources. In this context, the CFUG leadership felt increasing pressure from the wider

community to redesign the water distribution system so that all the CFUG members could get a minimum amount of drinking water supply.

Amidst this situation, in April 2014, the research team initiated a dialogue with the Dipdole Etapu CFUG leaders to enable them to address the water related conflicts. This was followed by collaborative inquiry – involving the research team and the local CFUG leaders – to jointly analyze the nature of the conflict and its consequences. From April to May 2014, we carried out bilateral and multilateral meetings with the community leaders, members of executive committee, and marginalized groups within the community. As an informal group of 15 people, ALG took a lead in developing a step-by-step plan of a participatory assessment of water related conflict, organized reflective workshops, and organized bilateral meeting with past members of the committee members.

Table 3. Summary of ALG meetings and its outcomes

Date	Participants	Agenda and outcomes of meeting
03-04-2014	ALG members	An ALG with 15 members formed with a mandate to consultation, analysis and recommendation on management of water distribution system
15-04-2014	Members of ALG	First meeting of ALG; developed its own TOR, identified preliminary issues, planned for hamlet level consultation meetings in each hamlet
June to July 2014	Member of ALG + local leaders +Hamlet people	Discussion on concern and issues on forest and water use
12-09-2014	ALG members + EC members + Researchers	Sharing of meeting notes and learnings with EC, received their view on it
November 2015	ALG + EC members	Analysis of current water use pattern, distribution system and possibilities for rearrangements and agreed on developing new arrangement for water distribution under CFUG
January 2016	ALG + EC members+ hamlet representatives	Collective identification of new water sources, rearrangement opportunities and investments for establishing new water collection tank
October 2016	ALG	Preparation of plan by the ALG
December 2016	ALG+EC	Agreement and initiation of establishment of new water collection tank and re-distribution through CFUG

As a part of improving governance through deliberative processes within the CFUG, we organized six hamlet level meetings in July 2014, followed by a workshop among the representatives of each of the six hamlets, CFUG officials, other community leaders who had publicly disagreed with the existing forest management practices, forest authority and Federation of Community Forest Users Nepal (FECOFUN) members. The meeting presented itself as a deliberative forum for diverse actors, and became instrumental in calling for a general assembly of the CFUG. Accordingly, the CFUG leadership called for the general assembly which then elected new executive committee on 22 December 2014. All hamlets actively participated in the general assembly, discussed conflicting issues around the

distribution system of forest and water, and mandated the executive committee to establish more equitable distribution mechanisms.

One year later, on 14-15 March 2015, the new executive committee, local leaders, hamlet representatives, and the research team participated in a two-day workshop and developed a plan to undertake an assessment of water use practices and underlying institutional arrangements. This was considered essential by the CFUG executive committee before it could enter into the conflicting domains. Based on the plan, the CFUG members and research team carried out forest resource assessment, analyzed the existing water sources, developed conservation measures and located additional water sources and sprouts, and identified hamlets with poor access to water. This process helped understand patterns of use of existing water sources, the potential capacity of available water sources, and possible alternative distribution arrangements. Later, new water sources have been identified and more equitable and possible more sustainable distribution mechanisms have been developed within the institutional framework of the CFUG. The CFUG invested in the conservation of water sources and water distribution system including construction of new water intake and collaborative distribution system that largely satisfied the members. There is increased compliance of CF rules including reduced illegal logging. Instead, there is active participation in forest/water management and in institutional processes such as plantation, putting off forest fire, conservation and cleaning of sources of water, and holding regular meetings. As a result, Dipdole Etapu CFUG has demonstrated a new example in the Kavre area on how ALD approach involving regular dialogue, reflective learning process and collaborative decisions help improve resource governance and promote equitable access.

Along with these visible successes in addressing conflict, we experienced a couple of challenges in applying ALD in Dipdole Itapu community. First, living in a peri-urban area, people were quite busy and did not have enough time and attention the ALD process required. Moreover, those who were enjoying piped water into their houses and farms, tended to avoid the workshops. We had to create internal pressure through the women's group who were more concerned with inadequate access to water. However, most important is the gap between availability and ever-increasing demand due to ongoing in-migration and drying up of springs in the recent years. This means that the local level ALD approach can only do so much when the challenge is more related to the availability of water than its distribution alone.

