Evaluating the Network Governance of Rural Development Interventions:

A Relational Assessment of Aid Policy in Afghanistan and Pakistan

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Abstract

With over ten years since the OECD Paris Declaration of Aid-Effectiveness, the core principles of "ownership," "alignment," "harmonization," "results," and "mutual accountability," have reshaped international development initiatives in challenging environments. Arguably, the Sustainable Development Goals (SDGs), signifying the 2030 development agenda, offer a new framework for measuring development progress towards more attainable objectives, emphasizing social inclusion, environmental sustainability, and economic development (Sachs, 2015). As a critical time to reevaluate policies and frameworks for aid-effectiveness, innovative approaches are in demand. Though great strides have been achieved, the debate continues to address the relevance of the SDGs and overall effectiveness of external development assistance in various local contexts.

This study contributes to the "social inclusion" factor of the SDG framework, providing critical observations on relational patterns among key stakeholders in aid policy networks. Assessing how power is embedded within development structures can provide crucial insights about their outcomes. Greater social and cultural complexity is evident in fragile and conflict-affected regions like Afghanistan and Pakistan. Establishing development programs based on their unique provincial socio-cultural contexts and collective involvement of local partners has presented significant challenges.

Applying an integrated conceptual framework of social capital theory and social network analysis (SNA), this paper illustrates the inter-organizational relationships of two prominent rural development interventions: The Afghanistan National Solidarity Program and Pakistan's Federally Administered Tribal Areas (FATA), Rural Livelihoods and Community Infrastructure Program. Both programs aim to generate social capital among communities, allowing for alternative evaluation methods unique to this objective. This exploratory analysis examines the whole-network organizational structures of these programs, and how the structures can challenge the underlying objectives of Community Driven Development (CDD) initiatives, working to create sustainable solutions through community managed processes.

Findings from the SNA reveal organizational whole network properties that proxy for power, influence, and cohesion. The resulting visualizations depict core-peripheral social structures, hierarchical clustering, alongside measures of high centralization and low cohesion. These results support observations from the aid-effectiveness literature, which imply that the inherent organizational structure may inhibit local actors from acquiring the necessary influence for sustainable, locally-owned processes and outcomes.

The study promulgates a distinct approach of "network evaluations" (Davies, 2006) to enhance impact assessments throughout the duration of programs and upon closeout, responding to the shifting paradigm for conventional development studies. As both development programs aim to improve social inclusion and "localization" processes, this paper elevates the "lessons-learned" through a more contextualized relational assessment, potentially translatable to similar local contexts. Analysis of the structural properties of development assistance will enable improvement of intervening structures to best meet the needs of beneficiaries, by enhancing local social capital and ownership, critical to a vibrant and prosperous socio-economic future for Afghanistan and Pakistan.

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1. Introduction

The past few years have been critical for reflection among the international development community. More than a decade after the Organization of Economic Cooperation and Development (OECD)'s Paris Declaration of Aid-Effectiveness, such principles as "ownership, alignment, and harmonization" (World Bank Group, 2008) continue to remain invaluable to determine measurable targets in the new 2030 United Nations development agenda (Sachs, 2015). Similarly, with the newly derived Sustainable Development Goals (SDGs), replacing the United Nations Millennium Development Goals (MDGs), the post-2015 development planning and implementation presents a crucial time to examine the policies and frameworks derived from the core principles. Arguably, the SDGs offer a new framework for measuring development impact and progress towards more attainable objectives, emphasizing social inclusion, environmental sustainability, and economic development (Sacks, 2015). However, the SDGs are critiqued by some as too complicated and too many – consisting of 17 goals and 169 targets – further adding to the already existing complexity of objectives and agendas among various actors (Easterly, 2015). The SDGs are also criticized for disregarding the local context of developing societies (*The Economist*, 2015). Though great strides have been achieved, the debate continues on the ambiguity, relevance of the SDGs, and the overall effectiveness of external development assistance programs. Encompassing social inclusion and economic development will be an essential part of conceptualizing and operationalizing future international development policies.

This study aims to contribute to the discussion on the "social inclusion" factor of the SDG framework, and the relationships among key players in aid networks as significant indicators of aid-impact. Assessing how transactions diffuse and how influence and power are embedded within the social structures of development interventions can provide crucial insights about their expected outcomes. An inter-organizational network approach not only can uncover the potential positive and negative externalities from these structures, but also allow for a better understanding about the factors that challenge trust-building and social interconnectivity among donor organizations and their local counterparts. Attributes of whole-network structures can reveal varying social constraints towards inclusive and participatory development at the local level. This paper aims to look at how and why this is possible, and why cohesion, power, and influence among stakeholders are crucial factors to understanding the potential sustainable success of development interventions.

The paper aims to develop an in-depth understanding of the "networks element" of social capital theory. The nexus between social capital theory and development processes are examined with reference to Community-Driven Development (CDD) initiatives. For a few decades now, community-oriented development has been increasingly adapted as a localized approach by international organizations, such as the World Bank, alongside more advanced economies. Promoting a greater understanding of social cohesiveness within and among actors in development programs can have a strong influence on the effectiveness of aid interventions. Power dynamics within the networks explain whether or not decision-making can be localized in practice. The focus of cohesion and power will be on the actors (at the organizational level) involved in aid allocated to social sectors in Afghanistan and Pakistan. Observations about the

relationships of key players within a development intervention, based on their roles and activities, can contribute perspective on the sustainability of aid-impact.

This study will seek to answer the following questions: To what extent do the whole-network organizational social structures of development programs demonstrate cohesion? Based on the primary exchanges in the interventions, how does the interplay of power, dependency, and influence shape the *formal* organizational structures? Are implementing agencies effective in transferring "influence" among local populations? What are the potential hindrances towards fostering a sustainable Community-Driven Development (CDD) approach? The paper will explore these questions with a theoretical and methodological framework leading to an intuitive understanding of whether there is a relationship between social network properties and development outcomes (social capital impact) for future research.

The analysis begins with background on the aid-effectiveness literature, the growing relevance of development policy networks, and CDD programs to place the story in context. It will follow with a discussion on the combined conceptual framework of the social capital research tradition and network theory, which will develop the justification for network evaluation through network structure, visualization, and analysis. Relevant content about the cases analyzed in this study will follow. These include Afghanistan's National Solidarity Program (NSP) and Pakistan's Rural Livelihood and Community Infrastructure Program (RLCIP) in the Federally Administrated Tribal Areas (FATA). The paper will then explain the data and methods (a mixed method approach of case study, content analysis, and social network analysis) and present the descriptive results with network metrics and visualizations of the development programs. The paper will follow with an interpretation of the results, caveats to the research, and a few observations on the next steps. Though the current contribution is more descriptive and exploratory, crucial policy implications and network interventions will conclude the analysis.

2. Background and Context: The Aid Conundrum

In 2005, members of the international community convened with the OECD on a high-level forum in Paris, France, resulting with the Paris Declaration of Aid-Effectiveness, based on five core principles that would eventually govern aid-processes: "ownership, alignment, harmonization, managing for results, and mutual accountability" (World Bank Group, 2008). These principles became integral to the rhetoric and the political jargon associated with aid and the aid-effectiveness literature. The expansion of bilateral and multilateral donors involved multiple aid channels and donor fragmentation, and a great organizational complexity from both the donor and recipient perspectives (2008). The principles demonstrate the importance of collaborations across organizations and various actors involved in development assistance, and the applicability of a networks approach.

Improvement of social sectors and capacity building empowered local communities to participate in civic activities, allowing room for more sustainable approaches (Groves and Hinton, 2004; Fukuyama, 2002). Yet, proliferation of donors has led to fragmentation and administrative burdens to recipient countries, challenging coherent strategies for assistance (World Bank Group, 2008). Analyzing this complexity of aid agents allows for a "more realistic understanding" about the limitations of aid and on-the-ground challenges (Ramalingham et al., 2014). Network analysis is a valuable approach in promoting a greater understanding of the role

of all stakeholders with respect to their positions of influence in their networks (Ramalingham, 2013, 301).

2.1.Exploring the "Networked Governance" of the Aid-Industry

Although there is a consensus on applying community-based, and home grown solutions to counter the traditional "top-down," "conditional" processes of aid, there remain challenges in producing the critical shift in power relations (Groves and Hinton, 2004; Eyben, 2006; Carothers and De Gramont, 2013). Anecdotal and empirical evidence has also indicated challenges in the communication and interaction between international development practitioners and the locality (Minyasan, 2014; Easterly, 2013). For instance, Minasyan's assessment of the donor-recipient cultural differences shows that traditional development frameworks have largely neglected the local cultural context (Minyasin, 2014, 30). Using the genetic-distance among actors as a proxy for culture, her empirical findings show that development interventions fail when cultural differences among Western donors and recipients are apparent (Minyasan, 2014). Exploring culture as a primary cause for failure of significant aid-impact on economic growth, she premises that Western systems, imposed through development assistance, is an impediment to the recipient country's economic growth.

Cultural heterogeneity evident within and among the local and international social structures is an important factor challenging aid programs. An influx of actors, on both the donor and recipient sides, has produced greater heterogeneity of agents, which in turn creates more difficulty in harmonization and alignment of goals and agendas. It also increases transaction costs, which is a heavier burden for host-countries (World Bank, 2008). "Clashing agendas" and conflicting demands of stakeholders are often seen as the reason why aid is ineffective (Carothers and De Gramont, 2013, 269). Challenges remain in responding to the appropriate host-country contexts. Hence, information asymmetries among these variety of actors hinder the development of nationally coherent strategies towards successful aid-impact.

As multiple stakeholders are involved in allocating aid, multiple levels of actors need to be considered in the analysis, from local, national, to international domains. Many empirical works on development interventions recently emerged to study this type of "networked governance" effect and provide the language for networks in global development policy (Faul, 2016; Eilstrup-Sangiovanni, 2016). As critical policy networks supporting the delivery of basic services in environments where governments fail to do so, these collaborative efforts represent a variety of networks extending policy domains and stakeholders at different levels of society. For instance, the notion of bridging and bonding networks, is particularly critical among local government networks (LGNs) (Feiock and Manoj, 2016), where critical local government actors are influential in facilitating transactions for local communities and among the primary government and international organizations. This is the case for the projects studied in this analysis.

Additionally, Global Governance Networks (GGNs) create the necessary bridging effects among the local government actors as well as other civil society organizations (CSOs) or the private sectors. (Eilstrup-Sangiovanni, 2016; Murdie and Pollizi, 2016). These international networks extend across diverse development sectors and involve a variety of actors in the network. Although these actors have become critical in the development and have been engaged in significant influential activities, scholars have noted adverse effects as well (Easterly, 2013). In terms of networks, it is possible the network can further exacerbate already existing local structures and institutions. For instance, the hierarchical characterization of many global

development organizations and networks can "amplify" the already existing hierarchies on the ground of local communities within certain countries exhibiting these structures (Faul, 2016). Often, many relevant actors from the developing host-country context can be "left out of the agenda-setting process by the more powerful gatekeepers" (Murdie and Polizzi, 2016). With these observations, bottom-up processes or programs that are intended to demonstrate bottom-up policies, like that noted in Community Driven Development (CDD) programs, can further exhibit hierarchical tendencies, that can create further inequalities within and among communities.

2.2. Community-Driven Development: The Problem with CDD Approaches

CDD programs were part of the gradual improved efforts in the aid industry to respond to the demands for inclusivity and empowerment and continue to be implemented as an integral part of many development program goals. This "community-based" approach aims to enhance social capital among communities and achieve sustainable poverty reduction strategies (Mansuri and Rao, 2004, 2). These programs are based on a "demand-driven" method of development, where the community controls the planning and decision making over how to invest resources and funds for local projects (2004, 4). CDD programs "operate on principles of local empowerment, participatory governance, demand-responsiveness, administrative autonomy, greater downward accountability, and enhanced local capacity."[1] It is assumed that with greater ownership of development processes, there is a greater likelihood of the sustainability of the development outcomes (Bennett and D'Onofrio, 2014).

As a positive outcome from this approach, national leaders and citizens can work together to solve problems. This collective action and collaborative effort is central to democracy. CDD initiatives have the potential to "reverse power relations" allowing for empowerment among the community members, particularly poorer populations (Mansuri and Rao, 2004, 2). These programs serve as alternative approaches to development providing opportunities for communities to take control of their lives. Success stories from the World Bank demonstrate CDD's intentions to "strengthen democracy where people feel, see and experience the benefits of development."[2]

The community-driven development approaches in Afghanistan and Pakistan have shown some positive initial impacts, but not without challenges. The cases examined in this study, both in the country context, and the specific organizational social structures of the development interventions, demonstrate a hierarchical, centralized notion of collective activity. This is evident among local and international actors as well as with existing socio-cultural community networks in-country. Though these CDD programs are reputable approaches in both countries, they continue to struggle with the ownership of processes as well as social cohesion among local communities. Ethnic cleavages and crisis-related issues make it difficult to help foster community-driven approaches. The "top-down" approval and implementation process of projects and hierarchical structures present obstacles as communities are not directly involved in the approval.[3] Some of the challenges have been related to interest and participation in the projects.

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[1] "Community-Driven Development Overview." *The World Bank Group.*

[2] "Community-Driven Development Spreads, Empowers the Poor in Asia." *The World Bank.* April 23, 2015.

[3] See the Multi-Donor Trust Fund (MDTF) for Khyber Pakhtunkhwa, FATA, & Balochistan. *The World Bank Group,* Operations Manual, July 2012; and "Practitioner's Guide: Governance Structures in a Post Conflict Environment. National Solidarity Program - NSP, Afghanistan." Method Finder. *Ministry of Rural Reconstruction and Development,* 2006/09.

Often, it is difficult for community members to maintain interest in the development project activities because of the amount of time it takes to obtain approval.[4] Many of the local political and economic gains are "short-lived" (Beath et al., 2015) after project completion. Economic gains from quick-win schemes are not sustained in the long-term and a continued reliance on international actors (more in Afghanistan), along with difficulty in engaging with existing and competing power structures,[5] have made it difficult to take action, despite the inclusive and participatory objective and purpose of building and enhancing social capital.

CDD is further challenged by elite dominance, improper targeting of beneficiaries or poor populations, and failing to consider the motivations of participatory development in difficult security environments, all which places the "sustainability" component in question (Mansuri and Rao, 2004, 22). This is particularly notable in areas where the already existing social structures in communities exhibit hierarchical tendencies. Several constraints for decision making and approval of subprojects may create contradictory and inherent barriers to the objectives of the CDD approach. With reference to the substantive elements of the roles and responsibilities of the actors within the structure, it is concerning that, despite these initiatives, decisions and the approval of subprojects remain in the hands of international actors (Kakar, 2005). International actors, including loan officers and project managers, are professionally accountable for the results of the projects. Their involvement may be crucial to the success of the development interventions, but it contributes to the challenges to *localization*, referring to the empowerment and agency of the locality, particularly the adaptation of ideas and processes suitable for the local counterparts and beneficiaries. It also contributes to the phenomenon of "aid-dependency," where countries like Afghanistan and certain contexts of Pakistan continue to heavily rely on international support.

In order to assess the value of community-driven development for the purpose of improving social policies and programs in developing country contexts, a closer look at the structure can provide important insights. This study will investigate aid-effectiveness in terms of all the different relationships of agents that define the processes and determine whether the relationships among these stakeholders and key actors matter. The study will also provide insight on whether diversity within the social structures has relevant implications, that is, whether the networks of exchanges among the various actors, including local development agents and international implementers, can explain the objectives and outcomes for building community institutions and enhancing social capital. Previous studies have examined relational elements and the power dynamics among local structures, the impact of the projects on the locality, but few studies examine the whole-network structures of development interventions to understand its architecture through an integrated application of social capital theory and network analysis tools, which will ultimately supplement impact evaluations.

