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Collective Action within the Household: Insights from Natural Resource Management

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Summary. — Households face many collective action situations, with members working together to produce livelihoods and allocate goods. But neither unitary nor bargaining models of the household provide frameworks to analyze the conditions under which households work collectively and when they fail to do so. Drawing on the Institutional Analysis and Development Framework based in the natural resource management literature, this paper explores the factors that encourage and inhibit collective action and provides insights into how to understand collective action problems within the household as dynamic, multi-actor situations with outcomes that can be evaluated by multiple criteria, not just efficiency.

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Key words — household, intrahousehold, gender, natural resource management, IAD framework

1. INTRODUCTION

Throughout the world, people organize much of their lives through households, which range from large intergenerational groups of related individuals to individuals raising children alone. Households are a basic institution in every society, although the exact form differs across time and location. Yet the models of household behavior and decision making typically fall into two categories. Either the household is treated as a single entity, with one set of preferences, or it is modeled as two separate individuals, each acting within their own best interest. Neither of these extremes adequately helps us to understand the complex set of relationships within households, where individuals make decisions based not only on their own self-interest but also on the interests of others. Households frequently involve more than just two people. While social scientists have noted that households are the location of both cooperation and conflict (e.g., Sen, 1990), frameworks have not yet been developed to analyze the conditions under which households work collectively to meet the needs of individual members and when they fail to do so.

A growing literature, much of it focused on natural resource management (NRM), explores the conditions under which groups are able to work together for a common goal and when they fail. They ask what affects the costs and returns to such collective action. Yet, this literature has not explored one of the most common forms of collective action institution: the household.

In this paper, we bring together these two sets of literature.¹ Drawing on the Institutional Analysis and Development (IAD) Framework that was originally developed for the collective action in NRM literature, we explore the factors that encourage and inhibit collective action, both within resource management groups and within households. Considering households as institutions in the context of the IAD framework raises questions including, ‘Given the same resource levels, why are some households better than others at provisioning and caring for their members?’ We also ask what insights or directions the collective action literature might gain from the household and intrahousehold literatures.² This

pushes the collective action literature in new directions as well. By using the collective action framework to explore household decision-making, we enrich both bodies of knowledge, raise new questions, and point to directions for future research.

2. ANALYSES OF HOUSEHOLDS AND INTRAHOUSEHOLD RELATIONS

Households face many collective action problems. Household members must work together to produce livelihoods, which may include producing food and goods for home consumption or the market and selling labor for a wage. In addition, household members must allocate the goods that they produce and purchase among themselves. These include both public goods within the household and private goods for individual members.

Many models of the household treat the household as the decision-making unit. Analytically, this assumes either that all household members have the same preferences, pool all resources, and agree on all decisions, or that one household member makes the decisions for everyone.³ Implicitly, these models assume that the collective action problem has been solved.

One set of innovations in household models was to include both production and consumption, initially through agricultural household models (e.g., Singh, Squire, & Strauss, 1986)

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which treated these decisions as recursive (households first decide how much to produce, and then allocate what is produced across public and private household goods). Extensions of the models explored the linkages between these decisions. For example, consumption decisions, such as food allocation or health care expenditure, may impact production.

The women in development literature provided initial evidence that households did not necessarily make joint decisions and that men's and women roles and responsibilities impacted production decisions.⁴ While this literature initially focused on demonstrating that ignoring gender roles could result in inefficient outcomes for projects, it also had implications for understanding how households behave and how gender roles and power dynamics shape household decisions.

The literature on health, education, and nutrition raised issues of resource allocation within households. Questions about how to target resources to specific household members led researchers to analyze intrahousehold consumption. Girls and boys often receive different levels of nutrition and education and the bargaining power of men and women within the household impacts the allocations.⁵

An extensive literature considers that individual household members may have different preferences and different abilities to impact outcomes.⁶ Much of this uses a game theoretic framework. Collective models of the household begin with the assumption that the household will reach an efficient outcome. Thus, the household could not produce more simply by reallocating labor or other resources and goods and services could not be reallocated across household members to make at least one better off without making anyone worse off. Assumptions that preferences differ by gender then allow tests of how men's and women's bargaining power affects outcomes.⁷

In cooperative bargaining models, a subset of the collective models, each individual is defined as having an outside option or a 'threat point.' This is the amount of resources that they could access if they were not part of the household. Each individual must obtain at least their outside option within the household or they will leave. Depending on the context, 'leaving' could involve divorce or desertion or it could involve simply opting out of pooling resources and making joint decisions. The important policy insight from this model is that outside options affect household resource allocation. For example women's wages affect household resource allocation, even in households where women are not employed.

A number of studies examine factors that provide women with bargaining power within the household. Women's bargaining power may be related to income, assets, and education, among others. While endogeneity problems often make it difficult to establish causal relationships, there is increasing evidence that women's bargaining power, using a variety of proxies, affects the outcomes of household decisions.

A second set of models do not assume that resources are pooled and explicitly allow for outcomes where these potential gains have not been realized. While there are many variations of these models, they typically draw heavily upon the public goods literature of welfare economics. They model how individuals contribute to a shared good, such as housing, a farm, small business, or child rearing. Each individual makes separate but interrelated production and consumption decisions based on his or her own preferences and interests and expectations of what others will do.

Many studies find outcomes that are consistent with noncooperative bargaining models. Jones (1983) found that women contributed less than optimal amounts of labor to household rice production, preferring to produce lower value sorghum, since women felt that they were not adequately compensated

within the household for their work on irrigated rice fields. Udry (1996) found that total household crop yields could have been increased by shifting fertilizer from men's fields to women's fields. McPeak and Doss (2006) found that male household heads among East African pastoralists located the household farther from town to limit women's milk marketing.

The use of experimental games is beginning to illuminate the processes of household decision-making, particularly regarding the sharing of resources and information and transparency. Recent studies have identified strategic behavior between spouses (Ashraf, 2009), couples making choices that do not maximize surplus (Iversen, Jackson, Kebede, Munro, & Verschoor, 2010) and that outcomes differ depending on the process through which income was acquired (Dasgupta & Mani, 2013).

Much of the empirical work has focused on trying to identify inefficient outcomes. Some of it was motivated by failed programs, concluding that the assumptions inherent in cooperative bargaining models did not hold. The cooperative bargaining models suggest that policy can influence the bargaining power of individuals within the household by shifting their outside options. The noncooperative bargaining literature indicates that households do sometimes obtain outcomes that are not Pareto-efficient. Once it has been established that households can reach these outcomes, the more pressing question becomes why they do not cooperate. For example, in Burkina Faso, why don't men provide fertilizer to women's fields and share in the additional crop that is produced? And in Northern Kenya, why don't women pay their husbands to locate closer to town so that they can more easily market their surplus milk?⁸

To understand this, we would need to examine why some households are able to obtain cooperative outcomes and others are not.⁹ The literature on collective action, especially in natural resource management, can provide some insights. We are interested in identifying policy that can strengthen the functioning of households and improve the well-being of everyone within them. The NRM literature has much to offer in terms of shifting attention to the factors that affect when and under what circumstances cooperation occurs.

