

Work-in-progress draft

Network Capital and Community Sustainability: A Case of Community Water Projects in Nepal

Manoj K. Shrestha

University of Idaho

mks@uidaho.edu

Abstract

Most network research on policy implementation focuses on the link between network strategies and immediate project outcomes. What is less understood is how network strategies facilitate spillover benefits that are beyond the direct results of the projects. These spillover effects can be observed in terms of a variety of new projects or the amount of external funds beneficiary groups mobilize for their wellbeing. In this context, this article examines how beneficiary groups' self-organizing external networks become catalyst for spillover effects. More specifically, it tests the proposition that spillover effects are more probable for communities that develop expansive networks with external organizations, that assimilate with the existing institutional set-up, and that receive the coordinated support of network partners. The theoretical focus is whether the beneficiary communities follow networks as the underlying organizing principles to pursue self-help development.

Introduction

One of the less studied, yet important, aspects of public programs is how these programs assist beneficiary groups or communities to promote community sustainability. A beneficiary community can be considered moving towards sustainability when the community pursues activities on their own beyond the completion of a specific project the community was supported for. Such self-initiated post-project activities are spillover effects that occur beyond the scope of

the project, but are offspring of the contribution the project makes on the capacity building of the beneficiary community. These effects are manifested in terms of greater amount of resources mobilized or new activities undertaken by the beneficiary groups themselves. However, many public programs regard spillover effects outside of their control because programs often are not design to calibrate those effects. By implication, the nature of these spillover effects is also uncertain. It is not surprising that public programs hardly articulate such benefits in their design as explicit indicators of achievements and, thus, remove such effects from formal evaluation or public scrutiny. However, this does not negate the fact that the social value of many public assistance programs hinges on the added dividend these program creates for the beneficiary groups. After all, public assistance programs are largely justified as means of change – help the affected ones to help themselves.

Debates surrounding the significance of public assistance continue to persist. Many observers view that communities are hardly self-sufficient and, therefore, require external support to get ahead (.....). These observers consider that development assistance, in particular, be used as a means of behavioral change on the part of the beneficiary communities towards their self-help development. What is less known is how behavioral change on the part of the communities results into spillover effects. Many public programs hardly perform systematic impact evaluation of spillover effects. (Add: past studies in this regard). Nevertheless, a growing number of collaborative public programs consciously invest on helping beneficiary communities to build their self-help capacity as a part of a project assistance so that these communities are able to engage externally and to build networks with potential partners for their advancement even after the designed, time-bound intervention ends.

Networks are structured patterns of relations between actors. In policy networks, actors make strategic choice in developing relationships with other actors that enhance their ability to pursue goals which otherwise would not be possible (Lin 2001). The beneficiary communities are also assumed to do the same to pursue their spillover activities. One of the network strategies is the tendency for actors to create direct, expansive networks with a variety of organizations to access various resources (e.g., Agranoff and McGuire 2003, Lubell and Fulton 2007, Berardo 2009, Shrestha 2014). But partners are also connected with other partners. This implies that partners can differ in their ability to help actors reach distant partners to facilitate the access to valuable information or knowledge. Thus, utilizing the differences in the bridging ability of partners is another network strategy the actors can pursue in selecting their partners which can be as influential as direct ties. These indirect connections are attractive because they can be maintained with little or no added costs to actors (Granovetter 1973, Burt 1992). In addition, while expansive network of partners is beneficial, its advantage may be offset if the partners have conflict of interests and, thus, create difficulty for coordinated support. In this situation, cohesion among partners has shown to have improved performance (Provan and Sebastian 1998). Cohesion, reflecting in overlapping ties, improves communication among the partners, resolves conflict, and promotes credible behavior through building trust (Coleman 1988, Putnam 2000).

