Collective identity and resilience in the management of common pool resources

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Abstract: Effective management of common pool resources through collective action is dependent upon the efforts of the resources users to establish an identity that is held collectively. It is widely accepted that the term common pool resources implies a resource that is common to a 'pool' of people, the resource users. Their interests in the resource connect users and potential users, and we propose that the more strongly they identify with the resources and commit to act collectively, the stronger the collective action. Achieving sustainable use of common pool resources is thus determined by the interplay between collective identity and collective action. But collective identity as defined by the resource and its users is dynamic, making the identity vulnerable in directing the behaviour of users. In this paper, we draw on collective identity and resilience theories to develop a framework for exploring the role of collective identity in understanding collective action in the management of common pool resources. We suggest that two key attributes of collective identity – identification and affective commitment, provide the premise for interpreting, tracking and directing change in collective identity. We interpret how the interactions between the two attributes contribute to resilience of common pool resources as complex social-ecological systems.

1. Introduction

Most natural resources that are subject to joint-use and support human well-being across multiple levels of social organization are increasingly being viewed as common pool resources (CPRs) (Berkes and Farvar 1989; Agrawal 2001; Fernandez-Gimenez 2002). CPRs are those from which it is difficult to exclude potential users (weak or low excludability) and where use of the resources by a potential user reduces availability for other users (subtractability). In this way, management of the use of CPRs such as grazing, water, forests, fisheries and wildlife requires collective action that supports coordinated responses to the challenges of excludability and subtractability (Wade 1987; Berkes 1989; Ostrom 1999; Burger 2001; Araral 2009; Poteete et al. 2010). Examples in CPRs literature (Berkes 1989; Ostrom 1999; Dietz et al. 2003; Laerhoven and Ostrom 2007) show that people tend to cause destruction through over-utilizing and under-investing in maintaining commonly owned resources where there is no confidence to invest in collective activities. Collective action embodies the organizational endeavours of a group of individuals in the management of the use of CPRs for collective benefits. This understanding essentially entails that collective action requires the involvement of a group of people that voluntarily engages some kind of coordinated action based on their shared experiences and expectations towards the achievement of a common interest (Meinzen-Dick et al. 2004).

Research attention to the concept of collective action, especially as it relates to natural resource management and rural development, has increased in tandem with the efforts to devolve management to local communities (Araral 2009). Although the literature in general provides several examples of successful collective action (Dietz et al. 2003), there are studies that still reveal many examples of failed collective action for which research should continue to seek better understanding (Meinzen-Dick et al. 2004). In the last three decades, salient debates in the literature on collective action have focussed on factors which impede or facilitate collective action. While some studies have emphasized the physical characteristics of common pool resources such as scarcity, size and proximity to markets, others have stressed the importance of the characteristics of resource users themselves such as age and origin, wealth, salience, group size and heterogeneity (Wade 1987; Subramanian et al. 1997; Agrawal and Gibson 1999; Agrawal 2001; Poteete and Ostrom 2004). Although there is general agreement that both types of factors are relevant to the enhancement of collective action, little attention has been given to

the importance of these factors in fostering dynamic long-term collective action (Araral 2009).

Meinzen-Dick et al. (2004) have called for renewed focus of research to understand how collective action is developed and sustained over time. This call is based on the understanding that long-term collective action embodies dynamic human processes which evolve over time. Despite a few exceptions (Folke et al. 1998; Janssen et al. 2006), few studies have attempted to understand collective action from a dynamic perspective. Yet, collective action occurs in complex, dynamic and uncertain situations in which diverse and conflicting human interests that tend to change over time (Dietz et al. 2003). To understand such situations, we need to understand the dynamic human processes through which resource users influence each others' behaviours over a period of time to advance a common purpose.