Clearly, there are many examples of successful community-driven development programs around the world. Afghanistan and Pakistan present critical cases, as a qualitative understanding of the examples demonstrates some of the key challenges in this approach. Before examining

[4] Progress Report of Rural Livelihood and Community Infrastructure Project. Quarterly Progress Report, *RLCIP*. April – June 2014.

[5] "Strategic Directions for the National Solidarity Program: Assessment of Strategic Issues and Recommendations for Future Directions." Technical Assistance Paper. *The World Bank Group*, March 31, 2015.

these cases in further detail, the next section will discuss the concepts that serve as the foundation for a network analysis of these programs.

3. Integrated Theoretical Framework

To provide a supplementary outlook of impact evaluation processes and to address some of the current discrepancies in development assistance and CDD approaches, the study takes an integrated conceptual framework of network theory from the social capital research tradition, and the methodological application of social network analysis. A meso-level analysis is conducted to assess the inter-organizational relationships involved in the aid-delivery processes within critical sectors in rural development, including agriculture, local governance, and infrastructure development. Social structures are deeply influenced by the paradoxical effect of homogeneity and heterogeneity evident within the ecology of aid projects, more specifically the bridging and bonding relationships among different groups. An inter-organizational analysis can conclude critical features of the aid structures as a whole and the positive and negative externalities of this paradox that impact authority at the local level, as CDD programs are structured to facilitate the social capital of local communities. This framework will allow for a better understanding of the critical variables (network-level measures of cohesion and centrality) that explain the significance of relationships between foreign aid organizations and their local counterparts.

3.1. Social Capital

Enhancing social capital is a key ingredient and impact indicator to CDD approaches, and is particularly important since the programs of this analysis operate in areas of very low social capital. Also, the primary goal of the aid interventions is to enhance social capital and bridge communities at the local level. Development interventions can be more effective with strong positive networks and community engagement based on trust. Social cohesion or social capital is thus a critical independent variable to measure development impact. Though the network measures are applied at the organizational level for this study, the overall conceptualization of social capital refers to an outcome of a cohesive structure within a network, which can provide important insight about the network properties of local groups as they relate to other groups in the program. Adapting the "networks" definition, in the context of development, elevates the theory of the advantages of social capital. Here social capital is defined as, "the resources embedded in one's social networks which can be accessed or mobilized in purposive actions" (Lin, 1999, 28). This definition of social capital (noted by "network capitalists" (Lin, 1999; Burt, 1997; Prell, 2012, 46), is directly applicable to the primary objectives of the development interventions: there are expected returns with an investment in social relationships (Lin, 1999). The relationships between and among the different organizations are important for optimizing the returns at the local level.

3.1.1. Bridging and Bonding. The bridging and bonding notions of social capital helps explain the narrative of these emerging social networks. Bridging and bonding among communities or groups could potentially help or hinder the aid flows, processes and delivery mechanisms. Putnam states that bonding social capital is "by choice or necessity, inward looking," reinforcing exclusive identities and homogenous groups (homophily effect). While bridging social capital explains the characteristics of networks that are "outward looking," encompassing people across diverse socio-cultural cleavages (heterogeneity effect) (Halpern, 2005, 31). Moreover, bonding social capital can potentially produce more negative externalities than bridging social capital. Information can flow more easily among actors with stronger bonds. The value of bridges can

also be understood from Granovetter's "Strength of Weak Ties" (SWT) theory (1973) an important concept that exemplifies the dynamics of strong and weak relations along with local and global cohesion. Granovetter argues that it is not the strong bonds *within* groups, but the weak ties *among* groups that will allow for the diffusion of ideas throughout the network (1973). The stronger the relationship among actors, the greater likelihood that their social activities will overlap, they will have ties with the same third parties, and thus serve as a conduit of information. Further, these "weak ties," or bridges are potentially the primary source for novel ideas and information (Borgatti and Lopez-Kidwell, 2011, 41). From a bridging tie, agents can hear things that are not already circulating within their primary groups, spreading knowledge and resources among the agents of other groups.

Burt discusses the reverse of this idea, through the language of "structural holes," also relevant to the discussion of bridging and bonding. Burt's "structural hole" theory, suggests that there is the absence of a tie between an alter and the third party in the ego-network (the network of one individual or node) (Burt, 1995). In other words, an actor is connected to two actors that are not connected (Hanneman and Riddle, 2005). In a network model for competition, a structural hole is an opening between two individuals with resources or information that could be of benefit to the other. The benefits and advantages are important for the particular individual or group that filled the gap.

3.1.2. Trust-Building in Development. Bridging and bonding and the extent of these effects depend on trust existing and developing within and among groups. Fukuyama emphasizes that economic policy is not sufficient to explain the development framework and outcomes, and it is "the socio-cultural preconditions of economic and political actors and institutions" that are an essential part of the equation, creating a more complete framework (Fukuyama, 2002, 31). He discusses the importance and relevance of networks of trust and the varying levels of trust among different societies. 'Outsiders' are more visible in strongly 'familialist' environments, where greater homogenous groups create exclusive ties. This impacts local structures dominated by heterogeneous groups, yet with stronger in-group connections (Fukuyama, 2002). Trust-building within and among groups is a crucial element of the network theory behind social capital, especially in aid relationships. Trust is important in regions that exhibit various kinds of social, cultural, economic, and political diversity within borders, including Afghanistan and Pakistan.

Furthermore, the social capital research tradition is a framework providing the tools and language that highlight the processes of cooperation and collaboration. The complexity within the social structure of development contexts allows for an important lens illuminating the social phenomena and processes existing in the aid-world. The bridging and bonding notions derived and explained by Granovetter, Burt, and Putnam are consistent with understanding trust and cohesion in networks of groups and individuals involved in development programs. From this purview, one can describe a narrative not normally captured in traditional aid-effectiveness literature or development models, an emerging perspective and paradigm diverging from conventional development studies. The variation of cultural and social dynamics and different country contexts can be examined through this lens, especially among the diverse provinces across Afghanistan and Pakistan.

3.2. Applying Social Network Analysis

Network models can help in providing a description of the "observed" nodes and linkages, and "intended" and/or "actual" goals and outcomes of the development project (Davies, 2006)

This study will further understand social capital in CDD approaches through a network lens, hence incorporating what Borgatti and Lopez-Kidwell termed the "network architecture model" (2011, 45). Capturing the dynamics of the social capital perspective in development assistance, the "network architecture model" emphasizes the "coordination" as the primary mechanism of social capital (Borgatti and Lopez-Kidwell, 2011, 45), investigating the benefits of network positioning for individuals and groups and their interdependence. "The pattern of interconnections interacts with contextual rules to generate outcomes such as power" (2011, 50). Harnessing the power of *all* nodes in the network, resources and knowledge are not completely transferred to the periphery. Nodes are bound together toward a collective outcome, providing benefits (capital) through an "agglomeration" of multiple nodes (2011, 50). Thus, it is the alignment between nodes produced by the flow that leads to the outcome. The node's success or benefits result from coordinated efforts in the entire network. Network structure, thus, facilitates group collaboration. Examining the properties of whole-networks that create opportunities to coordinate is of primary interest to this study.

An application of social network tools to analyze social capital outcomes of complex social structures can be examined from this theoretical framework. Conducting a social network analysis of a development intervention can reveal important insights about social structures at the organizational level, influencing local social interconnectivity. One can acquire a perspective on the functionality of the structure and "purposive" interactions (Lin, 1999). As a methodology and a perspective, it determines the advantages and disadvantages of structural positioning of actors embedded in networks, hence revealing elements of influence and power (Hanneman and Riddle, 2005). Greater "embeddedness" of the actors depicts greater social interconnectivity, which in the context of development interventions that aim to strengthen community empowerment and cohesion, signifies greater sustainability or survival of the program over time. On development assistance in Afghanistan and Pakistan, modeling networks of the development interventions can serve as a useful evaluative process, especially for the current period or phase of the projects. Before diving into the data and methods, a closer look at the cases will help set the context for the network analysis of the programs.

4. Case Studies

The aid narratives of Afghanistan and Pakistan illustrate great social and cultural complexity of the regions and the larger aid-conundrum; thus serving as prime examples of the concomitant effects of social capital and fragility in aid-recipient countries. The ethnic pluralism and diverse agendas of the various actors in the region epitomize this great complexity. Additionally, corruption, weak and illegitimate institutions, intergroup ethnic conflicts, tribalism, and a burgeoning youth population further characterize these countries. Afghanistan and Pakistan have unique regional contexts where collective involvement of local partners has proven to be challenging. Though the social capital levels are very low at the aggregate level, social cohesion of the development projects at the meso and micro level can determine the sustainability of the aid-intervention that will enable communities to take control of the decision-making processes.

Scholars and practitioners alike have noted the parallels between the narratives of Afghanistan and Pakistan. Afghans and Pakistanis have common local and national "identity crises," political and economic struggles, social and community structures, and share a border, which suggests that understanding their development contexts together is vital. At the same time, important differences are evident through further exploration of their development landscape.

The Afghanistan National Solidarity Program (NSP) and the Federally Administrated Tribal Areas' Rural Livelihoods and Community Infrastructure Program (RLCIP) are two critical examples of the practice of *localization* in development. Building social capital and forming communities are important objectives and impact indicators for both projects. Before explaining the organizational social structure of the interventions, the following are a few contextual factors on the regions as well as details on each program.

4.1. Afghanistan

As a land-locked country, with 34 provinces, (Waldman, 2008, 25) defined by different tribes and sub-tribes, Afghanistan continues to struggle with a new transitional government upon the end of the US War in 2014, amid a 16-year war and a deteriorating security situation. A "national identity crisis" is nothing new to the Afghan people. Anxiety has plagued war-torn Afghanistan, a country that has endured ongoing socio-political and economic struggles, and rebuilding for decades (Barfield, 2011). Conflict, in the form of insurgency and terror, tribal disputes, and ethnic divisions contribute to battle over resources and funds, and remain an obstacle to the successful development of governing institutions across Afghanistan. In addition to four decades of war in the region, the country struggles with meeting demands and needs of its diverse inhabitants (Nagl et al., 2009). Ethnic cleavages in the region along with ideological challenges with respect to terrorism and militancy have created greater challenges to decentralization (Calder and Hakimi, 2009).

Donors attempts to engage in aid efforts with the local social structures and civil society of the diverse regions, questions the strength of local ownership of the development processes (Waldman, 2008). There are also competing traditional power structures of Afghan communities that challenge the ability of Western donor agencies to appropriately allocate aid. Though there have been positive achievements in Afghanistan in the past decade – the establishment of democratic institutions, improvement of health care and education, and the development of roads and transport infrastructure – economic growth remains relatively low (Waldman, 2008, 2) Problems in aid allocation exist due to difficult conditions at the operational level and "weak absorption capacities" of funds and corruption (2008, 1).

The World Bank is helping Afghanistan manage the critical transition to government-led security and development. The Bank has funded the Afghan government about $150 million per year since the beginning of the program, and the Afghanistan Reconstruction Trust Fund with up to $800 million per year.[6] Through its CDD program, the new President, Ashraf Ghani, aimed "to reach all rural communities to ensure the delivery of vital basic services."[7] Afghanistan is a prime example of a country adopting a national community-driven development initiative nearing full coverage of all provinces.

4.1.1. The Afghanistan Case Study: National Solidarity Program (NSP) III. Afghanistan's National Solidarity Program (NSP) was established in 2003, with five separate phases, and is nearing the end of the fifth phase.[8] The NSP is the largest rural development program in Afghanistan with coverage throughout all 34 Provinces. The funding delivered up to February

[6] National Solidarity Program III Project Profile. *World Bank, Afghanistan* . Website.
[7] "Community-Driven Development Spreads, Empowers the Poor in Asia." *The World Bank.* April 23, 2015.
[8] National Solidarity Program. *Ministry of Rural Rehabilitation and Development*. Project Website. 2015.

2016 totals approximately $2.5 billion.[9] The NSP is considered the "largest people's project in Afghanistan."[10] The first phase consisted of establishing communities, which continues into the other phases. To establish a community, the requirement is to include approximately 25 families with seven or more members.[11] This practice demonstrates the bridging social capital element with the creation of a community by building and connecting families.

The main objective of the project is "to empower Afghans to reduce poverty through establishing and strengthening a national network of self-governing community institutions."[12] These Community Development Councils (CDCs) have become the "primary vehicle for Afghans to build social capital."[13] Other goals include funding the priority sub-projects, improving access to services, markets, and infrastructure, and creating participatory processes and training that help strengthen community capacity-building.[14] The current third phase is set to close this year with the primary objective of forming communities among as many districts possible. Only with communities developed with elected CDCs, will they be able to design and implement local subproject proposals. Up to February 2016, in all 34 provinces, the grand total of communities financed was 37,708, which includes 34,981 communities with CDCs elected.[15]

The NSP is perceived as one of the most successful rural community-based development programs in Afghanistan and the world. The number of communities formed across the 34 provinces is one initial indicator of this success. Impact evaluation results generally show improvement. The project built schools for thousands of children, constructed village water pumps, and assembled irrigation networks, enabling high agricultural yields. More than 12,000 village development councils have been elected, more than 19,000 project plans have been approved, and nearly half of these projects have been completed.[16] NSP is the only government program functioning in all 34 provinces affecting nearly 2/3rds of Afghan's rural population.[17]

The establishment of CDCs adapts the Afghan traditions of *Ashar* and *Jirga*, meaning voluntary activities for the collective good and leadership in the form of council, respectively.[18] This demonstrates the World Bank's aim to integrate cultural understandings into the development intervention. The NSP is an example that is working to shift power relations in the rural areas of Afghanistan. However, network evaluation can provide important insights on the potential hindrances toward a complete transfer of power and decision making among the locality. Afghanistan remains aid-dependent and continues to rely on international support amid

[9] National Solidarity Program III Project Profile. *World Bank, Afghanistan* . Website.
[10] Ministry of Rural Reconstruction and Development. Islamic Republic of Afghanistan. Website.
[11] "Practitioner's Guide: Governance Structures in a Post Conflict Environment. National Solidarity Program - NSP, Afghanistan." Method Finder. *Ministry of Rural Reconstruction and Development*, 2006/09.
[12] National Solidarity Program. *Ministry of Rural Rehabilitation and Development*. Project Website.
[13] NSP Quarterly Report. *Islamic Republic of Afghanistan, Ministry of Rural Rehabilitation and Development*, National Solidarity Program. Reporting period June 22 to September 22, 2014.
[14] Ministry of Rural Rehabilitation and Development. Islamic Republic of Afghanistan. Website.
[15] National Solidarity Program III Project Profile. *World Bank, Afghanistan*. Website.
[16] NSP Quarterly Report. *Islamic Republic of Afghanistan, Ministry of Rural Rehabilitation and Development*, National Solidarity Program. Reporting period June 22 to September 22, 2014.
[17] "Celebrating Ten Years of the National Solidarity Program: A Glimpse of a Rural Development Story in Afghanistan." *The World Bank Group*. Working Paper 81984, Vol. 1, 2013.
[18] "Celebrating Ten Years of the National Solidarity Program: A Glimpse of a Rural Development Story in Afghanistan." *The World Bank Group*. Working Paper 81984, Vol. 1, 2013.

an increasing insurgency and conflict. Current technical reports suggest the CDC local power continues to be weak.[19] This study aims to provide perspective on why that may be the case.