This article examines a case of public-funded community drinking water supply projects in a developing country, Nepal, and shows how these projects assist the beneficiary communities to advance their self-help goals which are different from the immediate goal specified in the project. More specifically, this study tests the effect of expansive network, indirect reach and partner cohesion on the spillover benefits. While the role of these network strategies have been

investigated for project development and implementation (Berardo 2009, Shrestha 2014), their effect have not been studied for spillover effects. This study also examines whether assimilation with the existing institutional set-up is beneficial for greater spillover effects. In network terms, the theoretical focus is whether communities utilize networks with external organizations as the underlying organizing principle for improved community sustainability. Further, this study contributes to the policy implementation literature by establishing the link between the post-implementation networking behavior and the degree of spillover effects. The knowledge that the beneficiary communities utilize networks to gain spillover benefits can also be beneficial for public managers and policy makers who are under growing pressure to develop smart ways to help communities to help themselves.

Next, this study highlights the context of a collaborative water supply program within which spillover effects occur. Then, the study explains the theory and develops hypotheses linking post-implementation behavior and spillover effects. The subsequent section discusses the research design followed by the analysis of the results. Finally, the conclusion section summarizes the main findings, their limitations and implications for future research.

Collaborative water supply program, network capital, and spillover effects

Provision of safe drinking water supply in outlying rural areas, in particular, is one of the critical infrastructure needs of many developing countries. Despite decades of centralized and technocratic approach to development of this sector, skepticism about the prospects of the centralized approach for creating sustainable solutions to this problem grew which forced these countries to adopt collaborative program approach to public water supply as an alternative. The top-down model makes the central agency in-charge of the execution of water supply projects

which, by implication, discourages the initiative of the beneficiary groups. On the other hand, the collaborative approach to water supply encourages the beneficiaries to take full ownership of their projects. In this approach, beneficiary groups initiate, plan, execute, and maintain the project whereas the supervisory agency provides the beneficiaries technical assistance and funding support. The collaborative programs also invest on the beneficiary communities in order to foster confidence and to develop organizational capacity and social interaction skills. The program assumes that the investment on capacity building not only helps effective completion of the water supply projects but also prepares the communities to take on new initiatives on their own.

Research in farmer-managed irrigation and community forestry systems in Nepal and other developing countries suggest that, when given ownership rights, the users self-organize, invest resources, and create rules for the provision of collective goods (Ostrom 1990, Agrawal and Ostrom 2001). Collaborative programs also require communities to develop the same types of internal social capital described in this literature, but these communities also need various external resources dispersed across various government, non-profit, and private organizations to successfully implement these programs. Many collaborative programs foster the beneficiary communities so that they are able to effectively engage with external groups and organizations for new ideas they might want to pursue by themselves. Thus, collaborative programs create conditions for users to strategically seek relationships with external organizations whose resources are needed for successful planning and implementation of existing or new projects. The need for the beneficiary communities to seek resources from organizations is parallel to the generic need of organizations to seek external resources to succeed when they lack resources internally (Pfeffer and Salancik 1978, Cook and Yamagishi 1992).

The Rural Water Supply and Sanitation Program (RWSSP) in Nepal provides a suitable case for studying the effect of the communities' network strategies in mobilizing resources for spillover activities. Supported by the World Bank, the RWSSP is one of the largest collaborative water supply programs in the country with a goal of assisting rural communities to improve access to clean drinking water.ⁱ A quasi-government agency, called Rural Water Supply and Sanitation Fund Development Board (RWSSFDB), manages the overall program which involves capacity building of the communities, disbursing funds to competent projects, and supervising the overall program. The beneficiary communities are responsible for planning and organizing for their individual projects. Each project community elects a water supply and sanitation user committee (WSUC) to perform the day to day management of the project. The agency-contracted local non-profits, called Support Organizations (SOs), help the communities with project organization and social interaction skills as well as assist them in planning and executing the water supply projects. All projects that begin in a fiscal yearⁱⁱ (called *Batch*) follow a sequence of planning, development, implementation, and post-implementation phases consisting of sets of activities in each phase that generally requires twelve months to complete (RWSSFDB 2007). The quality of the activities in each phase in the execution of water supply projects is ensured by the Support Agencies (SAs), the agency-hired engineering firms, assigned with monitoring the compliance by the communities and the SOs.