3. COLLECTIVE ACTION WITHIN NATURAL RESOURCE MANAGEMENT

Groups of people who depend on common pool resources¹⁰ like irrigation systems, forests, fisheries, and rangelands also need to work together. The literature on collective action for natural resource management focuses on problems of provision (mobilizing labor, cash, or other inputs to invest in, build up, and manage the natural resources) and allocation (sharing the resources among the users).

A central concern, especially in much of the early literature, has been free riding, which in the case of natural resources, can take two forms: (1) underinvestment because the individual would bear the costs, but only receive a share of the benefits or (2) overconsumption and consequent depletion of the resource because an individual receives all of the benefit from consumption, but bears only a portion of the cost of its overuse. Identifying the factors that constrain free ridership was more than an academic exercise: it has been important for programs that manage resources with community involvement (and for other group-based approaches, such as microfinance). Effective community management was seen as an alternative to (1) state management (which was often not effective at the local level), (2) privatization of the resources, which often had negative equity outcomes, and (3) dividing up

heterogeneous resources (such as rangelands or biodiverse forests) that were better operated as larger units.

There have now been thousands of studies of common property regimes demonstrating the sustainable management of the commons, in some cases over centuries, through collective rules for resource use and provision.¹¹ In other cases, resources were not effectively managed by local groups. This literature addresses the critical question of what factors affect successful or unsuccessful collective action for managing the resources.

Many studies of collective management of resources in the 1980s were empirical case studies (e.g., Wade, 1988), followed by metareviews of case studies (e.g., Ostrom, 1990, 1992; Tang, 1992; Uphoff, 1986a, 1986b) that attempted to identify common themes and factors that enabled successful collective action. Others (e.g., Axelrod, 1984; Elster, 1989; Runge, 1986; and Taylor, 1988) drew on game theory to address these questions, analyzing how structural conditions affect free ridership. Many analyses predicting a lack of cooperation focus on the 'prisoners' dilemma': a one-round game with no communication between players and a payoff structure such that the rational strategy for each player is to not cooperate. However, different conditions and payoff structures, such as those found in the 'assurance game' or the 'chicken game,' are more likely to lead to cooperation, especially with communication among players and repeated rounds.

In the 1990s several seminal publications drew together the empirical and game theory stands of research (e.g., Baland & Platteau, 1999; Bromley, 1992; Ostrom, Gardner, & Walker, 1994). Together, these studies identified many factors that were hypothesized to affect collective action. Although not always arranged as such, these factors are broadly consistent with the IAD framework.

To test the factors that were hypothesized from case studies, metareviews, and game theory, a number of empirical studies have collected comparable data from a larger number of sites, to allow quantitative as well as qualitative analysis (e.g., Bardhan, 2000; Gebremedhin, Pender, & Tesfay, 2004; Lam, 1998; Meinzen-Dick, Raju, & Gulati, 2002; McCarthy, Dutilly-Diané, & Drabo, 2004; Place *et al.*, 2004; Poteete & Ostrom, 2004). Because the dependent variable (collective action) is at the level of the user group or community, it is relatively expensive to get enough cases to test the large number of factors hypothesized.

More recently, both computer-based lab simulations and games conducted in field situations are being used to test hypotheses about collective action in resource management, with narratives and payoffs simulating resource use (e.g., Cárdenas, 2003; Cárdenas & Ostrom, 2004; Ostrom, 2010; Poteete, Janssen, & Ostrom, 2010). These allow researchers to isolate the effect of particular factors (e.g., changes in a rule) on behavior, although contextual factors are often needed to explain these effects (Janssen & Anderies, 2011).

This NRM research is conducted by a wide range of disciplines, including economics, political science, sociology, anthropology, and ecology, as well as many interdisciplinary studies. Much of this research has both an academic and practical application, as policymakers and development agencies are interested in ensuring that communities play a role in managing local resources.

4. OVERVIEW OF THE INSTITUTIONAL ANALYSIS AND DEVELOPMENT FRAMEWORK

The IAD Framework was developed out of the NRM collective action literature.¹² It has been used to conceptualize

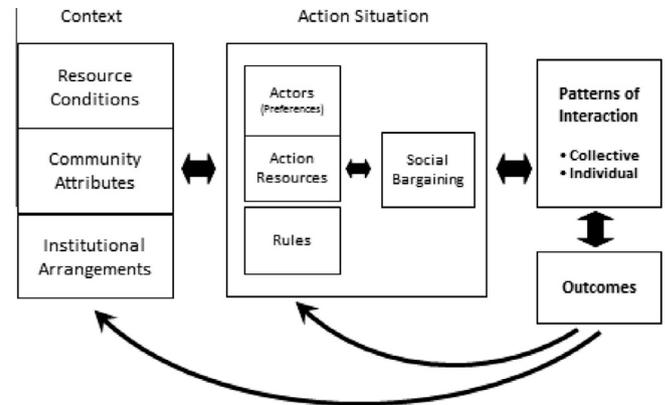


Figure 1. *Institutional analysis and development framework.* Source: Adapted from Ostrom (2011), Di Gregorio *et al.* (2012), Pandolfelli *et al.* (2007).

the factors affecting collective action. In the following sections, we show how its applications for discussing collective action within natural resource management groups can be extended to address collective action within households.

As illustrated in Figure 1, the IAD framework begins with a set of initial conditions that influence the action situation, which establish patterns of interaction that yield outcomes that, in turn, can modify the conditions for the next round of interaction. Much of the collective action literature focuses on three broad categories of initial conditions (although the exact labels for the categories vary somewhat). *Resource conditions* focus on the physical characteristics of the resource to be managed collectively. *Community attributes* are the socioeconomic characteristics of the group to manage the resource. *Institutional arrangements* refer to a range of rules in use and governance arrangements, both formal and informal. We discuss the specific factors under each of these categories, and how they can influence collective action, in the next section.

In the action situation, various actors, each with their own preferences, draw on their action resources for social bargaining—explicit or implicit negotiations that can be between individuals or groups. *Actors* include both group members and outsiders; both those who are and are not bound by the rules of the group. *Action resources* are those assets relevant to the specific situation that increase the bargaining power of the actors. They can include tangible assets, such as land or money, and intangible (and context-specific) assets such as time, knowledge, social standing, networks, cognitive schemata (one's way of thinking about the world), and habitus (way of carrying oneself and interacting with others) (Di Gregorio *et al.*, 2012). The ways actors interact and the relative importance of different action resources is shaped by the rules—formal and informal decision-making arrangements. For example, in a group that makes decisions based on financial or labor contributions, money or labor is an important action resource, whereas if decisions are made by consensus in an open meeting, then strong networks to mobilize others or the ability to speak eloquently would be more important.