4.1.2. The Afghanistan NSP Organizational Social Structure. Understanding the organizational social structure within NSP is crucial for grasping the impact of community-driven development, for the purpose of enhancing social capital of communities, at the macro, meso, and micro levels. The World Bank serves as the primary administrator and a major donor to the project. Three funding mechanisms distribute funds to the Afghan Government through the NSP with oversight from the Vice President of Afghanistan, working alongside the Ministry of Rural Rehabilitation and Development (MRRD) and Ministry of Finance.[20] An External Review Committee and Oversight Consultant group (each consisting of various government and non-governmental international actors) provide oversight and planning assistance. Four independent international consultants also provide expertise in key areas.[21] A key funding mechanism of the NSP is the Afghanistan Reconstruction Trust Fund (12) alongside other funding mechanisms/donors (bilateral donors (7), Japan – JAICA-JSDF, and World Bank/International Development Association Grants). The Project Implementation Unit (PIU) includes one national implementation unit, six regional coordinating bodies, and 34 provincial units. The PIU, with the help of the Facilitating Partners (FPs), builds a framework for village level consultative decision-making and local representative leadership.[22]

The FPs currently consist of 31 organizations, local and international, including one United Nations entity and several non-governmental organizations (NGOs) and international non-governmental organizations (INGOs).[23] (See list of organizations in Table 2 of Appendix). Each FP covers a certain number of provinces. As noted in Table 2, greater number of provinces are covered by larger INGOs, which is important to consider in the analysis of local vs. international organizational influence. Most INGOS tend to have greater capacity, which allows them to have more coverage. The PIU and FPs also help elect leaders and representatives to form voluntary, community development councils (CDCs) within the districts of the province and the PIU transfers funds from MRRD. These funds are around $200 "block grants" given to the village level councils with established bank accounts.[24] The Financial Management Agent (FMA) is a consulting firm that assists the PIU with the management of those funds. Within the NSP, there are thousands of sub-projects across the region and throughout the 34 provinces.[25] Sub-projects and actors within the micro level were not accounted for in the current network analysis, due to limitations in data, and focus on whole-network properties.

4.2. Pakistan

Pakistan is a nation with a pertinent development history and regional strife; an aid-narrative similar to Afghanistan. Both countries require a critical analysis of their aid allocation processes. Pakistan remains in dire condition, not only with respect to the level of fragility, low social capital, and human development indicators, but also because the region is in a delicate political

[19] "Strategic Directions for the National Solidarity Program: Assessment of Strategic Issues and Recommendations for Future Directions." Technical Assistance Paper. *The World Bank Group*, March 31, 2015.
[20] National Solidarity Program. *Ministry of Rural Rehabilitation and Development*. Project Website. 2015.
[21] Ibid.
[22] Ibid.
[23] Ibid.
[24] Ibid.
[25] Ibid.

and economic transition and remains a vital geo-political and geo-strategic force to international and regional security.

An influx of humanitarian assistance efforts in Pakistan has occurred in the past few decades largely because of Pakistan's massive humanitarian deficits from greater spending towards defense efforts (Qadeer, 2006, 70). Nevertheless, Western donors have a strong presence and influence, as in the case of Afghanistan. Numerous debates have taken place about the ineffectiveness of aid in this region, due to issues of corruption, weak institutions, and the inappropriate 'flooding' of US dollars as well as lacking strategic targeting of beneficiaries. Additionally, the ethnic composition, particularly within *biradaris* or tribal social structures across the provinces produces a greater challenge (Qadeer, 2006, 71). Kinship, communal, and ethnic diversity is embedded and interwoven among the vast social, political, and economic structures. Several factors continue to impact the uncertainty of democracy and economic development in Pakistan: corruption, weak government institutions, multi-party politics, international and regional dynamics, and a heightened security situation are a few. Culturally and ethnically, the country is bounded by divisive cleavages which present further challenges for 'outsiders' within country, regionally, and globally. Similar to Afghanistan, Pakistan's high dependency on foreign support further complicates the development of democratic institutions.

The Federally Administered Tribal Areas (FATA) is a province of Pakistan that exemplifies this phenomenon. FATA is noted to be one of the most dangerous *places* in the world (Gul, 2010). These provinces are crises-affected areas with tribal dominated social structures. Perceptions about the security issues however may not reflect the day to day social, cultural, and political realities of indigenous populations. A "collective tribal territorial responsibility" exists within "customs and usages prevailing in the tribal areas."(Gul, 2010, 51). The Government of Pakistan fails to deliver basic services to its people, particularly in the remote areas of FATA and KP. The diversity of competing governing structures in the communities and among the provinces, in part, explains this failure.

4.2.1. FATA Rural Livelihoods and Community Infrastructure Program (RLCIP). The RLCIP project came out of a recovery program that was established in response to the crisis in the Northwest region of Pakistan. In 2009, a needs assessment was done by the Post Crisis Needs Assessment group (PCNA) alongside the Government of Pakistan.[26] The Government of Pakistan requested the World Bank and several donors to establish the Multi-Donor Trust Fund (MDTF) to support the recovery program. The MDTF was established for the FATA, KP, and Balochistan provinces in Pakistan. The MDTF operations manual outlines the needs and strategies for a program of recovery, conflict reduction, and peace building in the provinces.[27] The role of the MDTF is to provide the coordination and financing mechanism and serve as a platform for dialogue and coordination in response to the needs outlined by the PCNA.[28]

The World Bank, as a primary donor and administrator, operates under the policies for 'rapid response' which emphasizes the cooperation and coordination with development partners – the

[26] The Multi-Donor Trust Fund (MDTF) for Khyber Pakhtunkhwa, FATA, & Balochistan. *The World Bank Group,* Operations Manual, July 2012: 5.
[27] Ibid.
[28] The Multi-Donor Trust Fund (MDTF) for Khyber Pakhtunkhwa, FATA, & Balochistan. *The World Bank Group,* Operations Manual, July 2012: 5.

need to harmonize, be flexible, and collaborate when allocating emergency trust funds.[29] Alongside the World Bank, there are eleven donors that contribute to the Multi-Donor Trust Fund. The FATA Secretariat and the Project Steering Committee (of the Project Management Unit) are the primary local administrators that coordinate with the government.[30] Project implementation occurs on the Mohmand, Bajaur and South Waziristan Agencies, covering nine Tehsils (or administrative units) out of the twenty within FATA.[31] The original cost of the program was $12 million with an expansion of a $2.6 million budget soon after.[32] RLCIP was launched on February 14, 2013 and is set to close on June 2016. The project plans to expand to other agencies.[33]

The objective of RLCIP is to improve livelihoods of the "un-served" and "underserved" low-income FATA communities in crisis-affected areas and apply a sustainable CDD mechanism. The themes include agriculture, livestock, and livelihood support and community infrastructure.[34] The four different components of the project include: community development and social capital, community physical and productive infrastructure services, livelihoods support; and institutional strengthening and project management.[35] RLCIP is the first of its kind rural community development program in FATA, and internal sources cite positive results. Impact evaluations demonstrate the creation of infrastructure schemes, and delivery or procurement of key services and equipment for agriculture and livestock, farming, homes, non-farm services, and rural finance programs.[36]

4.2.2. Pakistan's RLCIP Organizational Social Structure. Similar to the Afghanistan NSP, the social structure and bureaucracy of the RLCIP can reveal the overall level of social capital in the project. Besides the Project Management Unit (PMU) located in Peshawar, Pakistan, several consultants' offices and Agency Implementation Units (AIUs) were established across the three agencies. They are housed in government compounds. One goal is to establish "100% indigenous recruitment and procurement."[37] A capacity building consortium includes four firms contracted to provide technical support to the project: Consultancy Firm for Top Supervision of Infrastructure Schemes (CA); M&E Consultancy Firm (AID); Institutional development and Communication Firm (MIDAS); and the Capacity Building /Social Mobilization Partner Firm (SRSP).[38] The Sarhad Rural Support Program (SRSP) serves as the umbrella organization supporting the Locally-based Indigenous Organizations (LIOs), and provisioning the sustainable service delivery mechanisms.[39] The LIOs are the social mobilization partners for the three

[29] The World Bank Operational Manual Operational Policies: Rapid Response to Crises and Emergencies. Revised July 1, 2014.
[30] FATA-Rural Livelihood and Community Infrastructure Project (RLCIP): Supporting the Recovery and Livelihood Needs of the Targeted Communities of Bajaur, Mohmand and South Waziristan Agencies. Website.
[31] Newsletter RLCIP. Vol 1, Issue 1, June 2013.
[32] Emergency Project Paper on the Proposed Grant in the Amount of US $12.0 Million under the Multi-Donor Trust Fund for Khyber Pakhtunkhwa, Federally Administered Tribal Areas of Balochistan to the Islamic Republic of Pakistan for a FATA Rural Livelihoods and Community Infrastructure Project. *A World Bank Document*, 2011.
[33] FATA RLCIP Projects and Operations. *The World Bank Group.* Website.
[34] FATA RLCIP Presentation. Updated November 10, 2014.
[35] FATA-Rural Livelihood and Community Infrastructure Project (RLCIP): Supporting the Recovery and Livelihood Needs of the Targeted Communities of Bajaur, Mohmand and South Waziristan Agencies. Website.
[36] FATA RLCIP Presentation. Updated November 10, 2014.
[37] FATA RLCIP Presentation. Updated November 10, 2014.
[38] Ibid.
[39] Newsletter RLCIP. Vol 1, Issue 1, June 2013.

different AIUs located within the Mohmand, South Waziristan, and Bajaur Agencies. Current local coverage of project is within three tehsils of each agency. In each tehsil they coordinate with village organizations (VOs), farmer organizations (FOs), community organizations (COs), and economic interest groups (EIGs).[40] Social mobilization involves community consultative processes and village mapping operations on the ground. Additionally, procurement is done for farmers and community groups. In the Livelihood Support Component, the impact result shows 37,000 beneficiaries from products such as micro-poultry farms, sewing machines, fuel efficient stoves, solar lamps and agricultural support inputs.[41]

5. Data and Methods

5.1. Data and Content Analysis

An essential first step to assess the network effects in the development interventions was to analyze the available sources to construct a dataset in the SNA format. These sources highlight the primary exchange mechanisms (roles) of all formal (observable) and key stakeholders involved in the interventions. Upon obtaining the necessary information about the RLCIP and NSP case studies, noted in earlier section, network data was constructed in the form of an edgelist.[42] This data and content analysis was part of the triangulation efforts for the purposes of reliability and validity of the social network data acquired.[43]

5.2. Node and Edge Attributes

Assessing network effects in a development intervention involved analyzing the exchanges or transactions among all the formal stakeholders involved in the interventions. Nodes (actors) were classified as "organizations," (all stakeholders, including implementers, donors, and recipients) and the edges (links/ties) were categorized in terms of the agents' "relationships" or the transaction/flow between each stakeholder. Edges were classified based on their primary exchange mechanism in the intervention (See Table 1 in Appendix). The labeling of these exchanges was adapted from Schiffer and Hauck's net-map approach, a participatory mapping exercise among stakeholders for a development project in Ghana, which supported the projects' efficiency upon knowledge of all relationships in the network (Schiffer and Hauck, 2010). Since this study acquired data through a document analysis rather than fieldwork, as in Schiffer and Hauck's case, the research is by contrast, less about de facto relationships, building a network data matrix on the existence of ties, with limited reference to the direction of the ties where it was clear in the data sources collected. This demonstrates a "cumulative" (Davies, 2006) model of the relations, a model extracting data from any sources indicating relationships among actors

[40] Newsletter RLCIP. Vol 1, Issue 1, June 2013.

[41] FATA RLCIP Presentation. Updated November 10, 2014.

[42] Review of literature and documentation for content analysis and coding included: World Bank websites; operation manuals (ARTF, MDTF, World Bank Rapid Response, project manuals); impact evaluations and reports; websites of Government of Pakistan and Government of Afghanistan Ministries; websites of the project (local); brochures and pamphlets, and other archival documents (i.e. newsletters, weekly reports, monthly reports, quarterly reports, annual development reports, proposals, and agreements). This included any documentation providing information on the actors or stakeholders, along with their roles and responsibilities within the intervention.

[43] Data coding for both development interventions was completed in an excel edgelist (list of ties between nodes) indicating the source node, target node, label for the edge attribute/type of relations (numeric) and weights (all coded as 1). The specific network visualizations and metrics were obtained in both Gephi and UCINET software (delineated and referenced in sections to follow). Further coding in software classified attributes of nodes and edges.

up until the current period. The relationships/exchanges as well as the presence and active engagement of actors in the networks were verified according to current impact assessment reports indicating actual accomplishments or transactions between actors. Organizational stakeholders in the network boundaries for both interventions include donor and recipient country development and humanitarian agencies, international and local NGOs, local beneficiary groups and networks, project management or implementation units, national and sub-national governments, and other local civil society organizations involved in the information and resource transactions.

5.3. Network Metrics

The underlying justification for applying network analysis is that cohesion and power in organizational structures of aid interventions, considering the heterogeneity among various groups, can produce either positive or negative externalities in aid-impact. Organizational networks can be analyzed from levels of cohesion, trust, dependency, power, and influence, translating into basic network metrics. Alongside these metrics, an assessment of sub-group formations through community detection was conducted. The calculated measures for cohesion include density, average degree, average clustering coefficient, diameter, and average path length, transitivity and triad census, and a geodesic distance report. The measures for power and dependency are indicative of centralization and the core-periphery network structure (Prell, 2012, 170). These centralization measures include degree centrality, betweenness centrality, closeness centrality and Bonacich eigenvector centrality. The metrics overlap in the conceptual framework on assessing overall cohesion, power, trust, dependency and influence of the actors, part and parcel to the hierarchical nature of these networks. The following provides a detailed explanation of the metrics as it relates to this study.

5.3.1. Community and Clustering Effects. Communities and sub-groups form in large network boundaries and can be detected through a few different metrics. In this analysis, the subgroup effect is assessed through the average clustering coefficient and modularity class application. These metrics contribute to the discussion of the overall organizational cohesion. The community detection (modularity class) applies an algorithm in the Gephi software, which measures the strength of division within a network, forming modules or clusters (Blondel, 2008). This algorithm employs the "Louvain method" for community detection, which reveals hierarchical relationships in communities as well as the clusters in the visualization. Anything higher than a modularity of 0.4 is a meaningful observation for community detection (2008). Nodes are partitioned based on classes sharing certain patterns of relations. Each class has different structural roles in their unique environments and these differences would imply different consequences for nodes occupying those positions (Blondel, 2008). Applying Granovetter's theory in terms of his analysis of groups, communities with many strong ties have pockets of strong local cohesion (dense ties between nodes within clusters) but weak global cohesion (sparse ties between nodes of a different modularity class) (Borgatti and Lopez-Kidwell, 2011, 42). Thus, communities with many weak ties have weak local cohesion but strong global cohesion, creating a denser network.