The communities also learn during the execution of their water supply projects. Since only competent project proposals get funded, they learn to follow the project criteria and develop competent proposals. The project criteria include projects that generate more time savings to the households, that include minorities, that are smaller in size, and that are located in the remote areas. The communities are also required to find matching project costs (in-kind and cash),

secure an undisputed water source, comply regulatory provisions, and establish a user-funded operation and maintenance system for the project. Except for the unskilled labor, these communities rely pretty much on external resources such as information, technical expertise, matching cash, and political support for the successful implementation of their projects. The need for external resources requires the communities to develop contacts with a variety of organizations. For example, the community may need to contact banks to open a project bank account, seek help from village governments, community organizations or district government to secure the matching cash, visit agency offices in the district to meet the regulatory requirements, or seek support from political parties or elected officials to deal with conflicts that may arise within the community. The RWSSP expects that the communities would be able to use the learning and contacts as a springboard to get on to new activities on their own in the post-implementation phase of the project. While some of previous contacts may continue or serve as referrals, these communities may require new partners for new types of activities.

This study focuses on the how these communities use prior and current network capital to mobilize external resources for spillover activities. The community actor in this study is a settlement or a village with difficult access to drinking water, but located in a hydrological terrain that could support an efficient gravity-flow water supply projects. Not surprisingly, disagreements among the users regarding the selection and scope of the project, internal conflict about fair distribution of the costs and benefits, and mutual distrust can all pose barriers to developing new collective activities. Development studies have generally emphasized the role of social capital within such communities to resolve such collective action problems (Ostrom 1990; Gibson, Williams, and Ostrom 2005). But successful resolution of differences within the community is only a precondition for new initiatives; the community also requires external

network capital to mobilize resources needed for the successful implementation of those initiatives. Social network analysis is commonly used to capture such relationships between the communities and external organizations. The patterns or configurations of ties that the communities develop in this process can then be linked with the spillover effects observed in the respective communities. In this study, we correlate the extent of spillover effects measured by the amount of external resources mobilized by 62 water supply project communities in Nepal with the patterns of ties they developed with external organizations.

Resource Dependence, Networks, and Spillover Effects

All communities strive for improving their living conditions. Communities that received and implemented publicly funded projects like water supply projects are no exception. In general, communities that lack basic community infrastructures like water supply are in a greater need for external assistance to pursue new activities on their own. According to the resource dependence theory, these communities would rely on exchange relations with external organizations to undertake the spillover activities (Pfeffer and Salancik 1978). These exchanges may involve access to physical or monetary resources, information, knowledge, and technical or political supports which together can help communities to achieve their self-help goals. This reliance on outside resources reflects dependency of the communities on external organizations and, thus, serves the basis for ties between the two where the ties contain the flow of various types of support to the communities from the contacted organizations. It should be pointed out that such external support may come at some cost in the form of demand imposed by the supporting organizations that may constrain the actions of the communities.

For the project communities, therefore, developing ties with external organizations or groups is a strategic choice involving who to contact and how frequently. When making these decisions, they take into account the potential gain from these ties – access to various resources – against the costs of dependency and maintenance of the ties. Further, these choices are not independent of the ties the contacted organizations may have with other organizations and the positions these organizations occupy in the network of ties. The pattern of ties that is observed between the communities and organizations is, thus, the result of a dynamic process involving both exogenous resource dependencies and an endogenous development of network of ties. These networks are crucial as they provide access to valuable resources to the communities to implement their self-help activities. The network perspective maintains that a network seeking community can utilize three sources of network resources: its direct or proximate ties with external organizations, its indirect ties with distant organizations, and the position of the potential organizations in the network (Gulati 2007).

In network terminology, the focal community in the study is the *ego* that seeks ties with potential partnering organizations, called the *alters*. The contacted organizations also have incentives to respond because it is in their interests to be associated with the communities that are active and show potential for success. Thus, the tie between a community and organization is treated here as an undirected tie to reflect the mutual consent required by both parties to gain from the relationship. Further, since the communities compete for resources for new activities, it is reasonable to assume that these communities almost never maintain direct relationships with each other in relation to these activities. Similarly, different organizations possessing different resources may have very little reason to maintain contacts on priori. Thus, the policy context in this study is best represented as a two-mode network in which communities develop mutual ties

with the partnering organizations, but neither the communities nor the organizations develop ties within their own sets.ⁱⁱⁱ