4. Discussion

As the two cases show, management of conflict can benefit from adaptive learning and deliberative dialogues, and the application of ALD approach (in the way we designed) can lead to significant changes in institutional rearrangements towards more equitable access to natural resources (see Table 1). In the Chisapani case, management of conflict has resulted in legitimate access to timber and fuelwood by distant users, whose rights were neglected previously. The Chisapani community members have now been able to receive significantly higher volume of these products, either from collection centre near the forest or from the newly established depot in the south. Similarly, in Dipdol case, even the weak and marginalised social groups have now got better access to water provided by their own CFUG. Previously, these communities were unable to access water. Significant local level institutional rearrangements have emerged out of the ALD application.

ALD approach, which is underpinned by three interrelated processes of reflection, inquiry and deliberation, is crucial to effect institutional rearrangements. It provides more comprehensive framework for action research and deliberative engagement for researchers to catalyze change in governance practices than is offered by conventional practices of action research. ALD approach combines a post-empiricist, deliberative and discursive approach (Dryzek 1982; Dryzek 1989; Fischer 1998; Dryzek 2010) as well as mopbilizes the power of reflective approach to collaborative learning (Schon 1987). As such, the ALD approach is not just a participatory research in which the primacy of the production of knowledge dictates the process of participation. ALD is driven by the goal to identify and solve problems and the in this process, knowledge generation is applied and tailored to the expected outcomes. Our approach fully recognizes the need to tackle underlying political relations that shape problematic governance practices as emphasized in Freirean approaches, but ALD emphasizes the value of working through critical evidence generated through collaborative inquiry, which creates reflective moments for the powerful groups to rethink the existing practices of domination. ALD approach directly tackled the social fact that in most conflict situations actors take uncritical and self-defending positions, supported by facts of their own choice and selection. Using the ALD approach, once environment for reflective practice is created, the dominant actors begin to rethink their original positions and listen to alternative narratives and arguments. Our approach further created a safe environment for the marginalized actors to share their grievances with the dominant actors, who became more personally prepared to listen to such views. These experiences show that reflective and deliberative approaches, together with the practice of collaborative inquiry to generate evidence, offer a powerful way to help actors in a conflicting governance situation to rethink their positions, appreciate viewpoints of others, and then engage in fairer negotiations.

The promise of ALD approach holds true in the increasingly complex and cross-scalar nature of resource governance. The state of conflict or collaboration in resource governance contexts are cross-scalar, involving communities, stakeholders and state agencies at different levels of governance (Ojha et al 2016; Sterling et al 2017). This means that neither their origin nor the solution of conflicts lies only at the local level. As we saw through the cases, while conflicts are manifested at local level, their drivers are linked with national and sometimes even international policies such as those related to biodiversity conservation and climate change mitigation, as well as the wider political governance and knowledge system (Arts and Buizer 2009). Consequently, the sustainability of collaborative actions is also shaped by forces beyond the local. In such contexts of cross-scalar governance, the value of ALD approach is recognisable not only in the willingness of political actors to reconcile conflicts but also in the compulsion all actors are facing with regard to the need for certain level of cooperation. What matters most is the capacity and the vision of ALD research groups to internalise and champion the powers of the three pillars: reflective practice, collaborative inquiry and deliberative dialogues. Our experimental works on forest and water management in Nepal show that ALD approach has helped conflicting actors as well as policy makers to understand and respond to the challenges of conflicts.

We identified three critical challenges in applying ALD in managing and resolving natural resource-based conflicts. First, it demands substantial time and effort on the part of researchers and facilitators, conflicting parties, and other stakeholders. The number of workshops and meetings that were organized for the cases involve high transaction costs. Although inclusive and participatory processes are preferred, the heavy investment of time and efforts may not be justified. Secondly, the application of ALD demands well trained and skillful facilitators who can mobilize the communities and stakeholders towards creating

adequate enthusiasm and a constructive dialogue. He/she must be convincing, appealing and persuasive to ensure conflicting parties stay committed to resolve the conflict and trust the process. Facilitators having expertise on the substantive issue of conflict and also having a good moderation skill are rare in the current labor market. Third, there should be a public acceptance and welcoming environment for such external facilitation on a sensitive issue. In both of the cases discussed in this paper, there was ample space for external agencies and individual to engage and facilitate the ALD process.