This paper seeks to contribute to the understanding of how change in collective identity over time affects change in collective action. We argue that understanding the dynamic nature of the relationship between collective identity and collective action is fundamental to management of common pool resources. We draw on collective identity and resilience theories to develop a framework for exploring change in collective action. Two key attributes of collective identity – identification and affective commitment, provide the premise for interpreting, tracking and directing change in collective action. We interpret how the interactions between the two attributes contribute to desirable resilience in collective action. Based on the framework, we illustrate how change in collective action is dependent upon the temporal changes in the attributes of collective identity that differentiate a group of people – in other words the collective – from other similar social units. Such an identity, which we herein refer to as collective identity, is defined by shared meanings which direct the behaviours of resource users (Berkes et al. 1989; Ostrom 1999; Araral 2009). The shared meanings in turn define and underpin the actions of the members who act on behalf of the collective. Thus, collective identity can be considered as a precursor that facilitates or impedes collective action in the use of CPRs (Melucci 1996; Polletta and Jasper 2001; Snow 2001).

Resilience theory provides a useful means of understanding how collective action as a system responds to change when its integral components change (Holling 1973, 2001; Folke 2006; Nkhata et al. 2008; Duit et al. 2010). We use resilience theory both as an approach (a way of thinking) to analyse change in collective action (Holling 1973, 2001; Folke 2006; Nkhata et al. 2008; Duit et al. 2010) and in broad terms as a system property to refer to the ability of collective action to maintain its configuration in the face of internal change and external shocks (Brand and Jax 2007; Cumming and Colliers 2005). Although we argue that resilience theory (Holling 1973) is helpful in understanding the dynamics of collective action in the management of common pool resources based on collective identity, we are keenly aware that the concept of resilience has many interpretations and is applied across various scientific disciplines (Adger 2000; Brand and Jax 2007; Nkhata et al. 2008, Norris et al. 2008). While some authors

(Brand and Jax 2007) consider that the ecological meaning of the concept has been broadened and the term has become ambiguous, its positive influence in facilitating communication and research across disciplines is generally considered useful (Cumming and Collier 2005; Anderies et al. 2006; Folke 2006). In the same vein, for the purposes of this paper, we define resilience as "the ability of a system to absorb disturbance and self organise while undergoing change so as to still retain essential functions, structure, identity and feedback" (Folke 2006, p. 259).

2. Collective action, collective identity and resilience

The concepts of collective action and collective identity have long been a focus of social science research. The relationship between collective identity and collective action has been extensively explored particularly in social movement literature (Melucci 1996; Polletta and Jasper 2001; Snow 2001; Holland et al. 2008). Elsewhere, social psychology has been helpful in clarifying the connection between the individual and the collective as they relate to collective action and collective identity (Simon and Klandermans 2001; Klandermans 2002; Klandermans et al. 2002; Ashmore et al. 2004). The literature suggests that in order to achieve collective action members of a user group need to develop a collective identity which is founded on a shared understanding. The shared understanding enables members to contextualize their appreciation and expectations of the collective as it grows and evolves. It allows for continuous self-organization as the collective identity adjusts to reflect variability in the supply of benefits due to diverse and changing demands on CPRs. This implies that where it is necessary for collective action to be sustained in the long-term, as in the use of CPRs, it is important for members of a user group to be conscious of and responsive to change in collective identity.

While the literature in natural resource studies has in the past few decades focused on collective action under conditions in which groups of resource users self-organize to govern resources on which they depend (Ostrom 1999; Ostrom et al. 1999; Wade 1999; Agrawal 2001; Dietz et al. 2003; Meinzen-Dick et al. 2004; Araral 2009; McGinnis and Walker 2010; Poteete et al. 2010), an appreciation of the concept of collective identity in understanding collective action has been largely missing. In this paper, we attempt to illustrate that management of common pool resources through collective action is dependent upon collective identity. We argue that collective action is facilitated and sustained where there are shared interests and understandings that are actualized and reinforced through collective identity. Although collective action may in some instances not last when those interests are no longer shared and thus the group loses its collective identity, we contend that collective identity facilitates a degree of homogeneity which transforms individual experiences into collective experience (Simon and Klandermans 2001). In other words, collective identity confers on the group unique characteristics based on shared meanings, experiences and expectations around which the group members

coalesce (Cerulo 1997; Snow 2001). Such characteristics are expressed through the unique attributes of a resource user group, the resource it exploits, and the governance system that regulates use. In this way, the construction, maintenance and collapse of collective action can be understood as a dynamic system nested within a larger social-ecological system defined by the resource, its users and the institutions.