Social bargaining in the action situation leads to patterns of interaction, related to production or consumption, that shape and reshape the institutional environment. These patterns of interaction, in turn, result in outcomes that can be evaluated in terms of their efficiency, equity, or other dimensions. The outcomes then shape the conditions for the next round of interaction. For example, overharvesting can deplete the

resource stock while investing can increase amount available. Group interactions may exclude other potential members, change the attributes of the community, or establish new rules or governance arrangements.

This framework is useful in helping us to look within the ‘black box’ of institutions and analyze the factors that shape collective action. Pandolfelli *et al.* (2007) applied this IAD framework to gender and collective action, examining how gender shapes each element. Work, such as that by Folbre (1994), examines how gender—and race and class—shape collective action. Her work demonstrated the importance of collective action for shaping the opportunities and constraints faced by households, but did not treat the household as a collective action unit itself.

One of the key insights from the NRM literature is this emphasis on how the outcomes at one point shape the opportunities and constraints in the future. Similarly, the framework can provide insights into looking within the ‘black box’ of the household and conceptualizing household behavior and decisions.

5. APPLYING THE FRAMEWORK

In this section we examine how findings from the literature on collective action in NRM can provide insights into the question of collective action *within* the household, and conversely, how the intrahousehold application of these principles can provide new insights into the study of collective action within NRM groups. We draw upon several compilations of the factors affecting collective action, organized according to the broad categories in the IAD framework, as summarized in Table 1. We review each of these factors that have been identified in the literature on collective action for NRM and consider what analogous factors might apply to collective action within the household.

(a) *Resource conditions*

Studies of collective action for managing resources deal extensively with how the nature of the resources shapes the costs and returns to cooperation. Resource characteristics influence both the structure of the group and the ease with which groups can function effectively.

The characteristics of the resource often affect how the management groups are structured. For example, in irrigation systems that have main canals feeding secondary and tertiary distributary canals, water users associations are often organized as small groups of farmers served by a common outlet, linked with other such groups who share a common higher level canal. Forest user groups may be organized by village, each with rights and responsibilities over a designated forest area.

A number of physical features of the resource affect the ease of management. Clear boundaries of the resource units are generally assumed to make it easier to manage. The degree of subtractability or rivalry (the extent to which one person’s use deprives others of the use of the same resource unit) makes it both more challenging—and more necessary—to work together and devise rules to sustain the resource. Some resources are easily divisible (e.g., agricultural fields) whereas others have a high degree of jointness (e.g., rangelands, which tend to be seasonal or heterogeneous; herders need access to both dry and wet season grazing lands, watering points, and mineral licks). Agricultural fields are likely to be divided and managed by individuals, while in rangelands, herders need to

work together to access the resources in different areas. In addition, larger resource units are harder to monitor and more likely to call for collective management because they do not fall within the boundaries of an individual farm.

A static snapshot of a resource is not enough. The flow patterns—variability over space and time—are also relevant. Resources that are mobile—like water or fish—are more difficult to monitor and manage than those that are stationary, like forests. Resources are easier to manage collectively if changes are predictable over time, space, and quantity.

The technologies used for withdrawing resources, excluding others, and observing or monitoring of the resource are also important. More efficient harvesting technologies put more pressure on the resource, and call for stricter rules to limit depletion. As the costs of excluding others decrease, there is less incentive for joint management, and more for privatizing, as seen in the increased privatization of rangeland in the United States once barbed wire reduced the cost of fencing. Finally, the possibility of substituting one resource for another reduces the dependence on a single source, and changes the incentives to manage the resources. For example, when hay can be substituted for naturally growing grasses and shrubs to feed livestock, it reduces dependence on rangelands.

At first glance there may not seem to be much applicability of these to the household domain. However, when we consider that each of these user groups is managing a set of resources for their livelihoods, then the analogies become more apparent. Households are managing a complex set of resources in order to produce livelihoods.

As noted above, the agricultural household literature deals with the links between production and consumption in farm households. In the case of resource management groups, this is often referred to as provision and appropriation (Ostrom *et al.*, 1994). Provision requires groups to organize to create a resource (e.g., build an irrigation system), maintain it, or improve its productive capacities; appropriation requires setting the level, timing, location, or technologies for harvesting or using the resource. In households, provision requires allocating responsibility for effort or inputs to production and appropriation is the means of distributing the benefits of the resources and efforts among household members. The nature of the resources will shape those activities.

As the divisibility of resource units affects group size and structure in NRM groups, so also the structure of household resources and economic opportunities affect whether extended or nuclear families are the norm, and whether living alone is a viable option. Extended families are more common in agrarian societies, where farms call for cooperative labor, and subdivision of farms would make holdings unviable. These can be considered as nested institutions, akin to the federations of water users’ associations in irrigations system.

In both NRM groups and households, when resources fluctuate seasonally or annually, they may be associated with higher levels of risk. People with very risky resource bases, in either household or group contexts, often invest in social networks with loosely reciprocal obligations, as a way of reducing their vulnerability, as seen among pastoral tribes that have reciprocal access options to the rangeland (Ngaido, 1999), and families that send remittances or assistance to each other in hard times (Godquin and Quisumbing, 2008). When household livelihoods depend on more individualized resources, especially education (individual human capital), and there are formal insurance mechanisms, smaller families are more common.

The time lag between when investments are made and returns are realized will shape the opportunities for collective

Table 1. *Factors affecting collective action for resource management, with analogous factors for the household*