5.3.2. Measures of Cohesion. Alongside the community detection, other critical measures can supplement the level of cohesion in the network. Density is the level of interconnectedness in the network, in other words, the percentage of all possible links or ties present in a network (Hanneman and Riddle, 2005). The average clustering coefficient is the mean value of the individual coefficients and provides an indication of cohesion, referring to what extent each actor

engages with others in the network (Hanneman and Riddle, 2005). The degree is the actual number of ties for each node. More ties signify greater opportunities because of more choices for interaction and less dependency; ultimately, the node has more power (2005). Out-degree (giving ties) signifies influence, while in-degree (receiving ties) signifies less influence and more dependency. Though the degree is a power measure, the average degree metric can also be interpreted as a notion of greater cohesion at the whole-network level, when individuals have more ties. The diameter, alongside the average path length, is an alternative way of determining network level cohesion. The diameter is the longest geodesic in the network, where a geodesic is the shortest path between two actors (Prell, 2012, 171). Relatively speaking, if the diameter of a network is small, all actors will be close to each other and the network as a whole will observe a cohesive structure. The average path length is a similar notion to the network diameter. This takes the average of the geodesics in the structure and measures the closeness of the actors (Prell, 2012, 113). In addition to these measures, a geodesic distance report measuring the "compactness" and "fragmentation" based on distance is an indicator of cohesion.[44]

Lastly, detecting the presence of triads through a triad census and transitivity can demonstrate the notion of trust and the network social capital concept of "structural holes" (Burt, 2000). A structural hole is detected when analyzing triples. Transitivity or triadic closure is a way to describe and measure how trust works in a network by counting triples (triadic closure) in a network. Triads (triples) that are directed are determined as transitive (Borgatti et al., 2013). A triad census and transitivity analysis will assess the amount of triple and determine a percentage of transitivity in the networks. This is a form of analysis that examines the number of transitive triads in the network. Furthermore, these multiple metrics will help describe the overall cohesion in the network. Since measuring cohesion is difficult, using more than one metric can help in providing a valid conclusion (Prell, 2012, 170).

5.2.3. Measures of Power and Influence. Power in a network is essentially indicative of prestige, influence, and dependency among actors, which uniquely contributes to cohesion. Degree centrality is a measure of an "actor's level of involvement or activity" and highlights the players that have more contact in the network (Prell, 2012, 97). Betweenness centrality assesses the relationship of an actor to the entire network (2012, 103). It measures the extent to which an actor lies in between each other pairs of actors while no other actor lies between those actors (Hanneman and Riddle, 2005). Actors with high betweeness are in a more important position in the structure, serving as "cut-points" or "bridges." This metric captures the important role of brokerage, the intermediary nodes, crucial to explaining power relations within networks. The Bonacich eigenvector centrality is another form of power, expanding on the notion of degree centrality with a wider view of the entire network. It measures the "reliance" of ties to other ties in the network; connection to an actor with high degree centrality (high number of contacts) will lead to an advantage from the association (Prell, 2012, 113). Closeness indicates a level of independence due to reachability to other actors in the network, allowing one to easily mobilize the network to maximize access to gains from the network (2012, 107). Closeness measures the distance between actors; the actors with the shortest distance to others have the greatest closeness centrality. In other words, these actors are most informed or aware and locating them for monitoring and evaluation efforts would be helpful (Davies, 2006).

[44] Borgatti, S.P., Everett, M.G. and Freeman, L.C. 2002. Ucinet for Windows: Software for Social Network Analysis. Harvard, MA: Analytic Technologies.

Further, power and dependency will be evident in the core and periphery of the structure through network visualization and overall centrality. A K-Core Analysis visualization from UCInet can help show actors in core-periphery groupings. Additionally, network centralization scores were calculated for each of the centrality measures to not only determine the level of centralization, but to also validate the core-periphery social structure. The network with high centralization scores shows a clear delineation between the core and the periphery (Prell, 2012, 170). Thus, through high levels of centralization, the diffusion of information services and goods is efficiently accomplished among actors within the core, rather than the periphery.

6. Results: Network Visualizations, Metrics and Analysis

6.1. Whole-Network Diagrams

Network analysis was computed with UCINET and Gephi software. Figures 1, 3, 6, 13 for NSP and figures 7, 9, 12, and 13 for RLCIP (located in Appendix) show the whole-network visualizations illuminating core-peripheral network structures. In figures 1 and 7, the node color and size is attributed to the individual node eigenvector centrality scores. The darker the color, the higher the eigenvector score. The nodes in the periphery show the same eigenvector colors, these include the beneficiaries and donors. Figure 1 (NSP) is a directed graph with 136 nodes and 645 edges. Figure 7 (RLCIP) is a directed graph with 77 nodes and 208 edges. As noted in the legend, the edges in this graph are labeled in different colors in accordance to the edge attributes. If nodes have multiple types of relations with others, the arrow heads show the different colors. In some cases, multiple ties, representing the most significant exchanges, were captured. For example, The NSP PIU has two types of colored lines directed to the provinces and to the facilitating partners: a funding relationship (red) and a relationship of capacity building and technical assistance (light green) respectively. However, with the limited archival and content analysis based on the documentation available, the visualization does not capture all relationships.

The community detection graphs are shown in Figure 3 (NSP) and Figure 9 (RLCIP), which are directed graphs. The modularity class is shown in color and the nodes are sized by betweenness centrality scores. It would be essential to monitor and identify the actors with the highest betweenness, as they not only have the greatest flow capacity to increase diffusion, but also have the greatest vulnerability risk in the network, having to manage flow and coordination with multiple actors and with different types of interactions. In both projects, the headquarters of the project implementation has the highest betweenness centrality since it is the largest node with respect to size, which is expected. They have the most influence on what happens in the project, with greater access to nodes in the core and periphery. Further assessment of community detection will be in the next section.

Figure 6 (NSP) and Figure 12 (RLCIP) show the network visualizations of the projects based on their "cutpoints" depicted in the color of the nodes (completed in Netdraw, UCInet) (Borgatti et al., 2002). The nodes in blue are the "cutpoints," or the brokers, further emphasizing the concept of betweenness centrality. For that reason, the nodes are sized by the betweenness centrality. If the blue nodes are removed, the entire network will be disconnected. Hence, these can be interpreted as the most powerful and influential actors within the network, binding the nodes. For the NSP, they largely consist of international actors or actors that have greater connections to international actors. Similarly, for RLCIP, the cutpoints are the tehsils, PMU,

MDTF, with the highest betweenness. Among the higher-level actors, only the PMU and MDTF are shown as cutpoints, whereas the SRSP – a more local actor, the node with the highest betweenness centrality, is not shown as a cutpoint, which was an interesting contrast of assumptions.

A final Analysis is done to demonstrate the hierarchy through a different lens. Figure 13 shows network visualizations of NSP and RLCIP, together, and based on their "K-Core" analysis (completed in UCInet- Netdraw). The nodes are sized by eigenvector centrality scores. The K-Core was conducted to illustrate hierarchical grouping. As implied, hierarchy is a common network structure. Through the algorithm in Netdraw, the K-Core determines the grouping of the nodes based on a range for each number of contact they each have that demonstrates a core-peripheral structure, and is indicative by the colors of the nodes (Hanneman and Riddle, 2005). Because more actors interact and invest among the core set of actors, we can conclude that more activity, more exchange of information, more connectivity and transitivity is occurring within these core actors. This can be concluded for nodes within each color category. However, there is no substantive activity among the blue nodes or grey nodes (the peripheral nodes of the networks), though there is potential in gaining influence with their connection to stronger actors.

K-Core analysis will detect each actor based on their degree, and how it relates to other actors (Seidman, 1983.) This K-Core analysis in UCInet is set as a 3-core analysis for RLCIP, and 5-core analysis for NSP (given a larger network). Each color grouping connects at the same level of the nodes in their group, but do not necessarily connect to each node in their group. It can also include more than one cohesive subgroup (Borgatti et al., 2013). In this 3-core analysis for RLCIP, it uses black, red, and blue nodes to differentiate the degree of connection the nodes have in the network (core to peripheral order). In the 5-Core analysis for NSP, it uses 5 colors: black, red, pink, blue, and grey (in that order from core to peripheral actors). The black nodes connect with more nodes. This illustration thus shows the hierarchical groupings as well as which nodes may be less significant, and possibly important to eliminate. It is a way to "prune" nodes to eliminate isolates that are not of interest to the network (Borgatti et al., 2013). In this case, although the peripheral actors are donors and the beneficiary community-level stakeholders, both remain significant, but the primary target in measuring impact are the local beneficiaries. This would then suggest a need to keep these communities in the model, and remove donor communities, yet understand the nature of exchanges and transactions in the other core areas.

6.2. Community Detection Results

The community detection shows the level of heterogeneity evident within the structure. (See Figure 3 (NSP) and Figure 9 (RLCIP)). These figures display the modularity class size distribution for the NSP and RLCIP projects respectively. Numerous clusters in the community detection thus show the effects of homophily and heterogeneity. Clearly, a strong local cohesion (homophily) and a weak global cohesion (heterogeneity) is found within the structures. As noted earlier, this supports the "Strength of Weak Ties" theory. The "weak ties" will provide the novel information (that would ultimately build capacity). Therefore, novelty of information is what is being sought in these networks, for communities to build bridges with appropriate ties.

However, with a large number of clusters, coordination among the different organizations is further challenged. The community detection computed eight communities in the Afghanistan NSP with a modularity of 0.454, suggesting an accurate and meaningful detection (as noted in

the earlier section). FATA RLCIP also detects eight communities with a modularity of 0.538, which is also indicative of a meaningful detection. This diversity of the structure (based on the patterns of the main transactions and coordination between nodes), can be a factor for the overall low cohesion due the strong 'bonding' effect within numerous communities.

6.3. Network Metrics of Cohesion

Table 4 in the Appendix shows the primary cohesion metrics of the NSP and RLCIP. The density of the NSP project is 0.031 (3.1% of the potential ties an actor could have are actually present in network). The average degree for NSP is 4.448. The degree distribution for the NSP is shown in Figure 2, which describes the frequencies of nodes with different degrees. With the high average degree, it is indicative that there are several nodes that have multiple relations and suggests there is some cohesion. However, when examining individual degree and eigenvector scores of the implementers and beneficiaries, there is a clearer idea of where influence resides in the programs. Table 6 shows all the degree, eigenvector, and betweenness scores of individual nodes of NSP separating the beneficiaries and implementers (removing donors as peripheral actors). These scores show specifically which actors have the highest number of out-degree and in-degree ties, as well as the critical betweenness and eigenvector scores for each. Greater numbers of in-degree ties are evident among the local project implementation units and beneficiaries. Examining the data on facilitating partners, the out-degree ties are greater than the in-degree for most. However, certain implementers have higher scores than others. Some of the international actors, like the IRC, UN-Habitat, DACAAR, and CARE, have more out-degree ties, which proxy for greater influence. The eigenvector scores also correspond with those ties, highlighting the level of influence, which is higher among these actors with higher out-degree. These measures also supplement the presence of a hierarchical structure. The individual betweenness scores match this dynamic as well, with a few exceptions among certain CDC groupings within provinces. The highest betweenness score is the NSP implementation unit as evident in the graphs.

Further, on Table 4, the average clustering coefficient for the NSP is 0.316. This measures the extent to which actors are engaged with all other actors in the project and the overall interconnectivity in the network. Here, the average clustering coefficient is a small fraction, demonstrating low interconnectedness of all actors. Additionally, the distance measures the efficiency of exchange in the network (diameter and average path length).[45] The diameter (the largest distance between any two nodes in a network) is 5.0 in the NSP, while the average path length (the average distance between any two nodes in a network) is 2.963. From the NSP geodesic distance report, (noted in Table 4 as well), the distance-based cohesion, also defined as "compactness," is 0.294. Larger values (from 0 – 1.0) indicate greater cohesiveness. With this level of compactness, it can be argued that though cohesion is evident, it remains relatively low at the network level. The measure corresponding to that, distance-weighted fragmentation, "breadth," for the NSP network, is 0.706, which indicates a very large, fragmented network.

Further, the cohesion network metrics for the FATA RLCIP (also displayed in Table 4) show a similar dynamic. The density of the project is reported as 0.029 (2.9% of the potential ties the actor could have are actually present in the network). The average degree score is 2.234 (The degree distribution is shown in Figure 8). Table 7 shows all the degree and eigenvector scores of

[45] Prell, Christina. *Social Network Analysis: History, Theory, and Methodology.* Washington, DC: SAGE Publications, 2012: 171.

individual nodes, separating the beneficiaries and implementers and removing the donors as done for NSP. The table shows all beneficiaries with an out-degree and in-degree of 1, with very low eigenvector scores to demonstrate low influence. The LIO (locally-based indigenous organization), for each Tehsil, has a higher in-degree than out-degree, also showing less influence. The Tehsils have a higher form of influence than the LIO, with higher out-degree ties than in-degree ties, however the LIO eigenvector scores are higher. The main social mobilization unit (SRSP) has the highest out-degree along with the Agency Implementation Units (AIU), with greater out-degree ties than in-degree ties. The Project Management Unit (PMU) also has higher out-degree than in-degree ties. Hence, the SRSP and PMU have the highest out-degree and eigenvector scores than other actors. Similar to the NSP, these measures depict a hierarchical dynamic, though there are more local actors and very few international actors at the implementation level than the NSP, the greatest degree and betweenness along with influence is among these implementers, consistent with the literature. The betweenness scores of individual nodes also match this dynamic. Furthermore, the RLCIP's average clustering coefficient is 0.104, showing low interconnectivity and engagement among all actors in the network. Overall, with a diameter of 7.0 and an average path length of 4.853, there is a relatively low level of cohesion. A geodesic distance report was also calculated for RLCIP (in UCINET). The distance-based cohesion is 0.221 (on a range of 0-1, larger number shows more cohesion). Based on this distance report, the overall cohesion of the network is low. The distance weighted fragmentation, "breadth," of the RLCIP network is 0.779, which is similar to the NSP, a very large, fragmented network

Lastly, within the network-level cohesion metrics of Table 4, a triad census and a transitivity analysis result is also listed. As noted earlier this assesses the number of triads or triples in a network as a proxy for the existence of trust, which is key for the diffusion of information and resources throughout network. Both resulting outputs for both projects show a low transitivity. From the triad census algorithm in UCInet, the network transitivity resulted with a score of 0.009 for RLCIP and 0.034 for NSP. The transitivity output also completed in UCInet, but without the full triad census, showed a transitivity result of 5.768% for RLCIP and 4.590% for the NSP. With a very low fraction transitivity, it can be suggestive of a limited network level of trust. However, this could be due to the breadth of the large whole networks, as evident in the community detection. it will be important in the next steps to provide additional comparisons to these results. As noted earlier, these multiple network cohesion metrics were examined to ensure validity of the metrics. Future research will allow for comparison cases of development network structures to help with interpreting metric results.

6.4. Network Metrics of Centralization.

The centrality measures were calculated in the UCINET software and the summary of network centralization index scores is noted for both projects in Table 5. As noted in the previous section the centrality measures applied include: degree, betweenness, closeness, and the Bonacich eigenvector. The betweenness and closeness centrality distribution is depicted in figure 5 (NSP) and figure 11 (RLCIP), showing the frequency and values. The index scores on Table 5 for the NSP all indicate high centralization evident in the network, which supports the theory of the network holding a core peripheral structure. Hence, power is not decentralized from this observation and shows a high level of dependency among most of the peripheral actors in the network. As indicative in the visualizations and centrality scores, high betweenness centrality is evident among the project management unit, international actors, and donors.

A contrast to the RLCIP centralization index scores provides some important insight about the differences in the structures. In Table 5, the RLCIP shows low centralization scores relative to the NSP (with exception to Bonacich eigenvector centralization). Comparing the node degree and eigenvector scores of the beneficiaries to the implementers, in Table 7, illustrates the difference in their individual node centralization as it relates to the network, showing lower scores among the beneficiaries. With low network centralization index scores, the RLCIP project does illustrate the core peripheral, hierarchical structure, with respect to eigenvector and betweenness, yet still at a lower amount than that of the NSP.