We acknowledge that the resilience of collective action may not be socially desirable in all instances and that some undesirable states of collective action may often be highly resilient. This is particularly necessary if we are to identify those attributes that can help us recognize, interpret and manage change in collective action (Ellemers et al. 1999; Roccas and Brewer 2002; Ashmore et al. 2004). From this perspective, accepting the importance and vulnerability of collective identity in directing behaviours of resource users towards the collective highlights the need to develop understanding of how to foster resilience in collective action. Burke and Cast (1997) suggest that collective identity is a process that can either be static or dynamic depending on particular circumstances. Collective identity continuously changes in response to discrepancies that may develop between individually held meanings (self meanings) and collective meanings (Burke 2006). These changes occur within a dynamic system that is self-regulating (Burke and Cast 1997; Burke 2006). Changes in collective identity may also occur in situations where multiple identities that share similar sets of meanings emerge and activate at the same time (Burke and Cast 1997).

For example, resource user groups in wildlife conservancies in Namibia have been shown to have different collective identities each defined by a different pattern of resource use (Mosimane 1998, 2003; Nacso 2005, 2006). Such groups include divergent resource users ranging from livestock farmers to users who engage in wildlife tourism activities. While each of these groups represents a distinct collective, some users align with more than one collective identity. In such situations, when change is slow or actions are taken to ensure that the discrepancies between collective meanings are small, collective identity may evolve slowly and remain relatively stable most of the time. When developing collective identity, strategic and conscious changes of behaviour can be used to reduce discrepancies between self-meaning and collective meanings.

In such situations, self and collective meanings are continually realigned such that discrepancies remain small and collective identity appears stable (Burke 2006). In contexts where shared meanings are not deeply entrenched, collective identity is more susceptible to collapse as tensions develop between individual and collective meanings. Given such potential consequences for a common pool system, collective action ought to be resilient in its response to emerging meanings so that user actions are aligned with the shared meanings of the collective.

The development of collective identity has mostly been studied from initiation to maturity at which stage it has been considered to remain relatively stable or to

collapse. Collapse of collective identity, for example, would happen when the reasons for collective action no longer exist (Polletta and Jasper 2001; Holland et al. 2008). Despite this understanding, collective identity has not been interpreted in the contexts of resilience. Given that a long-term perspective is required in management of joint-use of CPRs, we postulate that the state (or configuration) of collective identity is an important determinant of resilience in collective action.

The resilience approach has been adopted in social-ecological systems studies as a useful way of organizing a collection of ideas for interpreting complex adaptive system (Anderies et al. 2006; Folke 2006). For example, Holling (2001) adaptive cycle has been used to interpret the dynamics and resilience of complex ecological and social systems. In an adaptive cycle, four phases – exploitation, conservation, release, and reorganization – are recognized that may or may not follow one another sequentially in the development of a complex system. Essentially, an adaptive cycle reflects discontinuous change in two dimensions of a complex system: capital that is inherent in accumulated resources; and connectedness among the elements that make up the system (Holling 2001). Change in the two dimensions is thought to determine the evolution of the four phases of the adaptive cycle.

In the exploitation phase, a complex system accumulates capital that allows it to grow and mature. While capital accumulates slowly, strengthening connectedness leads to enhanced stability thereby transforming the system from exploitation to conservation phase. As the conservation phase develops, and more capital accumulates, connectedness becomes more rigid exposing the system's vulnerability to disturbances which may trigger the collapse of the system into a release phase in which accumulated capital is lost. The release phase is followed by reorganization where the potential for capital accumulation is high but connectedness is relatively low. Depending on circumstances, the system would either resume the adaptive cycle or possibly change some of its properties to transform into a new system altogether.

While Holling's adaptive cycle has been applied in a range of the studies involving both ecological and social systems (Abel et al. 2006; Nkhata et al. 2008; Baral et al. 2010), it has in some instances been criticized for over-generalizing reality and being too broad. Cumming and Collier (2005) suggest that the broad application of the adaptive cycle renders it a meta-model that fits many social and ecological systems. On the other hand, Holling (2001, p. 393) describes the adaptive cycle as a "heuristic model, a fundamental unit that contributes to the understanding of the dynamics of complex systems from cells, to ecosystems, to societies, to culture." Thus, although one might argue that the resilience approach is intended to have wide application, in this paper we consider the adaptive cycle model as a useful metaphor for organizing ideas about the resilience of collective identity (Carpenter et al. 2001). Our consideration is based on the understanding that resilience theory allows the use of Holling's model on condition that the selected system is describable (as in the original ecological context) in dynamic terms and is able to move into multiple states (Holling 2001; Nkhata et al. 2008).