	Natural Resources Management ²⁰	Household
Resource conditions	<p>Structure:</p> <ul style="list-style-type: none"> ● Clarity of boundaries ● Subtractability/rivalry ● Divisibility/jointness ● Size <p>Flow patterns:</p> <ul style="list-style-type: none"> ● Mobility ● Predictability of time, space, quantity ● Possibilities of storage <p>Condition/capacity of the resource technology</p> <ul style="list-style-type: none"> ● For withdrawing resources ● For exclusion ● For observability/monitoring <p>Possibility of substitution</p>	<p>Not concerned with specific resources, but a set of resources, social reproduction</p> <p>Broader economic context:</p> <ul style="list-style-type: none"> ● Income ● Resources ● Opportunities ● Assets ● Livelihood strategies ● Risk
Community attributes	<p><i>Social capital/cohesion</i></p> <ul style="list-style-type: none"> ● Number of members ● Boundaries of the group ● Stability/time horizon <ul style="list-style-type: none"> - Migration and mobility possibilities ● Past successful/unsuccessful experiences ● Group identity ● Extent of interaction ● Mutual obligations ● Homogeneity/heterogeneity <ul style="list-style-type: none"> - Of assets - Of interests - Of identity <p><i>Human capital</i></p> <ul style="list-style-type: none"> ● Health ● Education ● Knowledge of resource ● Leadership ● Dependence on resource ● Competition between alternative organizations <p><i>Structures</i></p> <ul style="list-style-type: none"> ● Proximity <ul style="list-style-type: none"> - Between users - To resource ● Power structures ● Norms of behavior/culture 	<p><i>Social capital/cohesion</i></p> <ul style="list-style-type: none"> ● Number of members ● Household boundaries ● Stability/time horizon of household <ul style="list-style-type: none"> - Migration and mobility possibilities ● Family history, stability, economic history ● Family and household identity ● Extent of interaction ● Mutual obligations ● Homogeneity/heterogeneity <ul style="list-style-type: none"> - Of assets - Of interests - Of identity <p><i>Human capital</i></p> <ul style="list-style-type: none"> ● Health ● Education ● Individuals' skills, assets ● Headship ● Independence/jointness of household members' incomes ● Fallback position/outside options <p><i>Structures</i></p> <ul style="list-style-type: none"> ● Proximity <ul style="list-style-type: none"> - Coresidence - Proximity to natal home ● Power structures ● Norms of behavior/culture
Institutional arrangements	<p><i>Internal</i></p> <ul style="list-style-type: none"> ● Decision-making arrangements ● Operational rules <ul style="list-style-type: none"> - Member and access rules - Resource boundary rules - Appropriation (withdrawing) and provision rules - Monitoring, sanctioning rules ● Collective choice rules <ul style="list-style-type: none"> - Accountability of officials to users - Adjudication arrangements - Constitutional rules - Rules on group formation, registration <p><i>External</i></p> <ul style="list-style-type: none"> ● Recognition by external agents ● Relationship between users and state ● External rules and intervention ● Ability to change rules ● Adjudication arrangements ● Property rights ● Legal/political environment ● Market penetration 	<p><i>Internal</i></p> <ul style="list-style-type: none"> ● Decision-making arrangements ● Operational rules <ul style="list-style-type: none"> - Gender patterns of labor - Who pays for what? - Attitudes toward domestic violence, conflict ● Collective choice rules <ul style="list-style-type: none"> - Hierarchy of decision-making, with gender impacts - Rights and responsibilities - Conflict resolution ● Constitutional rules <ul style="list-style-type: none"> - Legal and social rules on marriage, divorce, household formation <p><i>External</i></p> <ul style="list-style-type: none"> ● Type of marriage ● State support provided for hhs? ● Laws and social norms ● How does the state intervene in hhs? ● Regulation of domestic violence ● Inheritance ● Tax policies ● Economic context

^aThis section draws from factors cited by Agrawal (2001), Baland and Platteau (1996), Bardhan (2000), Ostrom (2007), Wade (1988). Sources for each of the factors are not cited individually.

action. For example, managing an existing resource has a shorter time frame than planting trees which will only bear fruits in many years. The longer time between investment and returns makes collective action more difficult, since those investing may not reap the benefits. A close parallel is households' investments in children. While young children may produce some benefits, including both enjoyment and status for the parents and grandparents, the economic benefits of raising children are not realized for many years. Thus, it is a challenge to find ways to work cooperatively to plant trees or raise children. While the NRM literature does focus on questions about how people organize themselves to plant trees, the household literature usually doesn't ask about how people organize themselves to raise children.¹³ Instead, it asks about the outcomes for children; analyzing whether children receive adequate food, education, or health. Research examining household formation does not usually link to questions of cooperation.

(b) *Community attributes*

Turning to the community attributes, many factors influencing collective action for managing resources also affect collective action within the household.

(i) *Social capital and cohesion*

The number of members of the group and the household both point to the likely complexity of working together and to the potential for economies of scale or scope. Clear boundaries of the group and stability of group membership over time are generally expected to facilitate collective action; it is then easier to assign responsibilities and allocate benefits. With a longer time horizon, people build trust and are more assured that they will eventually benefit from investments. Thus, high migration rates in a community are likely to make it more difficult to build or maintain collective action.

The degree to which household boundaries are clear and fixed also varies greatly, especially with polygamy, divorce, intergenerational households, or extended family and even unrelated people living in the household. Typically, household models have considered the bargaining between a husband and wife. Others model intergenerational bargaining between a parent and child. But another way to conceptualize more complicated households is by treating them as a collective action group.

Concerns about the potential (in)stability of the household also is a factor for newlyweds, when a patriarch dies, or where divorce is common. Just as past successful or unsuccessful experiences with collective action will shape a group's likelihood of working together, so also family history of stability or instability affects the degree to which household members work together for a common purpose. Most empirical work on the household doesn't include measures of the stability or fluidity of the household.

The extent of interaction between group or household members also increases cohesion. *Meinzen-Dick et al. (2002)* found that where irrigation units served only one village, there was more likely to be a water users' association. Similarly households that live and work together are likely to have a stronger sense of cooperation than those with less interaction. Greater interaction creates multistranded linkages, whereby people interact not just over the sharing of material resources, but over social, religious, and other events as well. This generally builds trust and makes people less likely to try to narrowly maximize their returns to one joint activity at the expense of the overall relationship. But—both in communities and house-

holds—irritants and disputes from one sphere can spill over and reduce the likelihood of collective action in other domains.

Mutual obligations and interdependence among group members increase the likelihood of collective action. For example, irrigation systems are notorious for distribution problems between head and tail of the systems. In traditional irrigation systems in Nepal which had a diversion weir made out of materials that wash out in heavy rains, *Lam (1998)* found that water sharing was relatively equitable because head-enders needed the labor and material contributions of tail-enders to rebuild the weir, or no one would get water. But when an external program rebuilt the weir out of concrete, the head-enders were less dependent on the tail-enders, and hence had less incentive to share the water. There are similar patterns within the household. For example, *Quisumbing and Otsuka (2001)* found that with the introduction of cocoa in Ghana, men required more of women's labor to tend the trees. With this increased interdependence, many men 'gifted' land to their wives as an incentive for wives to tend their husbands' cocoa trees.

Little work in economics has looked at the impact of mutual obligations and interdependence of relationships on households functioning. Instead, the issue of dependence is often treated as one-sided, with women being more dependent on the relationships than men. A wife's high degree of dependence may limit her choices, leaving her locked into a relationship. Similarly, some social and economic structures may increase sons' dependence, limiting their ability to set up an independent household. But this is different from the notions of mutual dependence in the collective action literature. A useful area for further research on households is whether mutual dependence in one area of household activity fosters cooperation in other areas.