6.5. Further Analysis.

This paper provides a distinct evaluative approach to development studies through a network lens, allowing for observations on the attributes of relations and embeddedness of actors through these exchanges. The study offers a number of different ways network analysis can evaluate a development programs intended and observed network (Davies, 2006). Critical insights are determined at the meso-macro level: the network metric results for both aid interventions indicate an overall high centralization and low cohesion based on the primary transactions between each organization in the network. High betweenness centrality was evident among the international actors and project implementation units. A core-periphery network structure was found in both projects. The network centralization index scores for various centrality measures verified this for the NSP project. The difference of network centralization between the two networks for degree and closeness suggests the importance of looking at the development program structures differently and more closely. This contrast may be due to the different sizes of networks (more nodes and edges in the NSP program considering its national coverage). Further, clusters in the community detection show the level of heterogeneity within the structures, consistent with the literature. Lastly, a hierarchical power structure is clear from the visualizations and centralization measures. Though the outcome of local social capital cannot be definitively illustrated by measures of the organizational network, the interpretation of power, influence, dependency, and cohesion of the whole-network is indicative of critical constraints towards the goal of *localization*, and sustainable solutions.

7. Caveats on the Network Analysis

Important limitations should be considered within this whole-network, one-mode, and meso-level design and analysis. The present analysis demonstrates an "imperfect network." (Scott, 2013, 44). Levels or layers of analysis are integral to show the complexity. It does not represent the "multiplexity" of all relations among nodes, (where there might be more than one type of relationship) and potentially may leave out some critical actors either formally or informally linked, which may have influence in the programs. The boundary of networks is always a place of caution for network analysts. In this case, the boundary includes the "observable" nodes and "intended" relations (cumulative to current time through document analysis) (Davies, 2006). The networks represent all the current and documented formal actors contributing to the intervention, which is a critical step to a complete network evaluation at the localized level. Additionally, groupings of some of the main actors of interest in the periphery (the primary beneficiaries) was constructed from the research (i.e. For NSP: CDCs; For RLCIP: COs, VOs, EIGs, and FOs). These groupings were established to limit the number of nodes for focus on the whole-network structures and for visualization of the network structure. More importantly, the limited data collection restricted the nodes to these categories of actors. Further research on the specific

beneficiary actors and verification can enhance validity of analysis and provide more meaningful insight on the social capital outcomes in the local communities. As noted earlier, the aid outcome of local social capital cannot be determined at the organizational level, due to data limitations.

These micro-level interdependencies are the crucial portion to be studied with further analysis. The lowest dyadic-level can also show the informal sector influence, particularly in the periphery, measuring power from the bottom-up element of the intervention, if assessing community building as a primary indicator of impact. It can reveal informal power relations central to the success or failure of the interventions. All actors have some influence in the outcome even if their control is limited. Ensuring that all the stakeholders involved in the network are accounted for is crucial for validity and reliability purposes (Prell, 2012). Additionally, at the organizational level, the analysis does not consider the idea that some of the locally-based organizations would have a heterogeneous makeup, consisting of local, national, and international staff, and forming overlapping cliques. With a resolution limit in the community modularity class application within the Gephi software, it is unable to detect smaller communities or clusters (Blondel et al., 2008). The relational data also rests upon the assumptions about the significance of these actors along with focus on the most significant relations among them. Because the 'rules of the game' differ greatly across different rural local indigenous structures, it will be vital to detect sub-communities within these networks that have influence in the intervention. The whole-network level of analysis does not account for whether the nodes themselves consist of "collectivities" (Blondel et al., 2008).

Furthermore, expanding the definition of the edges with multiple relations as well as the directionality of edges is important to the study, as the links in the networks do not indicate the same kinds of relationships. Though the Gephi visualization showed the specific edge attributes, the more complex UCINET statistical network analysis was performed through a data matrix that was symmetric, binarized, and hence, based on the mere presence or absence of a relation, without reference and value given to the types of relationships. Potential measurement errors or misspecifications could also be present due to the manual coding of data. Lastly, issues of validity and reliability will be crucial with respect to the content analysis for constructing the social network. Further triangulation of sources, and following the cases as the projects close, will support the analysis. Though the present analysis shows an "imperfect network," the goal of a "cumulative" (Davies, 2006) network evaluation is to include as many relevant nodes as possible, in other words, incorporate all key organizations and individuals influencing the process.

8. Overall Conclusions and Next Steps: Policy Implications and Network Interventions

8.1. Discussion on Network Effects and Potential Interventions

Critical insights can still be gleaned from the story of these networks. This study focused on the key actors involved in the interventions that have some influence to the outcomes of the projects. Social network analysis fosters greater understanding among stakeholders on the 'focus' and the 'process' of development assistance (Ramalingham, 2013, 301). Hence, analyzing networks is important in order to gain perspective on the potential opportunities and hindrances, partially from the attributes of the actors' ties. The core-peripheral social structure of the whole-network is relevant to the overall network outcome (Borgatti and Lopez-Kidwell, 2011, 49). The network properties of the Afghanistan NSP and FATA RLCIP show constraints

towards inclusive and participatory development; the core-peripheral aspect of the network creates barriers to the objectives of the CDD approach in the interventions, on translating influence and power to the communities. The community-driven development approach is intended not only as a community-based initiative, but also an initiative that is formally and informally run by the community. Yet, with reference to the substantive elements of the roles and responsibilities of the actors within the structure, the whole-network properties alongside individual node properties, it is concerning that, despite these initiatives, decisions and the approval of subprojects remain in the hands of international actors and not the communities. Approval must be translated into the authority of locals to exemplify a fully localized approach. The hierarchical, top-down approach may be crucial to the efficiency of the structures as a whole, but it contributes to the challenges to *localization* and local empowerment. Nonetheless, the actors in the core remain important bridges to building social capital within these communities. Changes in the network dynamics over time, upon the expansion and closeout of the projects, will be particularly crucial for the evaluation process.

Ultimately, this analysis revealed that the attributes of whole-network structures are an essential part of building local social capital. Visualizing these networks can prove useful for the assessment of structures, showing multiple actors and interactions that affect the outcomes. Data and content analysis complement the integrated theoretical framework of social capital and social network analysis. The network offers additional and new insights on properties and the determinants of development outcomes that correspond with social capital network theory. This framework provides the language to understand the bridging and bonding, as well as diversity and homophily effects in development interventions. The case studies of the Afghanistan NSP and the FATA RLCIP project serve as critical examples for demonstrating these paradoxical effects which challenge the notion of sustainability. Cohesion, cultural context, as well as the institutions ("the rules of the game") developed by organizations ("players in the game") explain the level of social interconnectivity, that in turn, determines the outcome of the sustainability. Sustainability of local authority and empowerment becomes an important indicator of the effectiveness of these interventions, as their objective is to establish sustainable community institutions.

Moreover, as a form of evaluation, network analysis supplements current monitoring and evaluation efforts that follow more conventional "logical framework" type approaches by adding an explorative, descriptive analysis of the network structure and properties explaining the significance of relationships (Davies, 2006). Though development interventions create and enhance bridging links among the local communities, providing opportunities for building social capital, social network theory directs focus to severing the ties that demonstrate negative externalities, and creating the bridges or connections that produce positive externalities. Enhancing the bridging links among the locality allows for greater influence and ownership among the recipients or beneficiary populations. Localized "cut points" should emerge in order to ensure that if the current external "brokers" are removed, the direction of community capacity building will still remain progressive. The inclusive participation, shifting influence and ownership among the locality, will be integral to reducing dependency and thus, creating and maintaining sustainable development processes. Though impact results from literature review show progress, the literature also shows limited transfer of power and sustained gains, and the extent to which local actors hold authority over their projects must be further investigated and measured through a network lens. This network analysis study will promote understanding among local and international actors of their positioning and current influence on the program

impact. For example, on creating links to subnational governance structures, the more centralized institutions would be crucial to integrate among different communities. This relates to a method of network intervention, called "alterations," which can be applied throughout the network (Valente, 2012). Producing "alterations" of ties or actors (i.e. providing more prominent and influential roles to the local communities), can help transform the program structures to best meet the needs of the beneficiaries in the next phases of the programs.

8.2. The Next Steps in Future Research

As the first phase of a more elaborate research design, many useful tools and perspectives can come from evaluating networks in development interventions. The next step will examine the actors in more detail and expand the network data with more stakeholders. Block modeling (among the different layers of the hierarchy) and a more localized level of analysis will allow for a closer assessment on the micro and individual interactions influenced by specific aspects of the socio-cultural heterogeneity, as well as the "multiplexity" of relations and overlapping groups. Understanding that the partitioning within Gephi does not portray the overlapping networks based on informal connections or clique formation, there are other more advanced methods, like "clique-finder," which would be useful in this approach. Adding the specific cultural classifications of nodes for individuals or groups in data coding can also indicate overlapping effects.

The next step in the larger research design will also include a qualitative comparative analysis (QCA) of embedded case studies within these large development projects. Allowing for a more systematic analysis of comparison, both SNA and QCA have been integrated independently more recently for evaluation purposes in development (Davies, 2003; Serrat, 2009; Schiffer and Hauck, 2010; Baptist and Befani, 2015). The SNA indicators will be applied as conditions within the QCA to assess necessary and sufficient consistency and determine the conditions (or the combination of conditions) the explain the success of failure of projects in conflict and fragile environments. As a two-step process, this has been completed in different contexts and policy domains (Yamasaka and Spreitzer, 2006; Fischer, 2011), but not in the context of impact evaluation and within developing/fragile and conflict-affected countries. It will also incorporate an additional comparative analysis among more projects within the country. Comparing the networks of CDD interventions that are largely more domestic to those that entail greater international involvement would particularly show important comparisons of structures. The visualizations in this analysis depict examples of the anticipated structures of the development programs through initial content review. However, with an expanded informal network, from fieldwork and qualitative interviews, the networks may look different (Faul, 2016). The networks are constructed from a review of the formal documentation, covering the formal structure of the intervention. The steps to follow would involve collecting further archival research on these development programs and involving comparison of subcase studies. Further, identifying the subprojects to study at the subnational level, and conducting network analyses of the subprojects will be a critical part of the localized comparisons of networks. As comparative networks in public policy continues to be an underexplored area in empirical network studies, this research would be a fruitful contribution (Victor et al., 2016). Beyond this, incorporating other more advanced methods to provide a more robust understanding of comparison would be vital. In the next phase, applying the Exponential Random Graph Models (ERGM) or permutation tests to the relevant individual metrics, especially transitivity and the triad census, would also involve comparison and produce more meaningful, robust results in the analysis of network effectiveness (Borgatti et al, 2013; Eilstrup-Sangiovanni, 2016).

Lastly, evaluating the network across time would involve transforming the network evaluation, which is currently a "cumulative model," to a "consecutive model", by examining how the network evolves or changes (Davies, 2006). This is important for monitoring and evaluation specific to NSP and RLCIP in the current time and going forward, as different impact evaluations normally take place a few years after closeout. Additionally, social network analysis in these types of projects can incorporate qualitative (ethnographic) field research for verification, including interviews, focus groups with mapping exercises, and survey questionnaires. Further triangulation and mixed qualitative and quantitative methods will provide a clearer picture that can correct any concern of bias and ensure validity and reliability of data collection on the node and edge attributes.

8.3. Concluding Remarks: Are CDD Approaches Sustainable?

According to some practitioners, progress for the achievement of sustainable CDD outcomes is evident.[46] But when defining sustainability as locally-owned processes, the cases analyzed in this study convey some inherent problematic structural concerns to consider in externally initiated development programs. For an intuitive understanding of what sustainability involves, the "social inclusion" factor for instance, it is important to understand where power and influence resides in the development network as a whole and the potential implications. Network analysis is an important tool to gain perspective on impact and sustainability through the relationship attributes of the actors involved. The diversity of social structures in development programs is an important factor. The paradoxical effects of homophily and heterogeneity among actors serve as crucial environmental challenges in building trust and cohesion among key donor and recipient actors involved in the aid-processes, and hence, decentralized, democratic processes. This is arguably crucial to the effectiveness of aid programs, and constitutes a unique experience in conflict-affected and culturally variant regions like Afghanistan and Pakistan.

Power dynamics and challenges of fragility create further problems in reconciling state-society relations. A state's inability to support its citizens creates an avenue for external assistance. Building the state's capacity to deliver the basic services involves the redistribution of power, influence, and resources, embedded in several approaches in the international development industry. For the cases of Afghanistan and Pakistan, establishing a coherent national strategy is difficult, as alternative competing governance structures dominate in spaces with limited state control. Hence, international agencies have designed programs like community-driven initiatives, for that reason. However, one must remain critical to the actual effect towards inclusive processes, partly due to the hierarchical nature of programs. As this mixed-methods study has shown (combining literature on CDD and aid-effectiveness, global governance networks, case studies, alongside social capital theory and network analysis), positive externalities do not necessarily result due to the complexity of social networks and the web of inter-organizational relationships that create greater burdens and challenge trust-building potential. An analysis of the social structures and organizational networks of case studies in Afghanistan and Pakistan presents a clear hierarchical structure illustrating centralization and core-peripheral characteristics. Thus, a cyclical element of dependency is indicative in the blueprint of these interventions connecting to the overall architecture and complex "web" of aid relationships.

[46] "Community-Driven Development Overview." *The World Bank Group.* Web.