We propose that the adaptive cycle model offers an approach for understanding the continuous dynamic processes inherent in the relationship between collective identity and the collective action. It offers a systematic way of identifying and understanding the processes of how change in collective identity affects change in collective action over time. Without an understanding of such change and how collective identity affects collective action, research risks omitting important determinant variables. The use of the resilience approach does not only enable some measurement of the resource users' willingness to cooperate, but also their ability to work together at different stages of collective action. It also provides a useful perspective for understanding stability and change insofar as the resilience of collective action is concerned. We incorporate the collective identity framework of Ashmore et al. (2004) into Hollings' adaptive cycle (2001) to provide a unique approach to understanding change in collective action based on collective identity.

3. A resilience-based framework for understanding change in collective action

We posit that identification and affective commitment are two attributions of collective identity that are helpful in understanding change in collective action. We realize that the terms identification and self-categorization have at times been used interchangeably in literature (Bergami and Bagozzi 2000). For the purposes of this paper, identification is the process in which people come to view themselves in relation to the collective. It exemplifies the cognitive link of an individual to the collective and reflects the levels of awareness of an individual's membership to the collective (Ellemers et al. 1999; Bergami and Bagozzi 2000; Jackson 2002). An important aspect of collective identity is that people first have to identify with the collective before developing other dimensions of their identity. Identification is the first and most basic attribute of collective identity, which gives people a sense of meaningfulness (Ashmore et al. 2004) and allow individuals to assimilate collectives goals as their own (Bergami and Bagozzi 2000). We are keenly aware that identification on its own may not be sufficient for people to behave in terms of the collective, especially when they do not feel committed to a particular collective identity (Bergami and Bagozzi 2000; Ellemers et al. 1999). However, we also acknowledge that the extent to which people identify with the collective determines the inclination to behave in terms of the collective. Identification is thus characterised by an individual first recognising the collective of which the individual is a member, followed by an appreciation of the individual's membership to the collective (Jackson 2002).

The term affective commitment refers to a state in an individual feels emotionally involved with the collective and other members of the collective. It embodies the emotional link of an individual to the collective (Ellemers et al. 1999; Bergami and Bagozzi 2000). It is usually defined in terms of emotional attachment and sense of belonging (Bergami and Bagozzi 2000; Ashmore et al.

2004). The extent to which individuals feel affectively attached to the collective influences how they respond to the demands placed by the collective (Ellemers et al. 1999). Emotional attachment is an outcome of a process through which individuals merge their sense of self with the collective (Ashmore et al. 2004). The basic fundamental need to belong allows people to form positive and stable relationships that conform to the subtleties of the collective (Baumeister and Leary 1995). Affective commitment is thus much more than identification and is developed through strong ties, bonds and a sense of interconnectedness (Jackson 2002; Ashmore et al. 2004). It is characterised in terms of emotions (such as love or hatred, happiness or unhappiness, and likeness or dislikeness) arising from attraction to the collective (Bergami and Bagozzi 2000; Jackson 2002).

Although the two attributes of collective identity do not necessarily provide the only perspective for examining resilience in collective action, we suggest they provide a useful approach for analyzing the nature and substance of change in collective action especially as it relates to the management of CPRs. We consider the adaptive cycle of collective action as a representation of how collective identity based on the two attributes varies over time. As such, the two attributes are important in understanding how collective identity links members of the collective to a set of meanings, which if stable would produce consistent actions aimed at the collective (Burke and Reitzes 1991). Conversely, a change of meanings may result in actions that are inconsistent with the collective.