There is considerable theoretical and empirical debate about whether homogeneity or heterogeneity is more conducive to collective action in NRM (*Baland & Platteau, 1999*). Reviewing this literature, *McCarthy and Kilic (2015, p. 2)* note: 'Economic heterogeneity leads to divergent costs and benefits across members, and complicates the negotiation of agreements underlying communal contributions. Heterogeneity in socio-cultural norms and differing degrees of trust across different demographic and ethnic strata can further increase costs associated with negotiating, monitoring and enforcing agreements.' Without a shared understanding of the common interests, it is hard to cooperate in a sustained manner. Heterogeneity of identity is also problematic, as seen in many conflicts along ethnic lines, because of both differences in external labels and internal advantages that a shared culture provides. However, differences in assets can facilitate collective action, especially if wealthy members benefit enough, either materially or in social or religious standing, for them to bear a large share of the costs.¹⁴

Within the household, similarly, heterogeneity of assets may foster cooperation. *Becker's (1993)* models of the household assume that husbands and wives bring different assets to the marriage, primarily skills relevant to the wage sector and household production and child rearing. The question of whether heterogeneity of physical and financial assets brought to marriage facilitates cooperative outcomes has not been addressed.¹⁵ The empirical work on the intrahousehold allocation of resources typically assumes that interests and preferences differ by gender. Analyses demonstrating that when women have more bargaining power more of the resources are spent on children, implicitly assumes these gender differences. Yet, there is also an implicit assumption that house-

holds share some common interests, in both production and reproduction.

Strong social norms against marrying outside of one's social group suggest that people worry about the heterogeneity of identity within households. While some of these norms may be designed to keep resources within a particular ethnic, racial, or religious community, they are often stated in terms of concern that people with different identities and backgrounds will have different expectations and find it harder to create a viable household.

(ii) *Human capital*¹⁶

The health status of group members has received relatively little attention in the NRM literature, although illness is likely to make collective action more difficult, especially where manual labor is required (as for clearing irrigation canals, or patrolling a forest). Prevalence of major diseases such as HIV and AIDS may also reduce incentives for collective action because of heavy discounting of the future benefits (Haddad & Gillespie, 2001).

However, health problems have also provided the impetus for organizing or expanding collective action by groups. GROOTS Kenya is federation of grassroots women's groups, many of which started out as AIDS home-based caregiver organizations, and then expanded their activities into addressing women's property rights and climate-adaptive agricultural practices to meet the needs of their members dealing with AIDS.¹⁷ The Bhavani River Protection Joint Council in India is a civil society movement that was founded in 1994 in response to women's concerns with health problems that they traced to water quality problems. Women participants in multistakeholder dialogs to improve fisheries in Uganda called for installation of sanitation facilities to reduce fecal contamination to improve water quality and human as well as fish health (Ratner *et al.*, 2013).

Health has received more attention in the household literature, especially in the literature on the care economy.¹⁸ Because illnesses are managed within household, being ill makes one more likely to want to be in a household. The HIV/AIDS epidemic in Africa has reshaped many households, prompting grandparents to care for grandchildren or families to take in children of other relatives. At the same time, health shocks are one of the most severe challenges that households face and the factor most likely to drive them into poverty.

Another element of human capital likely to affect collective action is education and skills. For example, Meinen-Dick *et al.* (2002) found the presence of college graduates increases the likelihood of farmers organizing to manage canal irrigation in India. But formal education is not always the most relevant type of human capital for resource management. Experience with the resource provides important skills and knowledge. The household literature has given substantial attention to education as a contributor to women's bargaining power, household income, and children's nutritional status. However, there is little or no literature on how education or other forms of human capital affect a household's likelihood of cooperation. Both absolute and relative education levels of household members are likely to play a role, affecting normative frameworks as well as the fallback options of individuals.

The household literature's attention to education affecting bargaining power suggests that NRM groups should consider how education affects leadership and power relations within the group and interactions with the formal sector. Although external programs often recognize only those in formal positions (e.g., president) as leaders, studies of NRM groups have

gone beyond that. In India, Krishna (2004) found that leaders with connections to outsiders like government agents were important for successful groups. While many of the well-known cases of 'successful' collective action are associated with strong individual leaders, it is difficult to identify the key traits necessary for leadership, much less to say how to replicate them. Further attention to education may provide insights into entry points for strengthening local leadership.

The household literature does not usually explicitly address leadership. It is often implicitly assumed that the 'head of household' is the leader and often defines the senior adult male as the head of household.¹⁹ As with NRM groups, leadership within the household may take many forms. The roles of mothers or mothers-in-law are relevant for food consumption decisions and educated youth may affect interactions with new technologies.

Where all the members of the group depend on a shared resource for their primary source of livelihood, there is likely to be greater incentive for cooperation than where many can 'opt out' of cooperating, because they have other livelihood options. Competition between alternative organizations is also hypothesized to reduce the likelihood of cooperation over resource management because the organizations are more likely to be at cross purposes or divert attention from what needs to be done collectively. The cooperative bargaining models of the household recognize this explicitly in the identifying the fallback position. Where there are alternatives to being in a household (such as where it is socially acceptable and economically viable to live alone), there is less incentive to cooperate within households. Household studies have examined this in terms of the fallback options of members affecting the stability of marriage.

(iii) *Structures*

Finally, a set of structural characteristics of the user groups, including both physical and social structures, are hypothesized to affect collective action in managing resources. The physical proximity of residence among members of a user group and the proximity between residences and the resource tend to reduce the costs of communication among members and the costs of monitoring or working with the resource. However, technology plays a role, as the availability of mobile phones and vehicles makes it easier to communicate and come together over larger distances. We would similarly expect that coresidence of household members increases communication and ties, as seen when comparing joint families with nuclear families and those with nonresident members. As communication technologies improve, physical proximity may become less important. Yet, shared work, whether it is agricultural production, a business enterprise, or the raising of children, strengthens the sense of shared purpose.

Although less tangible, social structures and power structures are no less influential than physical structures. Caste, ethnicity, and lineage are a source of bonding within a group, and may also provide the bases for one group's power or influence over another. Within the household, strong patriarchal or matriarchal social structures will shape household structure and dynamics. Patrilocal, matrilocal, and uxorilocal residence patterns influence the extent to which a couple depends on each other or the husband's or wife's families.

Norms and cultural constructs shape collective action within communities and households. In NRM, norms about the resource (e.g., stewardship over the resource as a religious duty), about preventive maintenance, and about helping one's neighbor are but a few examples. In households, religious or other attitudes toward marriage and family and gendered

patterns of labor can either reinforce or undermine the likelihood of members working and staying together. In both the NRM and household cases, attitudes and approaches toward conflict also influence collective action: are disagreements likely to be suppressed, lead to violence, or are there effective arbitrators, whether from the state, the community, or family?

(c) *Institutional arrangements*

The literature on collective action for resource management pays considerable attention to both the internal (within the group) and external (outside the group) institutional arrangements and rules, dealing with self-governance as well as with a range of comanagement arrangements between resource users and the state. These include both written rules such as constitutions and formal policies as well as unwritten rules such as social norms that influence collective action.

Key decision-making arrangements can be examined at three levels: (Ostrom *et al.*, 1994).

Operational rules govern day-to-day actions. These include rules on access to the resource, rules defining the boundaries of the resource that can be accessed by individuals or groups, the rules relating to appropriation (withdrawing) of the resource, as well as provision—what each person or group needs to supply in terms of labor, cash, or materials to invest in the resource. Monitoring and sanctioning rules have been identified as particularly important in the sustainability of groups as well as sustainability of the resources upon which they depend. Graduated sanctions, beginning with mild correction for minor first offenses, increasing to serious penalties for repeated or more egregious offenses, are particularly identified with long-enduring resource systems (Ostrom, 1992).