More partners, more spillover effects

One of the widely observed network phenomena is the link between an actor's number of network contacts and its success. In a variety of program contexts including education, economic development, and watershed management practices, scholars have found that the number of network contacts is a significant contributor to an actor's success (Agranoff and McGuire 2003, O'Toole and Meier 2004, Lubell and Fulton 2007, Schalk, Torenvlied and Allen 2010). This has also been the case with the funding success of the project proposals put forwarded by the beneficiary groups (Berardo 2009, Shrestha 2014). The argument is that the greater number of contacts with multiple organizations provides enhanced access to various resources the actors need to succeed. In a two-mode network between communities and organizations, the number of organizations affiliated with the community is equal to network activity or the degree centrality of the community (Everett and Borgatti 2005).

In the case of water supply communities pursuing spillover activities, more diverse partners implies a greater ability for these communities to access diverse resources from a broad range of organizations. This suggests that a community with more partner organizations will have a comparative advantage over communities with fewer organizational partners. Considering the need for diverse resources for different types of spillover activities, multiple ties with the same type of partner organization are unlikely to be as effective as the same number of ties with different organizations. In addition, multiple partners may result less dependence on any given organization; hence, a greater independence for the community to pursue the best course in its

search for partners (Pfeffer and Salancik 1978). Both prior contacts (developed during project implementation) and new contacts can be beneficial in this regard where the prior contacts may play more of a facilitator or a referral role. Hence,

Hypothesis (H1): The beneficiary communities with more organizational partners experience greater spillover effects.

More indirect partners, more spillover effects

In addition to direct access to resources, a community can also access valuable know-how from indirect links to other communities. In the two-mode network where communities are reachable only via paths containing one or more affiliated organizations (Wasserman and Faust 1994), a focal community can learn the experiences of other communities via the partner organizations supporting those communities. The argument is that, in the network setting under study, such lessons pass on to the focal community through its partner organizations who support other communities and are familiar with the problems those communities faced and the solutions sought. This indirect access highlights the critical advantage of indirect ties to other communities that can provide with unique information from these distant actors otherwise unavailable to the focal community. This phenomenon is akin to Granovetter's (1973) theory of the "strength of weak ties" which argues that the strength of ties lies in the connections to one's outside world as opposed to proximate friends by illustrating the importance of social mechanisms for getting a job: Job seekers do better when they reach out to extended friends and acquaintances compared to when they limit their reach to close friends.

Indirect ties through partners can also help identify distant actors that have faced and resolved problems that are being currently faced by a focal actor (Freeman 1991). If so, for a

focal community, the bridging partner organizations become vital in identifying the key communities that would provide indirect access to valuable information essential for organizing the spillover activities. Such information perhaps more needed when a community is organizing variety of spillover activities compared to when dealing with one type of activity like water supply projects. The bridging ability of a proximate partner, thus, reflects the number of other communities whose experiences a focal community can indirectly access for its benefit. Hence,

Hypothesis (H2): The beneficiary communities with more indirect reach to other communities through their partner organizations experience greater spillover effects.

More cohesion among partners, more spillover effects

While more partners can increase a community's potential for mobilizing diverse resources for spillover activities, this gain may be offset by the increased conflicts of interests and greater difficulties in dealing with a diverse set of partners (Burt 2000). In this scenario, a community is more likely to benefit when the partner organizations work as a group, restrain conflicts, and are committed to the wellbeing of the community. Given the network under study, such behavior is more likely to present among the partners which sponsor a common or the same community, rather than among the organizations which sponsor different communities for projects unrelated to each other. When the partners share the same community for a common project, they exhibit mutual interest for the success of the community. In contrast, supporting different communities can create conflicts of interest among the partners because each partner must consider the net advantage it gains by helping the shared community versus by helping a different community. Obviously, the advantage of having more partners will not be realized

when the partners are in conflict and utilize their unique resources as a bargain to achieve their narrow interests over the interest of the community (Reagans and Zuckerman 2008).