We contend that the degree of identification and the amount of affective commitment influence how people relate to the collective identity and in turn impact on the collective action to manage the use of CPRs. The degree of identification is a measure of how closely the meanings held by an individual or sub-population of individuals accord with the collective meanings (Ellemers et al. 1999; Bergami and Bagozzi 2000). However, when there is a discrepancy in the two sets of meanings, the individual or group may not willingly identify with the collective. Affective commitment is a measure of how emotionally involved an individual or group of individuals is with the collective meanings, identity and associated actions (Bergami and Bagozzi 2000). In this way, the more emotionally involved people are the more committed they are to collection action.

3.1. The adaptive cycle of collective action

Change in collective action can be interpreted through understanding the extent of change in collective identity defined by identification and affective commitment. We propose that identification and affective commitment provide the basis for interpreting how collective identity influences the state of collective action, which may remain quasi-stable for long periods while going through phases of an adaptive cycle. The development of identification and affective commitment represents the process through which collective identity evolves, matures, collapses, and reorganizes as it adapts to reflect changing context of collective action. Change in

collective action is controlled by either fast or slow changes in identification and affective commitment (Abel et al. 2006). The extent to which people identify and feel affectively committed to the collective determines the direction and pace of change and thus the state of collective action.

This understanding is illustrated through a representation of an adaptive cycle of collective action in Figure 1. When compared with Holling's adaptive cycle model, the attribute of identification corresponds with the connectedness dimension and affective commitment with that of capital. As depicted in Figure 1, the exploitation phase in the development of collective identity may arise when people perceive and seek to make use of an opportunity that may be optimally realized through collective action. Such a period occurs when people engage with each other through social relationships to establish a collective identity (Child 2004). In the conservation phase, identification and affective commitment continue to increase, thereby strengthening collective identity. While there is always potential for opportunistic behaviour, the degree of identification and amount of affective commitment could be sufficient enough to enable individual behaviours that are shaped by members' understandings of the collective identity (Ellemers et al. 1999). Whereas the collective identity is consolidated during the conservation phase, the collective identity becomes increasingly rigid and vulnerable to disturbances. Increased identification results in complex social interactions with potential to stabilize or change meanings without disrupting the collective identity. Persistent disturbances may cause collective identity to change
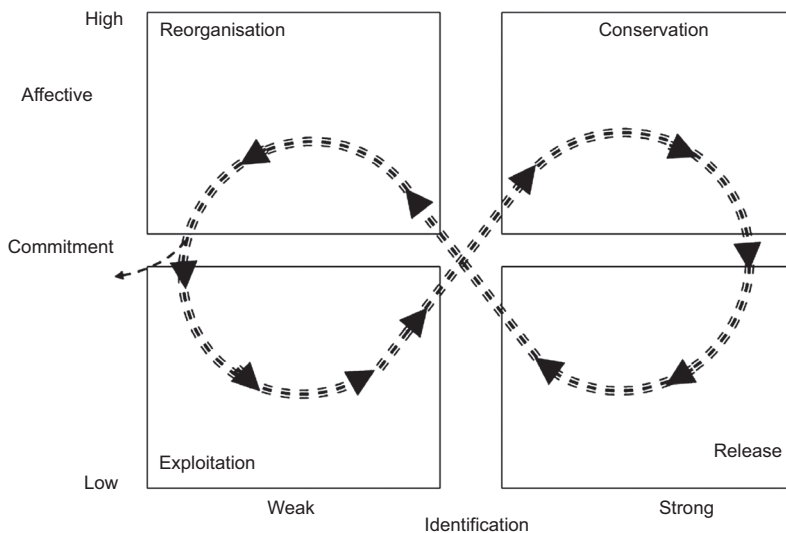

Figure 1: A framework based on identification and affective commitment for analyzing the evolution of collective action and collective identity. Source: Adapted from (Holling 2001; Nkhata et al. 2008).

its configuration of meanings slowly or to collapse, causing the conservation phase to give way to the release phase. The release phase is when the accumulated affective commitment that sustains collective identity is lost. Although affective commitment is weakened individuals still have strong identification with the collective, which in itself presents opportunities for the system to reorganize. The reorganization phase arises when the level of affective commitment increases as individuals seek to renegotiate the meanings underlying the collective after identification has weakened.