Collective choice rules specify how operational rules can be set or changed: who is eligible to participate, and how the decisions are to be made. Does a group come together and discuss matters, or do they have a smaller council or a single decision-maker? Are rules made by consensus, majority rule, or imposed by a powerful actor? What is the accountability of those making or enforcing the rules to the general membership of the group? What adjudication arrangements are there to deal with disputes?

Constitutional rules, in turn, govern how collective choice rules are made. Although there is an extensive literature on the advantages and disadvantages of different arrangements for effective collective action, their suitability depends on a host of local conditions. However, Ostrom (1990) and others note that where users are authorized to make decisions about their own resources, and to change the rules over time, they are more likely to develop rules that are considered fair and fit local circumstances, which is especially important when conditions vary over space and time.

The household literature has given less attention to rules, and where these are considered, the focus is on externally defined constitutional rules that affect the formation and dissolution of households, and who is considered a member, rather than on internal decision-making arrangements. While the institutions internal to households are rarely formalized, they are very similar to those of NRM groups. Operational rules identify the responsibilities of each household member and allocate the benefits. Collective choice rules describe the decision-making processes. Households typically include both adults and children, so the power dynamics in decision-making may be more explicit than in NRM groups. Adults may include children's voices in the decision-making process or exclude them altogether. There tend to be fewer constitutional rules that are internal to households, but they would include

the rules about who participates in decisions and who is considered a household member. Much of the literature on decision-making within the household focuses on identifying factors that give women voice in the decisions (Kishor & Subaiya, 2008), rather than identifying the processes of decision-making. Considering both the content of household rules and the decision-making processes can help to identify the mechanisms by which the contributions and needs of different members are mobilized and recognized.

Although the boundaries between internal and external institutional arrangements are often blurred, it is useful to think about what rules are set and enforced by those who are using the resource, and the role of outsiders. Some studies of forest, irrigation, or wildlife management, for example, assume government agencies set and enforce the rules, without recognizing the roles played by local resource users. At the other extreme, it is possible to idealize community self-management and focus on internal rules, without recognizing how they are shaped by the state, NGOs, or other actors. However, most studies of collective action in NRM recognize the interplay between internal and external forces.

Many groups manage resources collectively without any form of formal organization. Conversely, many formal registered associations are not active. But in general, recognition by external agents, especially the state, strengthens user groups in managing their resources. Official recognition decreases the likelihood that the outside agents will try to undermine the collective efforts, and may accord the recognized group with stronger rights over the natural resources, or access to government or NGO assistance.

Similarly, external recognition of a household would generally be expected to increase its durability. Some couples cohabit for many years without any form of marriage, and other unions dissolve within a short time of formal weddings. However, a primary function of a marriage ceremony is to recognize the formation of a new household by the family, the state, and/or society at large. For example, in much of Africa, there are various forms of recognition and formalization of relationships, including cohabitation, customary, civil and religious marriage, each with different institutions that reinforce the union or penalize those who split up. The legal rules vary by type of marriage. For example, Islamic, Catholic, and Protestant Christian marriages differ in their structure and ease of divorce. As in the case of natural resource management, recognition also affects the rights that members of a household have over household property and access to pensions, health insurance, and other programs.

At a broader level, the property rights systems in a country will affect the incentives and structure for collective action at both the community and household level. Insecurity of tenure undermines collective action in either domain. Groups are more likely to invest in improving a resource (or refrain from overharvesting) if they have assurance that they will have a right to the ensuing benefit stream. Privatization or nationalization of resources reduces incentives for joint investment. Similarly, the nature of marital property regimes affects the incentives of men and women in the household to invest in joint or individually controlled assets. For example, Combs (2006) discusses how the Married Women's Property Act in England resulted in women investing in property that they owned. However, legal mandates for gender equity may not necessarily affect the local level if they run counter to traditional norms, unless the state has very strong enforcement capacity.

Adjudication arrangements are needed to back up any types of rights and to settle disputes that may arise. These may be

based in the family, community, state institutions, or NGOs. Effective and trusted adjudication institutions increase the likelihood of collective action in the household, family, or community.

Other aspects of the legal and political environment affect the likelihood of collective action within NRM groups and household cohesion. This can include legislation about the rights of groups to organize or meet. Government agents interact with both NRM groups and households, in both positive and negative ways. Market penetration has a theoretically ambiguous effect on collective action. On the one hand, for resource-dependent communities, expansion of markets may provide opportunities to raise the value of the resource, making it more profitable to manage the resource. On the other hand, market penetration often provides alternate livelihood options, reducing the need to depend on the resource base or each other.

(d) *Bargaining in the action situation*

The action situation is an area in which the intrahousehold literature can particularly help to enrich the collective action literature. Although many discussions of the IAD framework (e.g., [Oakerson, 1992](#); [Ostrom, 2005](#); [Ostrom et al., 1994](#)) did not disaggregate the action situation, [Di Gregorio et al. \(2012\)](#) and [Pandolfelli et al. \(2007\)](#) considered that within the action situation various *actors* have different *preferences* and different *action resources* upon which they can draw, depending on the *rules*. All of these come together in social bargaining.

The NRM literature on heterogeneity of interests, discussed above, is useful in examining the effect of actors' different preferences on the social bargaining. [Di Gregorio et al. \(2012\)](#) identified some of the action resources upon which participants in collective action situations can draw, including not only tangible resources, human and social capital, but also less tangible resources such as time and cognitive schemata (mental models). The uses of wealth, education, and social connections as action resources to influence the patterns of interaction are clear in NRM, and have fairly straightforward applicability in household negotiations. Similarly, those with more time may be able to negotiate better arrangements. While cognitive schemata are intangible, they may be important: 'Cognitive schemata, or mental models, define the borders of what is imaginable to an actor in both his/her understanding (knowledge) and normative perspective and thus provide the limits of what an actor can perceive as feasible in his/her life' ([Di Gregorio et al., 2012](#)). Religious and social norms regarding gender clearly influence what men and women in different ages and classes view as possibilities, as well as their rewards or sanctions for different actions. For example, in many societies, employment opportunities for women outside the home broaden their options and bargaining power, but in areas of Bangladesh with strong norms of female seclusion, women may not consider the possibility of working outside the home, or if they do, the social stigma associated with women working overwhelms the potentially positive impacts on bargaining power.

The household literature deals more extensively with different preferences and resources. Many of the empirical models of the household assume that men and women have different preferences and these differences in preferences form the basis for testing the impact of bargaining power and other resources on outcomes. Men and women may also contribute different assets to the household and this may also affect outcomes ([Deere & Doss, 2006](#)).