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Appendix: Tables and Figures

Table 1: Node and Edge Attributes

Node Attributes	Edge Attributes
Donor/Funding Mechanism	Funds
Government	Reporting to
International NGO	Technical Assistance, Capacity Building, Procurement
Civil Society Organization/NGO	Oversight/Planning
Beneficiary Population	General Information exchange/General Support
Project Implementation Unit	

Table 2: NSP List of Facilitating Partners, Abbreviations, Province Coverage

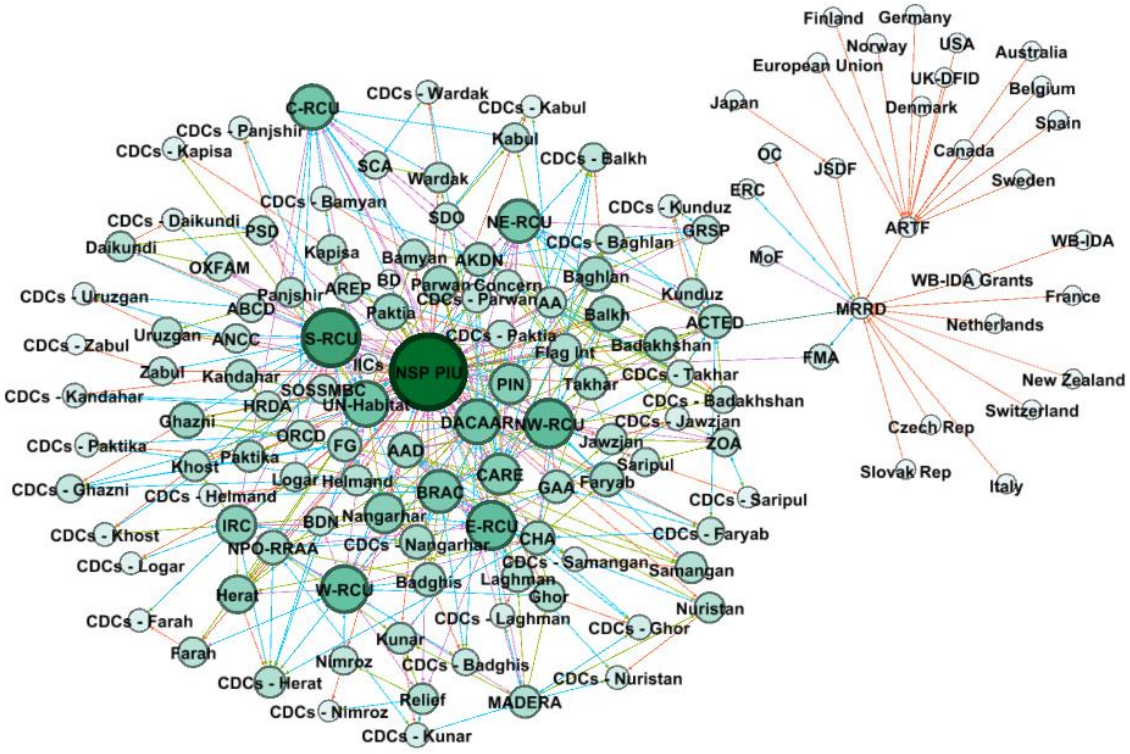
Abbreviation	FP (Full Name)	Coverage Area
ABCD	Afghan Business Capacity Development	Uruzgan
ACTED	Agency for Technical Cooperation and Development	Baghlan, Badakhshan, Faryab, Kunduz, Takhar
AA	Action Aid	Jawzjan, Kabul
AAD	Afghan Aid	Badakhshan, Ghor, Nuristan, Samangan
AKDN	Agha Khan Development Network	Badakhshan, Baghlan, Bamyan, Parwan, Takhar
AREP	Afghan Rehabilitation & Education Programme	Paktya
ANCC	Afghan National Re-construction Coordination	Uruzgan
BRAC	Bangladesh Rural Advancement Committee	Nangarhar, Helmand, Paktika, Badghis, Samangan,Takhar
CARE	Cooperative for Assistance & Relief Everywhere	Baghlan, Balkh, Ghazni, Paktya, Parwan, Wardak
CHA	Coordination of Humanitarian Assistance	Balkh, Faryab, Ghor, Herat
Concern	Concern Worldwide	Badakhshan, Takhar
DACAAR	Danish Committee for Aid to Afghan Refugees	Badghis, Faryab, Ghazni, Herat, Laghman, Paktya, Parwan
Flag Int	Flag International	Ghazni, Badakhshan
FG	Future Generation	Ghazni , Nangarhar
GAA	German Agro -Action	Faryab, Jawzjan, Nangarhar
GRSP	Ghazni Rural Support Program	Baghlan, Kunduz
IRC	International Rescue Committee	Herat, Khost, Logar, Nangarhar
MADERA	Mission d'aide au Dev.des Economies Rural	Ghor, Kunar, Laghman, Nuristan
NPO/RRAA	Norwegian Project Office /Rural Rehabilitation	Badghis, Herat, Nangarhar, Kunar
OXFAM	Oxford Committee for Famine Relief	Daikundi
PIN	People in Need	Baghlan, Balkh, Nangarhar, Paktya
PSD	Partners for Social Development	DaiKundi
Relief Int.	Relief International	Kunar, Nimroz
SCA	Swedish Committee for Afghanistan	Wardak
SDO	Sanayee Development Organization	Kabul
UN-Habitat	United Nations Human Settlement Programme	Balkh, Bamyan, Farah, Herat, Kandahar, Kapisa, Nangarhar, Panjshir, Parwan
ZOA	ZOA Refugee Care for Afghanistan	Jawzjan , Saripul
BDN	Bakhtar Development Network	Herat
SOSSMBC JV NTHDOA	Social for Social Services Madhya Bharat Chapter	Khost
HRDA	Human Resource Development Agency	Kandahar
ORCD	Organization for Research and Community Development	Paktika

Table 3: NSP List of Regional Coordination Units and Province Coverage

Northwestern	NW-RCU	Jawzjan, Balkh, Samangan, Saripul, Faryub
Western	W-RCU	Badghis, Ghor, Herat, Farah, Nimroz
Northeastern	NE-RCU	Badakhshan, Takhar, Kunduz, Baghlan
Eastern	E-RCU	Nuristan, Kunar, Laghman, Nangarhar
Central	C-RCU	Panjshir, Parwan, Kabul, Bamyan, Wardak, Logar, Kapisa
Southern	S-RCU	Khost, Paktia, Ghazni, Paktika, Daikundi, Uruzgan, Zabul, Kandahar, Helmand

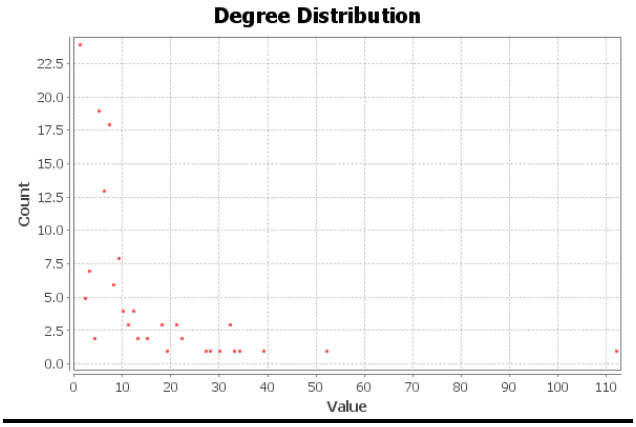
Figure 1: Afghanistan NSP Network Structure (Eigenvector Centrality)

Node Size and Color: Eigenvector Centrality



Note: There are 136 Nodes and 645 Edges in the current Afghanistan NSP Network Analysis. This visualization was computed in Gephi.

Figure 2: NSP Degree Distribution



Note: Chart was computed in Gephi.

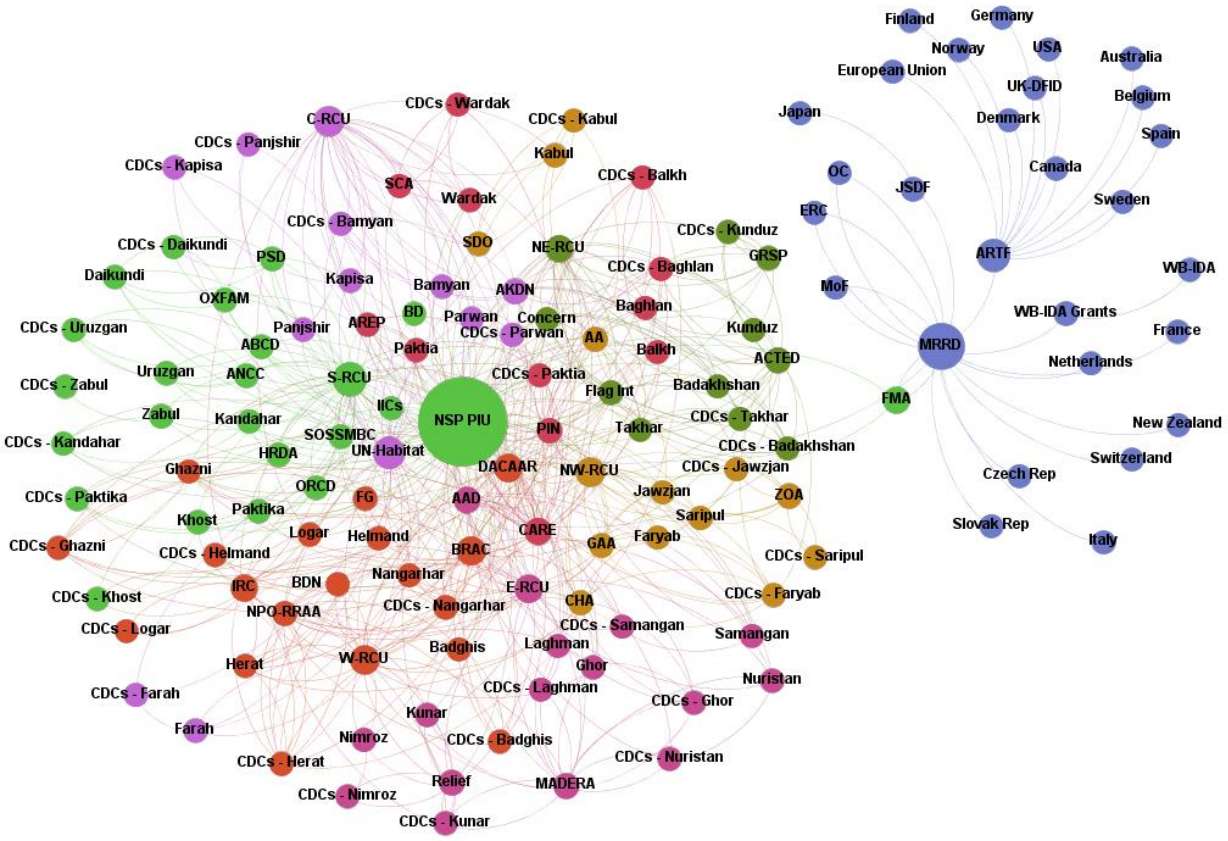
NSP Edge Attribute Color Legend

Red	Funds	14.42%
Blue	Reporting to	20.22%
Light Green	Capacity Building	28.22%
Dark Green	Oversight and Planning	0.47%
Purple	Information, Support	36.28%

Acronym Key for Figure 1, 3, 6, 13:

IDA = International Development Association
NSP = National Solidarity Program
PIU = Project Implementation Unit
MRRD = Ministry for Rural Rehabilitation and Development
CDC = Community Development Council
RCU = Regional Coordination Unit
IIC = Independent International Consultants
ERC = External Review Committee
OC = Oversight Consultant

Figure 3: Afghanistan NSP Community Detection



Node Color: Communities
Node Size: Betweenness Centrality
Edge Color: Edge attributes

Modularity (at Resolution 1.0): 0.454
Number of Communities: 8

Gephi Algorithm: The Louvain Method

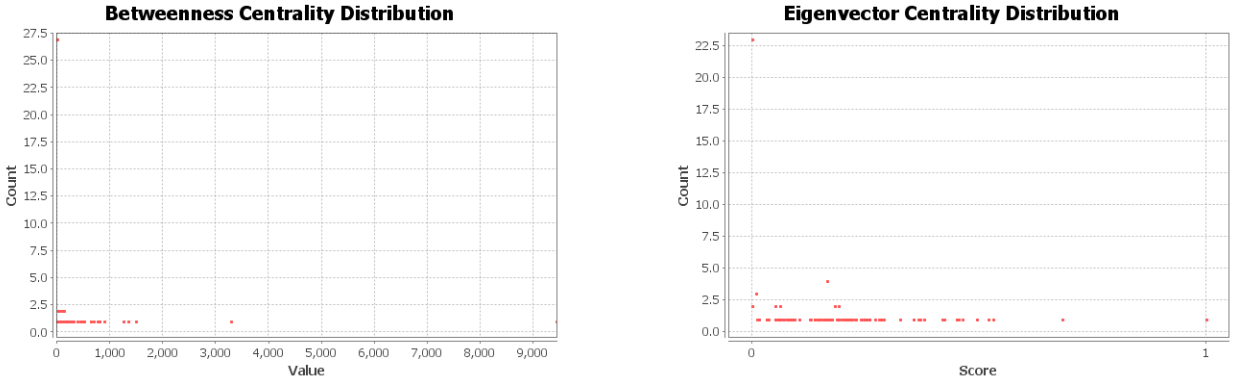
Algorithm citation: Vincent D Blondel, Jean-Loup Guillaume, Renaud Lambiotte, Etienne Lefebvre, *Fast unfolding of communities in large networks*, in Journal of Statistical Mechanics: Theory and Experiment 2008 (10), P1000.

Resolution citation: R. Lambiotte, J.-C. Delvenne, M. Barahona *Laplacian Dynamics and Multiscale Modular Structure in Networks 2009.*

Figure 4: NSP Modularity Class Distribution

Note: Chart computed in Gephi.

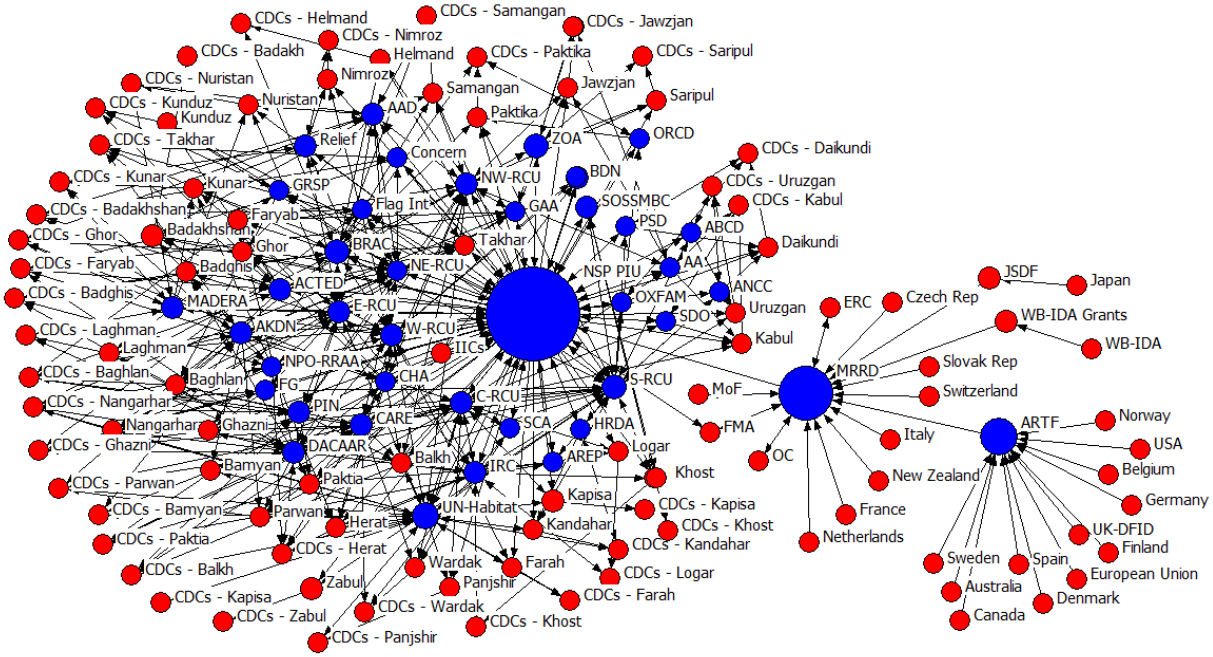
Figure 5: Afghanistan NSP Betweenness Centrality and Eigenvector Centrality Distribution



Note: Charts computed in Gephi.

Algorithm citation (Betweeness): Ulrik Brandes, *A Faster Algorithm for Betweenness Centrality*, in Journal of Mathematical Sociology 25(2):163-177, (2001).