Based on the framework in Figure 1, we postulate that the strength of collective identity is a predictor of the trajectory of collective action. To illustrate this postulation, we use a case study presented by Nkhata et al. (2009) of fisheries management on the Rovuma River in Mozambique. This case study provides a useful example of the changing context of collective action as it relates to common pool resources. It shows how collective action for the management of the Rovuma River fishery over time evolved through phases of an adaptive cycle of collective action from a conservation phase through release into a reorganisation phase.

During the pre-colonial period of Mozambique, the state of collective action was more or less in a conservation phase. During this period, there were indications of strong identification and affective commitment within the local community reflecting highly developed collective identity. Under these conditions, rights of access and fishing practices were regulated and the fishery operated as a common pool resource. In those times, the Chief of the area determined who could fish and groups of fishermen had 'exclusive rights' to fish a particular area. People from outside the community had to approach the Chief for permission to fish and such permission was used and reciprocated with a gift of fish to the Chief. It was believed that failure to comply could bring bad luck in fishing and perhaps even more serious misfortune (Nkhata et al. 2009). The traditional fishery was characterized by clear distinction of a 'group of users' to whom property was common. This arrangement allowed for the users to strongly identify with the collective, with positive ramifications for affective commitment. It is suggestive that collective identity was relatively high during this phase. Hence, the assumption that collective action during this phase operated under a regime that provided for the management of common pool resources.

The case study of Nkhata et al. (2009) characterises the period during the colonial administration as a release phase. This is because it was during this period that people associated with the Rovuma River fishery started to exhibit signs of low levels of identification and affective commitment. During this period, it became apparent that collective action was no longer effective. The levels of identification and affective commitment of the community members had changed from ones that viewed the fishery as a common pool of food to one that saw it as an open access regime. The elders within the community elaborated that self-interest had led to an erosion of collective identity and group ownership over the resource. The Mozambican civil war in the post-colonial era drove many people into exile in Tanzania leading to local community linkages to be weakened. While the arrival

of the Catholic Church might have led to new external linkages, the Church had little effect on collective identity because its belief system was strongly resisted. By contrast, the introduction of a market economy by the colonial administrators as well as the return of the refugees from camps in Tanzania after the end of the civil war had affected the levels of identification and affective commitment. The N'dunas, who previously were mere headmen, started to behave like Mwenyes (Chiefs) and instead of going back to their original locations chose to settle elsewhere so they could gain more power and influence. It was claimed that the collapse of power relations fractured the community by weakening collective identity, which in turn affected the state of collective action. This situation led to the degradation of the fishery.

Reorganisation in the Rovuma community-based governance system is evidenced in the present state of the post-colonial era through the Chipanje Chetu Community-Based Natural Resource Management (CBNRM) initiative (Anstey 2005). This initiative aims at 'the transfer of rights and responsibilities for land and resource management to local level user groups (a village community or group from within a village)' (Anstey 2005, p. 183). Although not explicitly stated, the initiative also has the goal of rebuilding collective identity. The fishery now has elements necessary for the development of a collective action system in which some claim traditional rights and others claim rights through use. In such a contested situation, it is hard to envisage establishing an effective collective action system until there is agreement on property rights. But, for purposes of this paper, this will also require that the levels of identification and affective commitment that are supportive of collective identity are strengthened.

Nkhata et al. (2009) contend that the increase in societal heterogeneity was perhaps the main driver for the release. It changed internal relationships and weakened further the collective identity thereby deinstitutionalising the collective action regime that had been undermined during the colonial period. The external social forces influenced the relationships among the local people, who could neither read and write Portuguese nor express their own opinions. Illiteracy was a mechanism the colonial administrators used to resist change to Christianity to the extent that the local people would not attend school. Nkhata et al. (2009) suggest that at one time there were strongly developed norms, relationships, trust and respect, but these were challenged by the new social forces. In the context of this paper, however, this case study is indicative of a deconstruction of collective identity and a subsequent breakdown of collective action. This is as a result of a number of interlinked factors; traditions and authority were weakened; the definition and cohesion of the group of fishermen were disrupted; tenure over the resource was no longer defined either in location or in person; and there was no legitimate control over who harvests where, when, how and how much. It was even not possible to sanction those that were clearly breaching the norms and traditional regulations for fishing. Consequently, there was a self-reinforcing cycle resulting from an absence of collective identity with more and more people engaging in practices that were not supportive of collective action.