The NRM literature looks at both external and internal actors; considering external actors is less common in household analyses. Yet in both cases, it is not only those who engage in cooperation that matter. 'Outsiders'—whether government officials, NGOs, other communities or households also take part in the action situations and can influence the outcome of social bargaining. For households, the extended family may be important in the action situations, both providing pressure for certain outcomes and providing outside options.

The rules in use affect on how action resources can be deployed in social bargaining, and on the overall distribution of benefits. The NRM literature considers both formal rules, such as government legislative frameworks and bylaws of the groups, as well as unwritten rules governing the use of resources. For intrahousehold analyses, family law and social norms are particularly pertinent. Family law governing marriage formation and dissolution, the rights of different members of the household, and inheritance patterns shapes bargaining power. Family law may derive from statutory, customary, or religious law, or a mix of these. In addition, local norms also play a crucial role in determining what resources are valued and can be deployed. For example, social norms on women's roles and female seclusion will affect the value placed on women's education. And domestic violence is an accepted action resource in some households and societies but not in others.

Although action situations involve social bargaining, the emphasis in the NRM literature has been on the joint or collective outcomes, rather than on the distribution of costs and benefits. Conversely, the household literature has dealt more extensively with bargaining, with a focus on distributional outcomes, and an explicit or implicit emphasis on improving the outcomes for women. In some cases, the emphasis on women is treated primarily as an equity issue, where women have been particularly disadvantaged. But attention to improving outcomes for women has also been justified as improving overall productivity or the welfare of children (see, for example, [FAO \(2011\)](#); [Quisumbing \(2003\)](#)), which can be seen as a collective good at the household, or even the national level.

The IAD framework's explicit attention to multiple evaluative criteria is important in this regard. While efficiency is a common (external) criterion for both NRM and households, equity and sustainability (of the resource base or the household unit) are also important. While biophysical measurement of trees and anthropometric measures of children are very different, both provide indicators of the future resource base. Other indicators of satisfaction and welfare are also worth considering, particularly when suggested as an objective by people themselves.

6. LESSONS LEARNED FROM THE COMPARISON

Both NRM groups and households face collective action challenges. Yet the research on these conceptualizes and analyzes these challenges in very different ways. The overarching questions in the NRM literature are about the management of the resource, whether it is water, a forest, or a rangeland. But in the household literature, the questions are about the household members, not their resources, and the outcomes are typically measures of household or individual well-being. Only the NRM literature explicitly frames these challenges as collective action issues, but each set of literature has important lessons to learn from the other. We can consider three sets of ways in which these literatures challenge each other. First is

by encouraging us to reframe our questions and conceptual framework. Second, is to consider potential policy interventions and how we might implement and evaluate them. And finally, there are a number of specific issues that are central in one literature and not the other.

First, the IAD framework suggests a way to resolve the problem of the household and intrahousehold literature which typically looks at bargaining between two people within the household. It suggests that we can consider the household as a group that is seeking provision and allocation of resources across its members, who have different levels of leadership and decision-making. This approach can accommodate nuclear families or extended, polygamous families. It also recognizes that households, like other institutions, have a range of desired outcomes, which may actually conflict with each other. And it takes for granted that the individuals within households may share some, but not all, of the same interests.

The NRM literature asks different questions than the household literature and can encourage us to reformulate our questions. In particular, it suggests that it might be fruitful to ask what enables households to reach cooperative outcomes. This could have direct policy implications, helping us to think through what types of policy interventions can support cooperation within the household as well as the community.

Within the household literature, it is important to think beyond the economists' definition of cooperative outcomes. Some of the literature simply asks whether the outcome is Pareto efficient—whether all of the benefits from cooperation have been reached and no one can be made better off without making someone else worse off. But an outcome where one person had all of the benefits and the other had none would be considered a cooperative outcome. It does not consider distributional concerns. Instead, we need to incorporate some subjective measures of how to support everyone in the household and create environments where everyone in the household can flourish.

The NRM literature is explicitly dynamic, while the household literature is much less so. This is seen not only in the conceptual frameworks but also in the game theory and experimental games used: one-shot games are less likely to lead to cooperative outcomes than repeated games. A dynamic framework may help to explain some of the puzzles of the household literature. For example, earlier we wondered why women don't purchase fertilizer for their fields from the men in their households or why women don't compensate men for locating closer to town so that they can market milk. The answer may be a dynamic story, with men resisting changes that provide women with greater resources, to prevent women from using those resources to bargain for more equitable outcomes in later periods. The feedback loops in the IAD model provide insights into why such patterns may persist—and how they can change.

The two literatures vary in terms of what they consider to be the outcome measure or dependent variable. In the NRM literature, the action itself may be considered the outcome. It may also be considered an intermediate outcome or the means to the end. But the intrahousehold literature has not looked at cooperation as an outcome.

There are many challenges with treating the action itself as an outcome. Often it is measured simply as whether or not a collective action group exists, or meetings are held, rather than determining whether or not the group actually works together cooperatively. However, the International Forestry Resources and Institutions (IFRI) research network has devised elaborate protocols for consistently measuring conditioning factors, rule structures, collective action, and outcomes in terms of the resource base. Building such a comprehensive database for

examining factors affecting collective action in forestry allows for cross-cultural comparisons as well (e.g., Coleman & Mwangi, 2013; Poteete & Ostrom, 2004; Wollenberg, Merino, Agrawal, & Ostrom, 2007). Similar methodological development for comparative empirical analysis of collective action in the household could also yield rich results if based on the factors identified in Table 1.

Second, bringing together these two sets of literature has some important policy implications. The first lies in the framing of discussions of the household and interventions designed to address intrahousehold relations, especially to promote gender equality. Many of these policies and interventions have targeted women, seeking to strengthen their incomes or bargaining power. This framing implies a zero-sum game, and can lead to opposition or backlash from men. By contrast, framing the policies or interventions as seeking to strengthen collective action for shared gains can gain greater support from men as well as women. Children's welfare is often one of the household 'public goods' that can be highlighted for cooperation. For example, a household garden project by Hellen Keller International in Burkina Faso emphasized improving maternal and child nutrition, but contributed to changes in attitudes that favored women's access to and control over land (van den Bold, Pedehombga, Ouedraogo, Quisumbing, & Olney, 2015).

Designing policy interventions to strengthen cooperation and collective action among household members points in new directions. For example, in both the NRM and household literature, the definition and recognition of the relevant 'group' has both research and policy implications. We usually define a household by its activities. Thus a household is defined as a group of people living or eating together, regardless of the formality of their relations. It may be a loosely defined group of people connected by kinship or friendship. Or it may be based on the formal marriage of a man and a woman with their children. Some NRM studies focus on groups that have a formal structure; often those that are formally registered with the authorities, but other types of collective action groups may be more relevant for managing resources. As with households, so also with NRM groups: What matters is who is together, not just the legal definition. Legal recognition can reinforce a marriage and a NRM group by conferring specific state-recognized rights. However, if the hurdles to getting state recognition are too high, couples will live together and groups will manage together without the recognition. Policies that make recognition affordable and accessible are therefore important in both sectors.