According to the social capital literature, when the partners are cohesive, reflecting mutual or overlapping ties, they are capable of solving differences for common good (Coleman 1988, Putnam 2000). Similarly, actors working together on a common project are expected to develop shared understandings and a stronger alliance for joint problem solving (Uzzi 1997). For example, Schalk, Torenvlied and Allen (2010) find that a cohesive subgroup of colleges working together for the primary education teacher training in the Netherlands resulted into a positive evaluation of the colleges' performance by the college graduates. In the context of the study, a subgroup of partners sharing a common community can be viewed as a reflection of the common goal – the advancement of the community. In this scenario, the shared community provides a basis for a cohesive relationship among the partners. Besides, the mutually-reinforcing set of shared community ties among the partners can discourage opportunism on the part of individual partners as these partners in the subgroup can monitor each other's deviant behavior and can impose a credible threat of sanctions for such behavior. One caveat is that, even though the partners share the same community, they may be supporting different projects as spillover activities are varied. If so, the partners may not find strong reasons to be as cohesive in reality as they appear to be (due to the shared community) because their support to specific activities are unrelated to each other and the assumed coordination among the partners may be irrelevant. But if there is commonality of the activities supported by the partners, the cohesion among the partners is expected to be beneficial for spillover activities. Thus,

Hypothesis (H3): The beneficiary communities with more cohesion among their partner organizations experience greater spillover effects.

Research Design

The network data and the spillover effects for the empirical test of the hypotheses was collected from a field survey of all 62 communities which completed their water supply projects in five districts of the Central Development Region (CDR) in the country. The survey was conducted by the qualified interviewers from May to July 2008 after one year of the physical completion of the projects. The survey specifically asked about the number and types of spillover activities the community initiated, the amount of external fund mobilized, and the contacts the communities made with various external organizations in order to mobilize the resources for the spillover activities. Since the survey was performed just after one year of project completion, no major memory issue in recalling the organizational contacts was expected on the part of the respondent communities. Nevertheless, any potential bias in this regard was minimized through carefully conducted interview that followed iterative prompting and confirming process including allowing the respondent community to correct the response. Therefore, the reported ties reasonably reflect the ties developed for the purpose of organizing spillover activities.

The field survey adopted a pre-designed questionnaire. The survey was completed by interviewing the key members of the WSUC on-site as a group, including the Chairperson, the Secretary, and the Treasurer. The survey involved extensive travelling to remote villages. The respondents provided information on who they contacted, how frequently, and the amount of external resource they mobilized for the spillover activities. Asking the community for contacts they made for four types resources – information, funds, political buy-in, and regulatory support – provided the community more reasons for reflection and, thus, produced a more complete list of organizations they contacted. In addition, a pre-prepared working list of potential contacts by the organizational types was also used to prompt the respondents, when needed, to help the

communities to recall the contacts. The working list was prepared in consultation with the agency experts in advance and was verified with the SOs in the field. The attribute data for the water supply project and for the community was gathered from the field survey as well as from the RWSSP's project data base.

Dependent variable

The dependent variable is the spillover effect and is measured by the proportion of external funding to total funding (external plus internal) mobilized by the communities. The measure reflects the ability of the communities to mobilize external funds and allows to make comparison across the communities in the study. The mean ratio of external funding is .37 with a standard deviation of .42.

Independent variables

The independent variables are listed in Table 1 with their descriptive statistics. There is no high correlation between the independent variables. The three independent variables corresponding to the three hypotheses are the number of partner organizations, indirect reach to other communities, and cohesion among the partners. A focal community's *number of partners* is simply the count of the number of external organizations contacted by the community. The mean number of partners is 2.87 with standard deviation of 2.03.

Table 1 about here

A community's *indirect reach* is measured by the number of other communities that are within two organizational steps from the focal community (Wasserman and Faust 1994). This

measure includes total number of other communities that the focal community can reach through its direct and indirect organizational partners. The measure is calculated from the community association matrix projection of the two-mode matrix, where a tie exists when the communities share at least one common partner. In this matrix, while the proximate communities have one partner in common, all communities connected in two steps are linked by two organizations sharing at least one common community.^{iv} The mean number of indirect reach to other communities is 14 with a standard deviation of 11.