4. Implications for collective action processes
in the management of common pool resources

The main contribution of this paper lies in understanding how collective action can be sustained over long periods of time through the evolution of collective identity. In the same vein, understanding the dynamic complexity of identity change is fundamental for the analysis of resilience in collective action. The conceptual framework presents two attributes that are fundamental to sustaining resilience in collective action. The behavioural responses to change depicted in the framework illustrate how collective identity can remain stable enough to allow for organized collective action and yet change slowly over time in response to disturbances (Burke and Cast 1997). Changes in the levels of identification and affective commitment have the potential to cause members of the collective to behave differently towards the collective (Ellemers et al. 1999; Bergami and Bagozzi 2000). We contend that failure to manage the drivers of change influencing identification and affective commitment could result in the collapse of collective action.

Desirable resilience in collective action can be sustained longer in the conservation phase through allowing small changes to identification and affective commitment over time that enable collective action to change according prevailing conditions. Understanding collective identity change allows members of the collective to reinforce their identity in order to reduce the emergence of undesirable behaviour, or to intervene to remedy undesirable behaviour, or to facilitate change that makes the identity relevant to the collective members. Continuous slow change increases the resilience of collective action and the ability of members to develop a behavioural pattern that conforms to coordinated actions. In this way, prospects are enhanced for collective action to develop the capacity to cope with change and prevent the system to change into socially undesirable ways that would impede collective action. Resilience in collective identity would thus sustain collective action as it evolves in relation to the change in collective identity.

It is fundamental to be able to identify when the attributes of collective identity are weakening so as to implement appropriate strategies before the change affects collective action. We propose that change in identification and affective commitment as a determinant of the state of collective identity could be an indicator that drives interventions to direct the collective action system towards a socially desirable state. The two variables highlight the need to understand and develop indicators that could help monitor collective action over time. We propose that identification and affective commitment could be managed by identifying the drivers of change and processes in the system that governs the dynamics of the attributes. The consequences of failure to recognize such drives is exemplified in situations where collective action developed with assistance from external donors collapses once the support is withdrawn in the conservation phase (Child 2004; Nacso 2006, 2007, 2008; Baral et al. 2010). Such collapse is usually attributable to lack of capacity in the system to cope with change and to self re-organise.

In most cases, local resource users do not have the necessary support structures to self reorganise the collective identity to sustain the collective action.

We concur with (Shivakoti and Ostrom 2002) that self organised resource user collective action might be likely to have a resilient collective identity to remain longer in the conservation phase, compared to collective action organised by government or non-governmental organisations. It is therefore reasonable for the management of common pool resources to plan for the release, reorganisation and exploitation phases of collective action. This can be in similar lines with the planning for the release and reorganisation phases through adaptive management that is widely used in the management of complex systems (Folke 2006). When a collective action system collapsed, it implies that appropriate structures and processes have to be developed in the system for it to self-organise or to access interventions from outside the system to direct the system to a socially desirable state. The resource users would have to be capacitated to self-organise to reinforce collective identity that sustains collective action. The capacity to manage the drivers of change and processes also needs to be established through structures that could support resources users.

This study is particularly instructive in that it illustrates how collective identity is continually defined and structured by the underlying meanings which in a sense describe the collective, and its members (Burke 2006). Given that meanings shape behaviour and that identity and behaviour are strongly linked, it can be postulated that a resilience approach requires that members of a user group adjust and adapt their behaviours to conform to the evolving meanings held by the collective (Burke and Cast 1997; Burke 2006). Because meanings are rooted in the values and norms of a culture, they are slow to change and confer stability on collective identity. As long as meanings are shared, individuals will identify with the collective identity and adapt behaviours accordingly (Burke and Cast 1997; Burke 2006). However, should discrepancies arise that cannot be resolved, behaviours may not adapt in some situations, resulting in the waning of commitment and collapse of identity and with it the ability to secure collective action to manage the use of CPRs.