Finally, there are a number of specific issues for which it becomes apparent that they are missing from one literature when we read the other. The intrahousehold literature takes for granted heterogeneity of age and sex within households and asks how it matters. The empirical work either looks at the bargaining decision between a husband and wife or between generations. Thus, we expect that both gender and age will play important roles in household decision-making. While there is some work on gender and NRM (Agarwal, 2010; Coleman & Mwangi, 2013; Resurreccion & Elmhirst, 2008; Valdivia & Gilles, 2001), the literature would be strengthened if gender were explicitly considered as a matter of routine. But the household literature has not dealt as extensively with economic and socio-cultural heterogeneity, and how that might affect collective action; this is an area where the NRM literature can provide insights.

The NRM literature has relatively little on the health of group members or of how education affects leadership and power within the group. Both of these issues are central in the literature on household and intrahousehold issues. The

explicit consideration of these factors of human capital would enrich the NRM literature.

Specific issues missing from the household literature include how the nature of the resource base affects collective action. For example, how do different types of livelihood risks affect household structure and the need for cooperation, both between men and women and across generations?

Although households are composed of multiple individuals, much of the literature focuses on dyadic relationships, whereas the NRM literature has done more to address interactions among larger groups, and between levels of nested institutions. Drawing from this literature can improve household analyses, especially of extended family and kinship structures.

The household literature has also paid less attention to the operational, collective choice, and constitutional rules of different types of households. Yet both the specific rules and the decision-making arrangements can play an important role in shaping incentives to cooperate. The NRM literature suggests that participation in decision-making increases cooperation and rule compliance, and that when users with knowledge of the resource shape the rules, outcomes for the resource are improved. It is worth investigating whether more participatory household decision-making similarly contributes to greater cooperation, as well as productive outcomes, especially in agricultural households where men and women have different roles and knowledge of the resources.

Neither set of literature adequately addresses the issue of power relations among the individuals. The intrahousehold literature does examine 'bargaining power' which is often proxied by education or age differentials. To the extent that one's outside options are determined by power relations within society, they are implicitly considered within some of these models. Several feminist economists explore how the broader community and societal rules and norms impact household decision making (Agarwal, 1997; Folbre, 1994), but these are typically not included in the models. The NRM literature similarly examines elite capture, but often does not consider how power is exercised to enable elite capture.

Both literatures would benefit from considering other aspects of power relations among individuals. The action resources identified in the IAD framework suggests factors that affect bargaining power, along with how the structure of (written and unwritten) rules affect the value of different

action resources. Sen (1990) encourages us to consider how capabilities and perceptions impact the range of choices that individuals see as options. This is consistent with notions of human capital and cognitive schemata as action resources, and provides insights into both household decisions and the roles that people play within collective action groups. One challenge is that even when researchers ask questions about these types of power relations, the empirical variables that they use are similar to the ones discussed above, such as education and age differences. Further qualitative research is needed to identify the key perceptions and action resources.

7. CONCLUSION

A discussion between the NRM collective action literatures and the household and intrahousehold literatures suggests some fruitful areas for future research. Considering households as institutions engaged in collective action provides a way to address some of the challenges facing this literature and move to ways to understand the processes through which households make decisions. It also provides a means to go beyond dyadic relationships to address the fact that households may be composed of multiple people of different generations, abilities to contribute, and needs.

Instead of trying to identify whether or not households reach efficient outcomes, with efficiency defined quite narrowly, a collective action approach would support considering a range of potential outcomes for households and would focus on determining what types of other social and government institutions may support or discourage household members reaching desired outcomes.

Reading the household literature in the context of the NRM collective action literature also suggests that the NRM literature would be strengthened by greater emphasis on human capital issues, including gender, health, and education. Understanding household dynamics, restrictions on mobility, and the resources that men and women control can also enrich our understanding gender patterns in collective NRM activities. And those working in both arenas need to strongly consider the power relationships that go on within all institutions, whether they are natural resource management groups or households.

NOTES

1. Each of these two sets of literature is extensive. We do not propose to review the literature in detail, but instead to highlight the key areas where one literature can illuminate the other, drawing on key pieces from each literature, especially those that synthesize a broader set of studies. Furthermore, our focus in this paper is on the theoretical and quantitative studies from both bodies of literature, rather than the qualitative studies.

2. We will use the term household literature to refer both to the broader literature on households and the literature specifically on intrahousehold issues.

3. For example, Deaton's (1989) synthesis of the literature on savings, consumption, and intertemporal choices asks about aggregation up to the economy level, but not aggregation of individuals into a household.

4. Early work in this area includes Dey (1981) and Carney (1988). Quisumbing (2003) provides a good synthesis of the household decision-making literature.

5. See Haddad, Hoddionott, and Alderman (1997) for an excellent discussion of these issues.

6. See Doss (2013) for a review of this literature.

7. If the preferences did not differ by gender, we would not see gendered patterns of outcomes based on bargaining power.

8. These transactions within the household would not have to be in cash, but could be in other goods, services, or favors.

9. In much of the economics literature, a cooperative outcome is one that is Pareto efficient; where the same resources couldn't be used to produce more output or where the resources couldn't be reallocated to make one person better off without making someone else worse off.

10. Common pool resources, such as irrigation systems, forests, or rangelands are characterized by high subtractability and low excludability. That is, one person's use of the resource reduces its availability to others

(subtractability or rivalry), but it is difficult to keep people from using it (non-excludability).

11. See the Digital Library of the Commons, <http://dlc.dlib.indiana.edu/dlc/>.

12. For a review of the IAD framework, see Ostrom (2011). In the remainder of this article, we use the version as adapted by Di Gregorio *et al.* (2012) and Pandolfelli, Meinzen-Dick, and Dohrn (2007), because it includes specific reference to the preferences and action resources of different actors. Some category headings have also been modified to highlight the applicability to household cooperation.

13. An exception to this is Folbre (1994) who considers how societies organize to provide for children.

14. The issue of possible complementarity of different types of assets, which has been explored more in the household literature, has received relatively little attention in the NRM literature.

15. There is a literature on physical and financial assets brought to marriage and how it affects bargaining power within the household; see Quisumbing (2003) and Quisumbing and Maluccio (2003).

16. Human capital is one domain where the household literature gives more explicit attention than the NRM literature. However, many of the characteristics of user groups that are hypothesized to affect NRM relate to aspects of human capital. We group them under this heading to show the potential links between the two bodies of literature.

17. See <http://gatunducommunityinitiatives.blogspot.com/2011/01/intersection-of-land-rights-and-spread.html>.

18. Surveys of this literature include: Friedemann-Sánchez and Griffin (2011), and Razavi (2011).

19. For critiques of assumptions about headship, see Buvinić and Gupta (1997), Budlender (2003), Deere, Alvarado, and Twyman (2012).

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