Cohesion among the subgroup of partner organizations is measured by the proportion of all the communities the partners in the subgroup have in common. Such cohesive processes operate primarily through direct contacts among the subgroup members (Wasserman and Faust 1994, p. 263-264). The actual measure of subgroup cohesion among the partners involves the calculation of an organization's subgroup cohesion in its ego network from the organizational association matrix projection of the two-mode matrix, where a tie between two organizations represents at least one common community.^v In this matrix, an organization's cohesion measures the percentage of the organization's copartners that share communities with each other. In a cohesive subgroup of partners where all the partners share the same community, the percentage of each partner's subgroup cohesion would equal 100. On the other hand, an organization, whose co-partners do not share any community in common, would have a subgroup cohesion equal to 0. For a community, cohesion among its partners is calculated by averaging the subgroup cohesion over all partners; thus, adding partners with low subgroup cohesion lowers the community's average cohesion score. The mean cohesion among partners for a community is 0.49 with a standard deviation of 0.34.

Controls

A number of community attributes, regional dummies and prior contacts are included in order to test the effect of the primary network variables. One such community attributes is the physical distance or *remoteness* of a community. This variable is measured in hours to get to the community by bus and on-foot together from the SO, usually located in a town. The mean distance is 5.49 hours with a standard deviation of 3 hours. The *size of a project* is captured by the number of water supply beneficiaries in natural log which averages 6.52 beneficiaries. Since high caste households can mobilize more spillover activities than their low caste counterparts, high caste household ratio is also included. The mean high caste ratio is 0.43 with a standard deviation of 0.32. *Time savings* from access to drinking water can contribute to spillover effect. This variable is measured in hours per household which varies from 1.74 to 14.87 hours with a mean of 4.31 hours. *Conflict in the community* can reduce the spillover activities. The mean community conflict is 2.02 in a scale of 1 to 7. Finally, more prior contacts can increase spillover activities. The mean number of prior contact is 9.84 with a standard deviation of 2.69. Four dummy variables are also included to account for unobserved regional differences in spillover effects. Kavre is the omitted district against which other four districts are compared.

Results and Discussion

Figure 1 depicts the two-mode network graph of relationships between the communities and the partner organizations where the circles represent the communities, squares indicate the partners, and lines connecting the circles and squares indicate ties between the two. The size of the circles denotes the number of partners: bigger the size, higher the number of partners. Since information about the dependent variable - the spillover effect - is not included in the graph, no

firm conclusion can be drawn from the graph about the correlation between the number of partners and the spillover effect.

Figure 1 about here

Table 2 reports the regression results. The models in the table are significant. The full model explains 23 percent of the variation in the proportion of external fund mobilized by the communities. Among the primary network variables, only the number of partner is statistically significant. It implies that a community having more partners is able to mobilize greater level of external resources compared to a community having less partners. Prior contacts (maintained during the implementation of the water supply project) were not found significant.¹ With respect to the controls, physical remoteness of a community is statistically significant in the expected direction. This result suggests that the communities located far away from towns in remote areas mobilize less external resources. Regional variations in the two sample districts were also found to influence external resource mobilization in the communities. Other control variables are not significant. Factors like time savings and size of the project that were found to be significant in project development (Shrestha 2014) did not appear to play important role in the mobilization of external funding for spillover activities in the post-implementation phase.

Table 2 about here

It is also interesting to observe that a community's indirect reach to other communities and cohesion among the community's partner organizations are not significant in mobilizing external funds. This result indicates that indirect reach and partner cohesion function differently

¹ Because prior contacts can influence new contacts ($r = .31$ with $p < .01$), an instrumental variable regression was also performed. But the explanatory power of prior contacts on new contracts was very weak ($R\text{-squared} = .02$).

in the post-implementation environment for spillover activities than for project development where both of these variables were found significant. One substantive difference between post-implementation and project development scenarios is that the communities are more likely to pursue different spillover projects from each other during post-implementation as opposed to the project development phase where all communities undertake water supply projects. When two communities undertake dissimilar activities, their experiences may not be relevant or beneficial to each other even though the focal community can reach many other communities through its partners. But the situation would be different when all communities organize the same type of project (in this case, the water supply projects) where the experience of one community is more likely to be beneficial to another community. Similarly, because of the dissimilar spillover activities, partners working for the same community (cohesion among the partners) may not translate into a coordinated support for the specific type of spillover activities. In fact, the coordinated support in such situation may not pay off despite the presence of greater cohesion among the partner for the community.