It is important to emphasize that people managing the use of CPRs may have multiple collective identities with shared meanings. Multiple collective identities may become active at the same time in an individual only when the individual's self-meanings align with those collective identities. Individuals identify with and commit to collective identities that espouse the same meanings. As individuals move to engage a larger, more encompassing collective identity discrepancies may arise among the meanings associated with different identities. For example, livestock farmers who eliminate predators being subsumed within a collective identity of a conservancy in which wildlife preservation is a core value can illustrate this. To achieve a collective identity that can accommodate both identities (wildlife and livestock) the discrepancies of both the collective identities would have to shift towards each other and therefore the self-meanings and the collective identities of both would change to bring about shared meaning or transform into a new all-encompassing identity. The extent of change would

depend on the amount of commitment towards each of the collective identities (Burke 2006). The collective identity with the stronger commitment is likely to change less compared to the other with less commitment.

5. Conclusion

We set out to contribute to the understanding of how change in collective identity over time affects change in collective action. This was based on the argument that understanding the dynamic nature of the relationship between collective identity and collective action is fundamental to management of common pool resources. The framework we developed supports the proposition that the strength of collective identity is a predictor of collective action, and contributed to understanding change in the relationship between collective identity and collective action. Importantly, the framework facilitates the understanding and building of resilient collective identity in the management of use of CPRs in social-ecological systems. It provides a systematic analysis to the process of collective action formation and how it can be sustained. The framework helps us to think about the attributes that explain change in collective identity and how such an understanding contributes to management of the use of common pool resources through collective action.

The application of adaptive cycle raised three limitations in its application in the study. First, the paper had a limitation in accurately reflecting the level of identification and affective commitment in the release and reorganisation of the cycle. The cycle shows that the relationship between these variables diverges while sustaining weakened collective identity. Although we could observe similar trends to what is proposed in the adaptive cycle, there was no substantial evidence to support the divergence relationship beyond doubt. The application of social system on the adaptive cycle would require focussed research on operationalising the variables better to collect information that could support the correlation between the variables.

Second, the application of adaptive cycle in collective identity, especially in a qualitative study lends itself to subjectivity of analysing the information in terms of the four cycles. However, the advantage is the flexibility of qualitative methods to adapt to local situations and provide better understanding to the process of collective action emergence and its sustainability. Future research should consider combination of qualitative and quantitative when using adaptive cycle to understand collective action.

Third, the adaptive cycle suggests a dramatic collapse of the system into release phase, however our findings shows that the collapse of collective identity is not always rapid. Rather we observed a long slow process of collapse that was perpetuated by lack of intervention to direct the system into a socially desirable state from within and outside the system. We assume that in most cases collapse in collective action to manage the use of common pool resources would follow the slow process which provides opportunities for interventions.

Further research on collective identity attributes, in particular identification and affective commitment, is needed to deepen understanding of collective action processes in the context of CPRs and social-ecological systems. In particular, research is required to advance understanding of the dynamics and complexities that underpin the management of social-ecological systems from the perspective of collective identity change. A collective identity perspective is one of multiple perspectives for understanding complex social-ecological system (Anstey 2005; Gruber 2010). Collective identity system has the potential to self-organize. The collective identity system in terms of attributes of resource users and of the state of the resources is an influential driver in the collective action to manage the use of common pool resources. We suggest that collective identity of resource users and the state of the resource provides an effective foundation for the management of behaviour in social-ecological systems (Melucci 1996; Polletta and Jasper 2001).

Collective identity gives the management of a social-ecological system an inclusive identity, constructing the collective 'we' sense of identity, which serves important psychological functions for members of the collective managing the social-ecological system. We contend that collective identity makes 'free riding' less attractive because it provides the rationale for participation in collective action (Gupta et al. 1997; Klandermans 2002). We believe that collective action in the use of CPRs with a resilient collective identity contributes to the resilience of complex social-ecological system. A resilient collective identity system has the potential to prevent a social ecological system from moving into an undesirable configuration.

We hope that our approach on integrating resilience theory and collective identity theory to understand collective action to manage common pool resources promotes a pluralistic understanding of common pool resources management. This is a unique character of the commons with its interdisciplinary origins (Laerhoven and Ostrom 2007).

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