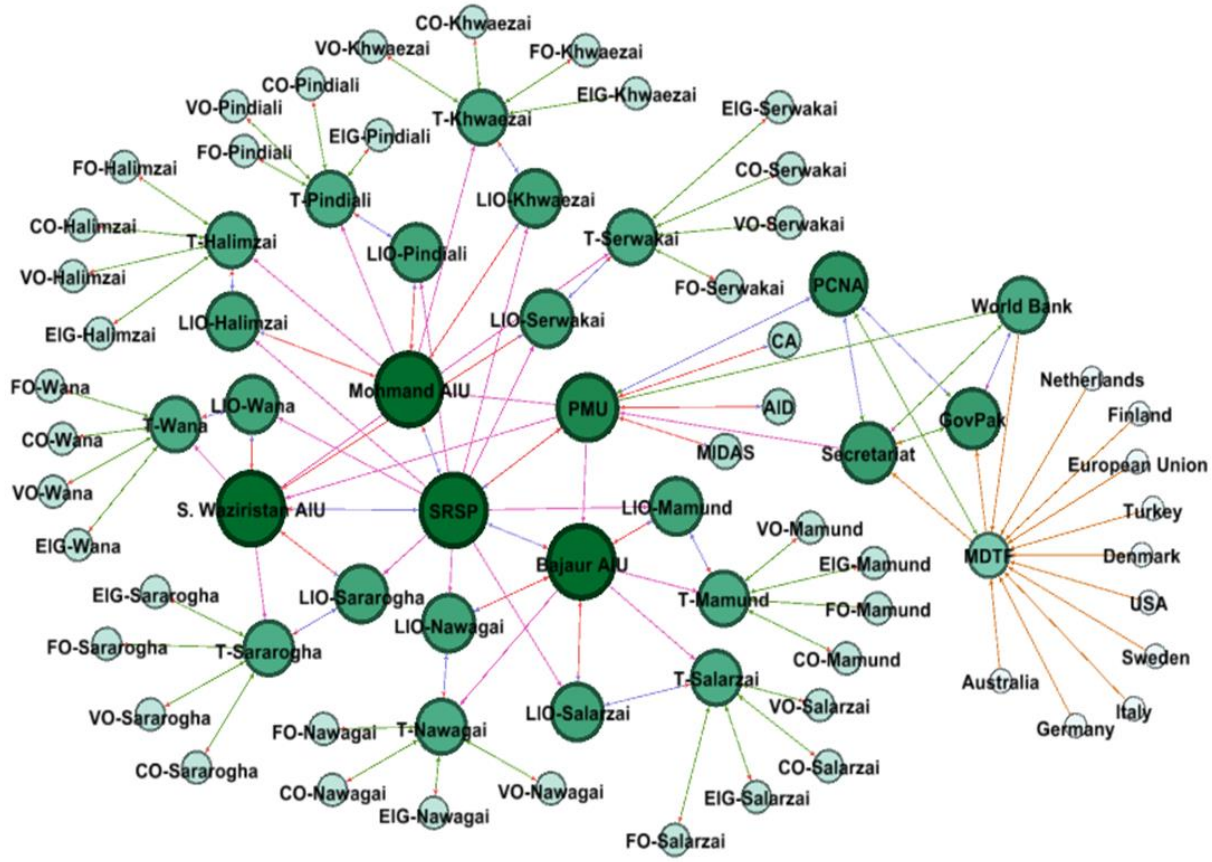
Figure 6: Afghanistan NSP Network "Cutpoints"



Note: The nodes colored in blue emphasize" cutpoints," if these nodes are removed, the network would become disconnected. This concept highlights centrality and brokerage. This visualization was computed as a directed graph through the Netdraw application in UCINET.

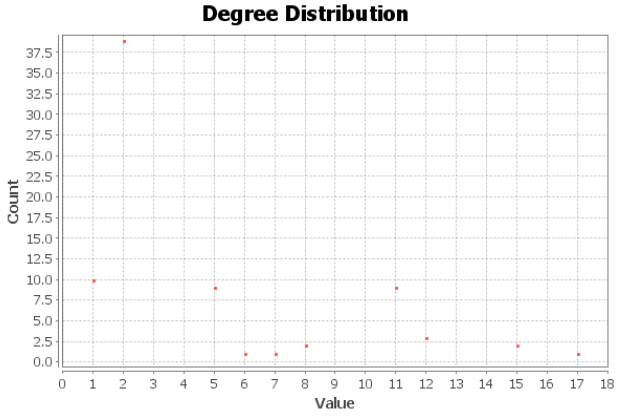
Figure 7: FATA RLCIP Network Structure (Eigenvector Centrality)

Node Size and Color: Eigenvector Centrality



Note: This is a directed graph with 77 nodes and 208 edges. The visualization was computed in Gephi.

Figure 8: RLCIP Degree Distribution

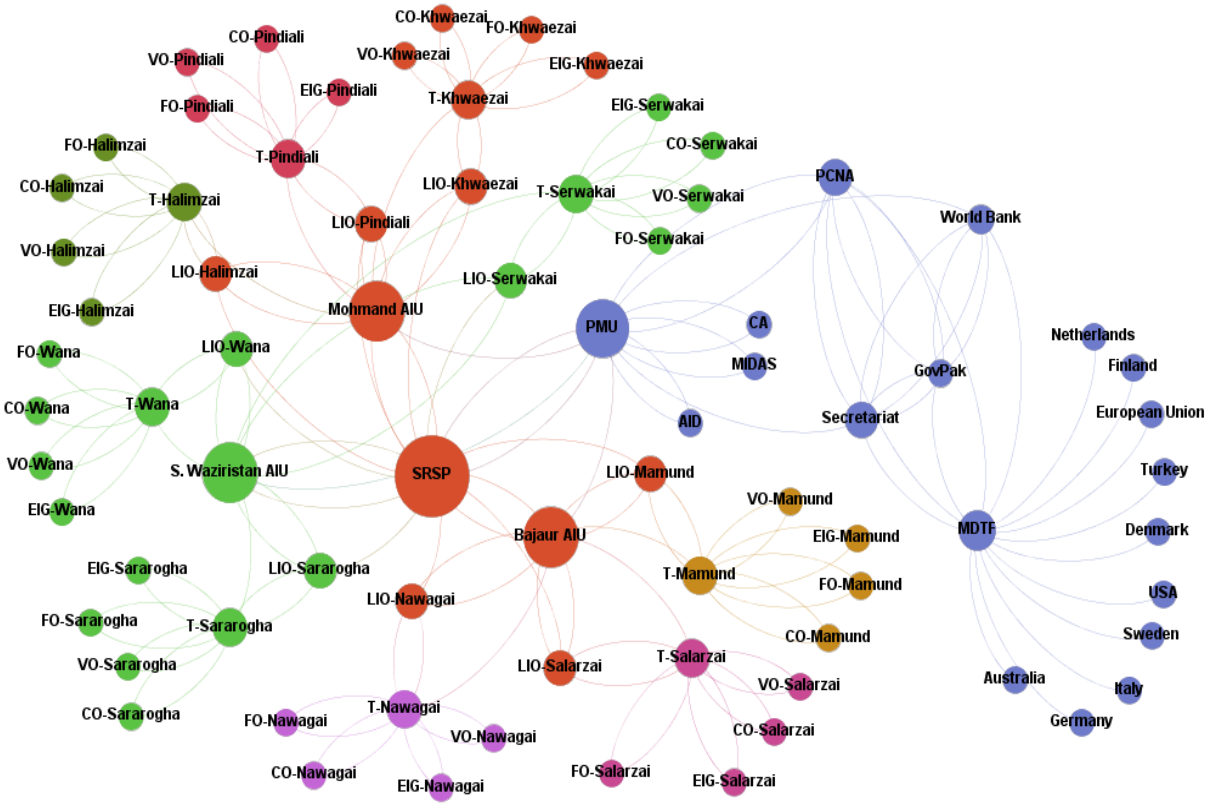


Note: Chart was computed in Gephi.

Acronym Key for Figure 7, 9, 12, 13:

FATA: Federally Administrated Tribal Areas
RLCIP: Rural Livelihoods and Community Infrastructure Program
IDA = International Development Association
MDTF = Multi-Donor Trust Fund
PCNA = Post Conflict Needs Assessment
MIDAS = Institutional Development & Comm. Firm
AID = M&E Consultancy Firm
CA = Infrastructure Schemes Consultancy Firm
PMU = Project Management Unit
SRSP = Sarhad Rural Support Program
AIU = Agency Implementation Unit
T = Tehsil
LIO = Local Indigenous Organization
VO = Village Organizations
CO = Community Organizations
FO = Farmer Organizations
EIG = Economic Interest Groups

Figure 9: FATA RLCIP Community Detection



Node Color: Communities
Node Size: Betweenness Centrality
Edge Color: Edge attributes

Modularity (at Resolution 1.0): 0.538
Number of Communities: 8

Gephi Algorithm: The Louvain Method

Algorithm Citation: Vincent D Blondel, Jean-Loup Guillaume, Renaud Lambiotte, Etienne Lefebvre, *Fast unfolding of communities in large networks*, in Journal of Statistical Mechanics: Theory and Experiment 2008 (10), P1000.

Resolution Citation: R. Lambiotte, J.-C. Delvenne, M. Barahona *Laplacian Dynamics and Multiscale Modular Structure in Networks 2009.*

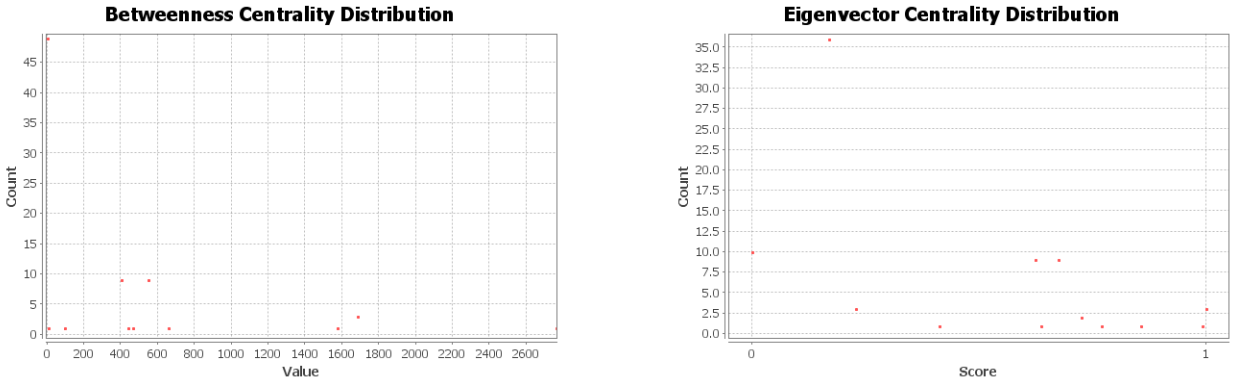
RLCIP Edge Attribute Color Legend

Dark Green	Funds	8.14%
Purple	Reporting to	25.58%
Red	Capacity Building	35.47%
Light Green	Oversight and Planning	13.95%
Blue	Information, Support	16.86%

Figure 10: Modularity Class Distribution

Note: Chart computed in Gephi

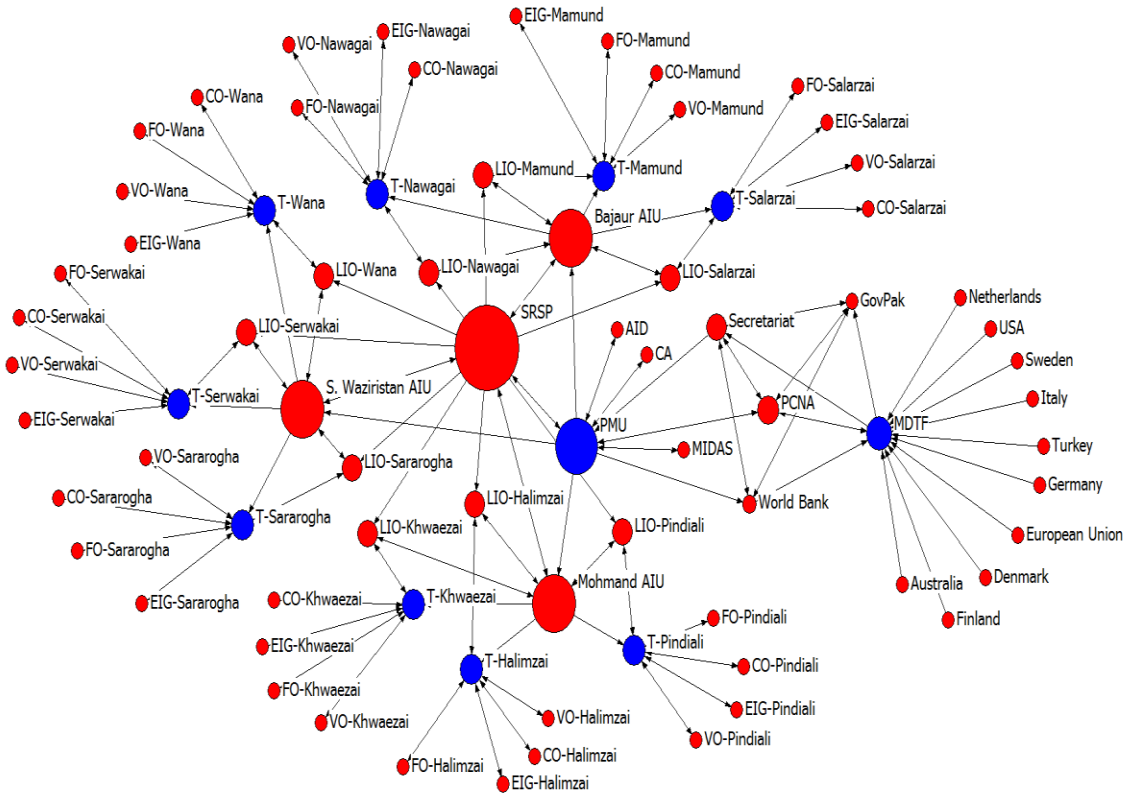
Figure 11: FATA RLCIP Betweenness and Eigenvector Centrality Distribution



Note: Charts were computed in Gephi.

Algorithm citation (Betweenness): Ulrik Brandes, *A Faster Algorithm for Betweenness Centrality*, in Journal of Mathematical Sociology 25(2):163-177, (2001).

Figure 12: FATA RLCIP Network "Cutpoints"



Note: The nodes colored in blue emphasize" cutpoints," if these nodes are removed, the network would become disconnected. This concept highlights centrality and brokerage. The visualization was computed as a directed graph in the Netdraw application of UCINET.

Table 4: NSP and RLCIP Measures of Network Cohesion

Multiple Metrics for Cohesion	NSP	RLCIP
Density	0.031	0.029
Average Degree	4.448	2.234
Average Clustering Coefficient*	0.316	0.104
Diameter	5.0	7.0
Average Path Length	2.963	4.853
# Weakly Connected**	1	1
# Strongly Connected **	30	11
Triad Census Results for Transitivity[47]	0.034	0.009
Network Transitivity (percentage)	4.590%	5.768%
Geodesic: Distance-based cohesion (Compactness) * **	0.294	0.221
Geodesic: Distance-weighted fragmentation (Breadth)	0.706	0.779

Note: These measures of cohesiveness were calculated from the Gephi and UCINET software.

***Clustering Coefficient Algorithm (Calculated in Gephi):** (The average clustering coefficient is the mean value of individual coefficients measuring overall interconnectivity among all nodes.) Matthieu Latapy, *Main-memory Triangle Computations for Very Large (Sparse (Power-Law)) Graphs*, in Theoretical Computer Science (TCS) 407 (1-3), 458-473, 2008.

****Connected Components Algorithm (Calculated in Gephi):** Robert Tarjan, *Depth-First Search and Linear Graph Algorithms*, in SIAM Journal on Computing 1 (2): 146-160 (1972).

*** (The range is 0 to 1: larger values indicate greater cohesiveness)
Note: The Geodesic distant report algorithm detects the number of edges in the shortest path between each pair of nodes. This was calculated in UCINET.