Who are the external partners?

Given the support for the importance of expansive network with external organizations for spillover activities, the next question is who those partners are. In order to examine this question, we estimated a disaggregated model by categorizing the total number of partners into the number of central, district, and village level partners.² Table 3 reports the result. The results did not change for any variable except for the category of the partners. The results show that only

² The minimum and maximum number of central and district level partners varies from 0 to 5. However, the mean number of central partner is .63 (with a standard deviation of .91) and the mean number of district level partners is 1.63 (with a standard deviation of 1.39). For the village level partners, the minimum is 0 and the maximum is 4 with a mean and standard deviation of .63 and .99.

the number of district level partners is statistically significant. This result suggests that the communities that mobilize greater proportion of external funding tend to rely more on the partners at the district level. This result is insightful. What this shows is that the collaborative programs that support local initiatives through decentralized institutional structure tend to promote the district level organizations that are less political (compared to the central level agencies), that carry devolved authorizes and resources, and that are relatively closer to the communities. That's why the communities appear to appreciate the importance of district level partners in order to pursue their spillover activities. This result also reflects the program's subtle goal of removing central agencies from meddling with micro management of the local issues and of focusing those agencies' energy on improving policies that strengthen local entrepreneurship.

Conclusion

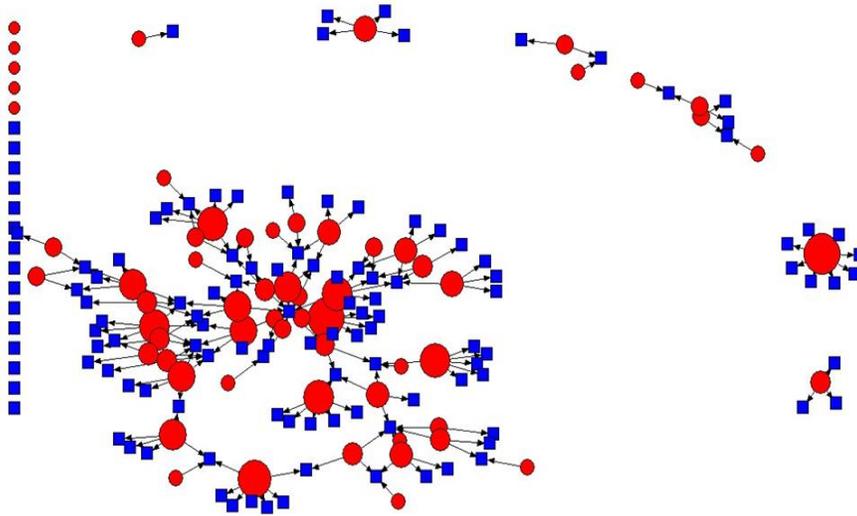
At least, three conclusions can be drawn from this case of collaborative water supply projects in Nepal. First, communities that received project funding from the collaborative program and completed their projects successfully pursue spillover activities and mobilize external funds for the purpose. Second, the communities maintain expansive network of external organizations, in particular, to pursue spillover effects. Third, indirect reach to other communities and cohesion among the partners may work differently in the project development and post-implementation phases. In the former, all communities undertake the same type of project like water supply whereas in the later, the communities can pursue different activities. Consequently, as noted, the motivations on the part of the communities and partners tend to be different in two scenarios.

This study also has some important limitations. One of the limitations of this study is the limited generalizability of its findings to other types of programs. Also, the nature and extent of spillover activities hardly remain static. Thus, the spillover activities observed at one time after one year of project completion may not be enough to understand the link between networks and spillover effects. Finally, the research design in this study does not control for the similar communities that did not receive project funding and the capacity building support that came with it and yet pursued community activities on their own. The current design only compares the spillover effect across the communities that received project funding limiting the ability to determine the effect of capacity building (through project funding) on spillover effects.