As clarified at the beginning, the ALD approach was not used primarily to tackle climate change induced conflicts, and as elsewhere, the climate connection to conflict is not yet fully established in Nepal's forest and water management practices. Yet the findings have at least four policy implications, which can cover well the domain of building climate resilience in natural resources management. First, understanding and mitigating natural resource-based conflicts demands a long, engaged socio-institutional process and therefore reliance on quick fix strategy does not work. Therefore, it is worth investing in teams of skilled facilitators and on encouraging CFUGs and similar community groups managing natural resources to understand and adopt an ALD approach rather than following the blue print approach such as local adaptation plan of action. Second, an ALD approach combining participatory assessment and reflective workshops could be made part of mitigating conflicts induced by climate change mitigation policies on forest (Reducing Emission from Deforestation and Forest Degradation or REDD+). Third, ALD processes can flourish only in the context of certain degree of decentralized and democratic governance, as it requires space for critical research and deliberative dialogues. In Nepal, this may be strengthened through federalism adopted in 2017, where sub-national level governments may be well placed to benefit from adopting such approaches. Fourth, considering the challenges of conflict mediation and resolution, ALD approaches can offer soft and non-confrontational approach to talk about hard questions of conflicts and policy arrangements.

5. Conclusion and implications building resilience for climate change

In this paper, we analyzed how and to what extent adaptive learning and deliberation (ALD) approach can help in overcoming natural resources conflicts, through our experimental work in local level forest and water management practices in Nepal. Overall, we found that ALD approach has the potential to foster rearrangement of local institutions for equitable resources management, with potential gains in building resilience to climate change. Specifically, three fundamental processes of ALD have been found useful. First, initial engagement of the research team with the community leadership, marginal groups, and other stakeholders was helpful in cultivating and nurturing reflective attitudes in relation to the ongoing conflicts. Once they became open to talk and explore beyond their initial positions, stakeholders embarked on a collaborative learning processes to understand the issues and identify options for more equitable resource distribution and management arrangements. Reflective practice helped individuals and groups rethink and even challenge their existing mindsets, and encouraged them to listen to other's viewpoints and arguments.

Second, once stakeholders became open to learn and negotiate, collaborative inquiry supplied with needed facts and information. The inquiry focused on the causes and consequences of conflicts. The cases show that collaborative assessment of biophysical status of water and

forest, their existing and future supply potential, and the assessment of existing distributional arrangements provided important evidential base for deliberative dialogue towards exploring more sustainable and equitable management of these resources. The inquiry was truly collaborative in nature – as questions and methods were agreed by representatives of all the key stakeholders related to the situation of conflicts. Such a collaborative inquiry not only developed a better and shared understanding of the limits and potentials of resource supply but also helped find ways for more productive management and equitable distributional arrangements.

Third, dialogues at different levels of resource governance were instrumental in catalyzing institutional rearrangements. Informed by the findings from collaborative assessments, members of the conflicting groups, policy actors, and other relevant stakeholders engaged in meaningful dialogue. All members, particularly the marginalized ones, felt safe and were encouraged to share their concerns, elaborate their arguments and suggest workable solutions. Even the marginalized groups (women, Dalits, and distant users) were able to express their cases and suggest solutions from their perspectives. Such deliberative dialogue helped develop trust among the participants, and encouraged them to make interventions for constructive resolution of the conflicts.

The ALD approach was deployed in the context of strong local institutions, a democratic policy environment where there was no restriction on expression of opinion, and the research team was experienced in this type of work. These contexts may vary elsewhere and therefore, ALD needs to be reframed and adapted considering the dynamic context of resource management where climate change is exacerbating conflicts. The ALD approach may not be feasible in highly sensitive areas where open discussion and critical inquiry is not politically feasible. Though we saw value in applying this approach, we also experienced severe challenges associated with high transaction costs, engaging the power actors in the redistributive process, and sustaining the processes of change that are primarily facilitated by groups outside of the internal governance system.

6. References

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[i] Nepal enacted National Adaptation Program of Action (NAPA) in 2010, and a major climate change mitigation under Reducing Emissions from Deforestation and Forest Degradation (REDD+).