Table 5: NSP and RLCIP Network Centralization

Summary of Network Centralization Index Scores		
Centrality Measure	**NSP**	**RLCIP**
Degree	47.60%	14.50%
Betweenness	49.45%	44.61%
Closeness	56.73%	32.25%
Bonacich Eigenvector	69.12%	64.01%

[47] This was the triad census network transitivity result, which differs from the percentage obtained from the transitivity analysis without a full triad census. Both these analyses were computed in UCInet. There will be a slight difference in algorithms within UCInet, when doing a full triad census versus a transitivity census.

Table 6: NSP Degree, Eigenvector and Betweenness for Beneficiaries and Implementers

NSP Beneficiaries	OutDeg	InDeg	nOutDeg	nInDeg	Eigen	nBetw
CDCs - Bamyan	2	3	0.007	0.01	0.031	0.067
CDCs - Kabul	2	3	0.007	0.01	0.015	0.015
CDCs - Kapisa	1	1	0.003	0.003	0.015	0
CDCs - Logar	1	2	0.003	0.007	0.015	0.014
CDCs - Panjshir	1	2	0.003	0.007	0.021	0.027
CDCs - Parwan	4	5	0.014	0.017	0.057	0.2
CDCs - Wardak	2	3	0.007	0.01	0.02	0.03
CDCs - Kunar	3	4	0.01	0.014	0.027	0.05
CDCs - Laghman	2	3	0.007	0.01	0.026	0.045
CDCs - Nangarhar	7	8	0.024	0.028	0.08	0.414
CDCs - Nuristan	2	3	0.007	0.01	0.021	0.03
CDCs - Badakhshan	5	5	0.017	0.017	0.038	0.1
CDCs - Baghlan	5	6	0.017	0.021	0.051	0.166
CDCs - Kunduz	2	3	0.007	0.01	0.018	0.018
CDCs - Takhar	4	5	0.014	0.017	0.041	0.125
CDCs - Balkh	4	5	0.014	0.017	0.052	0.162
CDCs - Faryab	4	5	0.014	0.017	0.044	0.134
CDCs - Jawzjan	2	3	0.007	0.01	0.018	0.021
CDCs - Samangan	2	3	0.007	0.01	0.027	0.051
CDCs - Saripul	1	2	0.003	0.007	0.009	0.007
CDCs - Daikundi	2	3	0.007	0.01	0.014	0.008
CDCs - Ghazni	4	5	0.014	0.017	0.045	0.115
CDCs - Helmand	1	2	0.003	0.007	0.017	0.019
CDCs - Kandahar	2	3	0.007	0.01	0.026	0.053
CDCs - Khost	1	2	0.003	0.007	0.015	0.013
CDCs - Paktia	2	3	0.007	0.01	0.03	0.051
CDCs - Paktika	2	3	0.007	0.01	0.022	0.034
CDCs - Uruzgan	2	3	0.007	0.01	0.014	0.008
CDCs - Zabul	0	1	0	0.003	0.004	0
CDCs - Badghis	3	4	0.01	0.014	0.04	0.091
CDCs - Farah	1	2	0.003	0.007	0.021	0.032
CDCs - Ghor	3	4	0.01	0.014	0.03	0.064
CDCs - Herat	6	7	0.021	0.024	0.068	0.346
CDCs - Nimroz	1	2	0.003	0.007	0.01	0.005

NSP Implementers and Facilitators	OutDeg	InDeg	nOutDeg	nInDeg	Eigen	nBetw
NSP Implementation Unit	72	40	0.252	0.14	0.504	51.166
NW-RCU	17	17	0.059	0.059	0.172	4.349
W-RCU	16	16	0.056	0.056	0.161	4.095
NE-RCU	14	15	0.049	0.052	0.15	2.681
E- RCU	16	16	0.056	0.056	0.17	3.224
C-RCU	17	16	0.059	0.056	0.165	4.713
S-RCU	26	26	0.091	0.091	0.207	7.91
Bamyan PIU	2	4	0.007	0.014	0.078	0.114
Kabul PIU	2	4	0.007	0.014	0.062	0.201
Kapisa PIU	2	3	0.007	0.01	0.066	0.685
Logar PIU	2	3	0.007	0.01	0.062	0.223
Panjshir PIU	2	3	0.007	0.01	0.068	0.187
Parwan PIU	2	6	0.007	0.021	0.104	0.061
Wardak PIU	2	4	0.007	0.014	0.067	0.152
Kunar PIU	2	5	0.007	0.017	0.074	0.138
Laghman PIU	2	4	0.007	0.014	0.073	0.125
Nangarhar PIU	2	9	0.007	0.031	0.127	0.036
Nuristan PIU	2	4	0.007	0.014	0.069	0.172
Badakhshan PIU	2	7	0.007	0.024	0.088	0.685
Baghlan PIU	2	7	0.007	0.024	0.097	0.06
Kunduz PIU	2	4	0.007	0.014	0.064	0.189
Takhar PIU	2	6	0.007	0.021	0.087	0.067
Balkh PIU	2	6	0.007	0.021	0.1	0.063
Faryab PIU	2	6	0.007	0.021	0.091	0.067
Jawzjan PIU	2	4	0.007	0.014	0.065	0.178
Samangan PIU	2	4	0.007	0.014	0.074	0.133
Saripul PIU	2	3	0.007	0.01	0.056	0.335
Daikundi PIU	2	4	0.007	0.014	0.064	0.223
Ghazni PIU	2	6	0.007	0.021	0.095	0.072
Helmand PIU	2	3	0.007	0.01	0.067	0.215
Kandahar PIU	2	4	0.007	0.014	0.076	0.141
Khost PIU	2	3	0.007	0.01	0.065	0.238
Paktia PIU	2	4	0.007	0.014	0.08	0.121
Paktika PIU	2	4	0.007	0.014	0.072	0.149
Uruzgan PIU	2	4	0.007	0.014	0.064	0.223
Zabul PIU	2	2	0.007	0.007	0.054	0.685
Badghis PIU	2	5	0.007	0.017	0.087	0.081
Farah PIU	2	3	0.007	0.01	0.067	0.187
Ghor PIU	2	5	0.007	0.017	0.077	0.125
Herat PIU	2	7	0.007	0.024	0.11	0.049
Nimroz PIU	2	3	0.007	0.01	0.057	0.305
ABCD	4	3	0.014	0.01	0.06	0.504
ACTED	13	8	0.045	0.028	0.109	1.531
AA	7	5	0.024	0.017	0.076	1.124
AAD	13	8	0.045	0.028	0.119	1.924
AKDN	14	9	0.049	0.031	0.124	1.364
AREP	3	3	0.01	0.01	0.055	0.43
ANCC	4	3	0.014	0.01	0.06	0.504
BRAC	18	12	0.063	0.042	0.159	3.866
CARE	16	11	0.056	0.038	0.144	2.885
CHA	11	7	0.038	0.024	0.106	0.961
Concern	6	4	0.021	0.014	0.069	0.285
DACAAR	20	13	0.07	0.045	0.176	3.661
Flag Int	7	5	0.024	0.017	0.085	0.507
FG	7	5	0.024	0.017	0.093	0.324
GAA	9	6	0.031	0.021	0.096	0.878
GRSP	6	4	0.021	0.014	0.067	0.549
IRC	13	9	0.045	0.031	0.132	2.593
MADERA	11	7	0.038	0.024	0.093	1.516
NPO-RRAA	11	7	0.038	0.024	0.109	0.88
OXFAM	4	3	0.014	0.01	0.06	0.504
PIN	13	9	0.045	0.031	0.138	1.373
PSD	4	3	0.014	0.01	0.06	0.504
Relief	7	5	0.024	0.017	0.076	1.281
SCA	4	3	0.014	0.01	0.057	0.338
SDO	4	3	0.014	0.01	0.056	0.451
UN-Habitat	24	16	0.084	0.056	0.205	6.603
ZOA	6	4	0.021	0.014	0.057	2.817
BDN	3	3	0.007	0.01	0.055	0.052
SOSSMBC	3	3	0.01	0.01	0.054	1.246
HRDA	4	3	0.014	0.01	0.061	0.31
ORCD	4	3	0.014	0.01	0.061	0.333

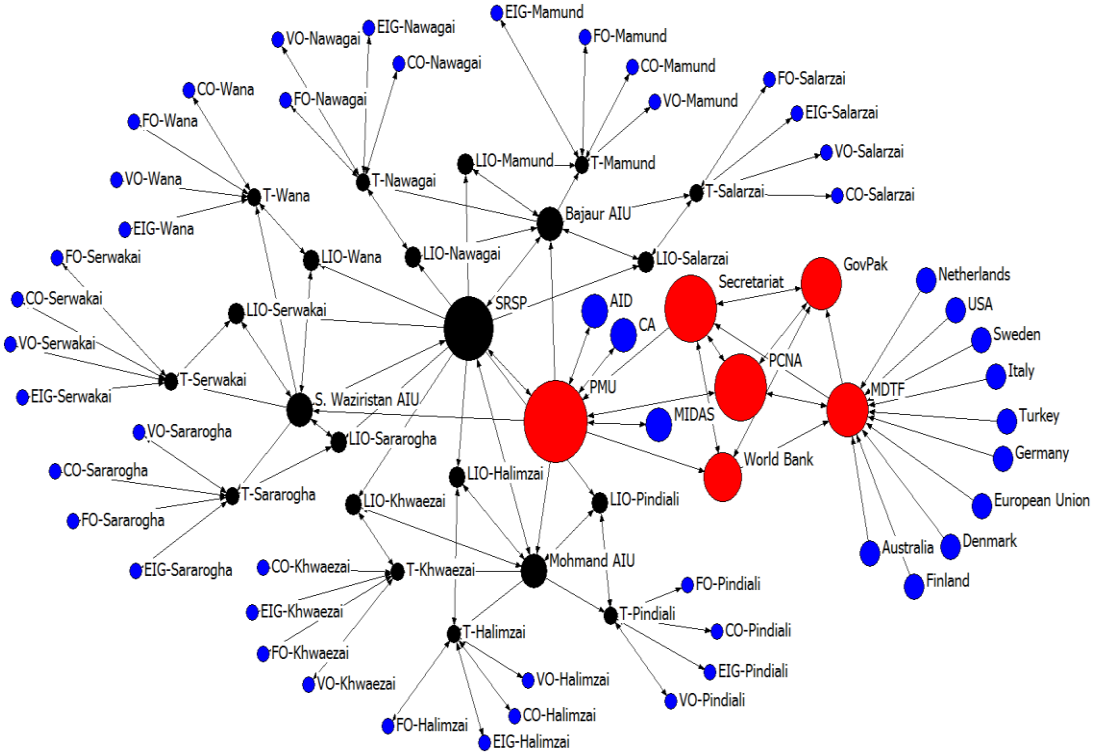
Table 7: RLCIP Degree, Eigenvector, and Betweenness for Beneficiaries and Implementers

RLCIP Implementers	OutDeg	InDeg	nOutDeg	nInDegree	Eigenvector	nBetweenness
World Bank	3	3	0.039	0.039	0.141	1.649
Gov of Pakistan	3	4	0.039	0.053	0.108	0.108
Secretariat	4	4	0.053	0.053	0.162	7.722
PCNA	4	4	0.053	0.053	0.141	8.175
MDTF	3	12	0.039	0.158	0.149	11.585
Project Management	9	6	0.118	0.079	0.355	27.62
SRSP	13	4	0.171	0.053	0.469	48.5
CA	1	1	0.013	0.013	0.064	0
AID	1	1	0.013	0.013	0.064	0
MIDAS	1	1	0.013	0.013	0.064	0
Bajaur AIU	7	5	0.092	0.066	0.283	29.579
Mohmand AIU	7	5	0.092	0.066	0.283	29.579
S. Waziristan AIU	7	5	0.092	0.066	0.283	29.579
LIO-Salarzai	2	3	0.26	0.039	0.153	7.061
LIO-Mamund	2	3	0.26	0.039	0.153	7.061
LIO-Nawagai	2	3	0.26	0.039	0.153	7.061
LIO-Pindiali	2	3	0.26	0.039	0.153	7.061
LIO-Halimzai	2	3	0.26	0.039	0.153	7.061
LIO-Khwaezai	2	3	0.26	0.039	0.153	7.061
LIO-Sararogha	2	3	0.26	0.039	0.153	7.061
LIO-Serwakai	2	3	0.26	0.039	0.153	7.061
LIO-Wana	2	3	0.26	0.039	0.153	7.061
T-Salarzai	5	6	0.66	0.079	0.091	9.614
T-Mamund	5	6	0.66	0.079	0.091	9.614
T-Nawagai	5	6	0.66	0.079	0.091	9.614
T-Pindiali	5	6	0.66	0.079	0.091	9.614
T-Halimzai	5	6	0.66	0.079	0.091	9.614
T-Khwaezai	5	6	0.66	0.079	0.091	9.614
T-Sararogha	5	6	0.66	0.079	0.091	9.614
T-Serwakai	5	6	0.66	0.079	0.091	9.614
T-Wana	5	6	0.66	0.079	0.091	9.614

RLCIP Beneficiaries	OutDeg	InDeg	nOutDeg	nInDegree	Eigenvector	nBetweenness
CO-Salarzai	1	1	0.013	0.013	0.017	0
CO-Mamund	1	1	0.013	0.013	0.017	0
CO-Nawagai	1	1	0.013	0.013	0.017	0
CO-Pindiali	1	1	0.013	0.013	0.017	0
CO-Halimzai	1	1	0.013	0.013	0.017	0
CO-Khwaezai	1	1	0.013	0.013	0.017	0
CO-Sararogha	1	1	0.013	0.013	0.017	0
CO-Serwakai	1	1	0.013	0.013	0.017	0
CO-Wana	1	1	0.013	0.013	0.017	0
VO-Salarzai	1	1	0.013	0.013	0.017	0
VO-Mamund	1	1	0.013	0.013	0.017	0
VO-Nawagai	1	1	0.013	0.013	0.017	0
VO-Pindiali	1	1	0.013	0.013	0.017	0
VO-Halimzai	1	1	0.013	0.013	0.017	0
VO-Khwaezai	1	1	0.013	0.013	0.017	0
VO-Sararogha	1	1	0.013	0.013	0.017	0
VO-Serwakai	1	1	0.013	0.013	0.017	0
VO-Wana	1	1	0.013	0.013	0.017	0
FO-Salarzai	1	1	0.013	0.013	0.017	0
FO-Mamund	1	1	0.013	0.013	0.017	0
FO-Nawagai	1	1	0.013	0.013	0.017	0
FO-Pindiali	1	1	0.013	0.013	0.017	0
FO-Halimzai	1	1	0.013	0.013	0.017	0
FO-Khwaezai	1	1	0.013	0.013	0.017	0
FO-Sararogha	1	1	0.013	0.013	0.017	0
FO-Serwakai	1	1	0.013	0.013	0.017	0
FO-Wana	1	1	0.013	0.013	0.017	0
EIG-Salarzai	1	1	0.013	0.013	0.017	0
EIG-Mamund	1	1	0.013	0.013	0.017	0
EIG-Nawagai	1	1	0.013	0.013	0.017	0
EIG-Pindiali	1	1	0.013	0.013	0.017	0
EIG-Halimzai	1	1	0.013	0.013	0.017	0
EIG-Khwaezai	1	1	0.013	0.013	0.017	0
EIG-Sararogha	1	1	0.013	0.013	0.017	0
EIG-Serwakai	1	1	0.013	0.013	0.017	0
EIG-Wana	1	1	0.013	0.013	0.017	0

Figure 13: NSP and RLCIP Network "K-Core Analysis"

RLCIP K-Core (3-Core Analysis, Node Size: Eigenvector Centrality)



NSP K-Core (5-Core Analysis, Node Size: Eigenvector Centrality)