Despite these limitations, this study highlights that network capital plays an important role for the mobilization of external resources for spillover activities. This indicates that spillover effects should not be treated as trivial, unintended consequences. Instead, these effects should be systematically studied to understand the contribution of the publicly funded capacity building initiatives on the communities' ability to engage on their own for their wellbeing. Such studies will accumulate more evidence about the nature of the link between networks and spillover effects beneficial for the theory in the field. In addition, the evidence could provide the basis for policy makers to tightly align project funding with capacity building of the beneficiary groups or communities to help them help themselves.

Figure: Network graph

Figure 1: Collaborative network (communities and their partners)



The network graph is drawn using Ucinet. Circles represent project communities. Squares represent organizational partners.

Table 1: Descriptive

Variables	Mean	SD	Min	Max
Number of partners	2.87	2.03	0	8
Indirect reach (number)	14	11	0	38
Partner cohesion	.49	.34	0	1
Number of prior contacts (partners)	9.84	2.69	4	16
Remoteness of the project (hrs)	5.49	3.00	0	18.5
Project size (beneficiaries in Ln)	6.52	.47	5.38	7.40
High caste HH (ratio)	.43	.32	0	.99
Time saving hours/HH	4.31	2.12	1.75	14.87
Community conflict	2.02	1.59	1	7
Participation in policy venues	5.58	1.12	1	7

Table 2: OLS results

Variables	Coef.	Se	Coef.	Se
Number of partners	.076**	.036	.058*	.035
Indirect reach	-.004	.005	.000	.005
Partner cohesion	-.061	.201	.014	.204
Number of prior contacts (partners)			.011	.021
Remoteness (hrs)			-.042***	.015
Project size (beneficiaries in Ln)			-.108	.114
High cast HH (ratio)			-.135	.177
Time saving hours/HH			-.005	.025
Community conflict			-.017	.035
Dhading district dummy			.295*	.163
Makwanpur district dummy			.518***	.176
Sindhuli district dummy			.235	.168
Sindhupalchowk district dummy			.112	.17
Constant	.236**	.106	.932	.697
Adjusted R-squared	.048		.23	
N	62		60	

Table 3: OLS results

Variables	Coef	Se
Number of central partners	-.107	.062
Number of district partners	.108**	.048
Number of village partners	.017	.062
Indirect reach	.000	.005
Partner cohesion	-.043	.203
Number of prior contacts (partners)	.013	.021
Remoteness (hrs)	-.044***	.016
Project size (beneficiaries in Ln)	-.126	.115
High cast HH (ratio)	-.130	.177
Time saving hours/HH	-.006	.025
Community conflict	-.011	.035
Dhading district dummy	.296*	.163
Makwanpur district dummy	.462**	.178
Sindhuli district dummy	.193	.170
Sindhupalchowk district dummy	.131	.176
Constant	.932	.697
Adjusted R-squared	.26	
N	60	

ⁱ The RWSSP is implemented in 71 of 75 districts in Nepal (RWSSFDB 2007) which has a population of about 28 million. About one-third of 22 million rural people lack access to clean drinking water.

ⁱⁱ In Nepal, the fiscal year is the budget or accounting year. The fiscal year spans the second half of first calendar year to the first part of second calendar year covering a period from July 15th to July 14th.

ⁱⁱⁱ In the two-mode network between communities and organizations, defining network mechanisms between communities or between organizations is done by defining a one-mode network of communities or of organizations where the links between the communities are the shared organizations and the links between the organizations are the shared communities (Wasserman and Faust 1994). These converted one-mode relations are symmetric and can be studied using methods for analyzing one-mode networks (Wasserman and Faust 1994, p. 295).

^{iv} A one-mode community association matrix was created by multiplying the two-mode matrix of 62 communities and 435 organizations (a matrix size of 62 x 435) with communities in rows by its transpose. Indirect reach is then calculated as the normal two-step reach (Wasserman and Faust 1994) on the dichotomized community association matrix. The measure is not weighted by the number of common partners, which reflects an assumption that the existence of a path for information flow is more important than the relative flows through multiple paths.

^v In this case the two-mode affiliation matrix with organizations as rows is multiplied by its transpose to produce the organizational association matrix with cells counting the number of shared projects. The subgroup cohesion measure of an organization is calculated from its ego network in the dichotomized organization association matrix in which any shared community project defines a link.