

Acknowledgements

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1. The Purpose of this Handbook

A very common work in English used among international non-governmental organizations (NGOs) is the term, network. Frequently, NGOs make references to personal networks, community networks, organizational networks, and institutional networks. However, all too often the term is used only as a metaphor; that is, only a figure of speech to present an image. Rarely, do NGO staff reflect that networks are actual relationships and linkages that can be measured both quantitatively and qualitatively.

The goal of this handbook is to help NGO staff, and particularly, monitoring and evaluation (M&E) staff to move beyond using network as a metaphor and understand how to measure and map them. More specifically, this handbook is designed to help NGO staff accomplish the following objectives: a) understand what network analysis is, b) how are network data collected, c) how to create visual maps of the network, and d) how to analyze the network data for program/project development or evaluation.

2. Introduction to Network Analysis

There are different types of networks, such as electrical networks, computer networks, neural networks, telecommunication networks and of course, social networks. The focus of this handbook is on social networks.

A social network is any type of relational ties or links between individuals, groups, organizations, and institutions. Relational ties or links can be such things as friendship, exchange of information or money, or seeking advice. Thus, an actual social network is the structure or map of the how different people, groups, organization or institutions are connected together based on a certain type or types of relationships.

Networks are ever present in everyday life. For example, the picture on the top right is a network of friends who connect on the social media site, Facebook. The network is comprised of people who are friends and are friends-of-friends, as well as friends-of-friends-of-friends.

The picture in the middle is a network map of a terrorist network. This network is comprised of individuals who have been identified as having communicated with each other related to the 9/11 attack on the World Trade building in New York.

The network on the bottom right is the World Wide Web (Internet) that shows the connections between millions of websites throughout the world.

Figure 1: Facebook Friendship Network

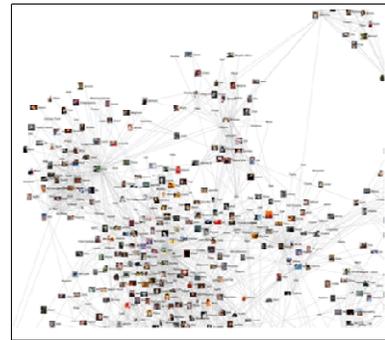


Figure 2: Terrorist Network

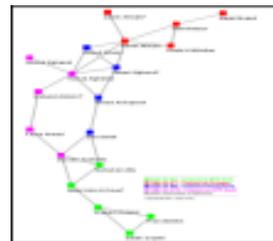
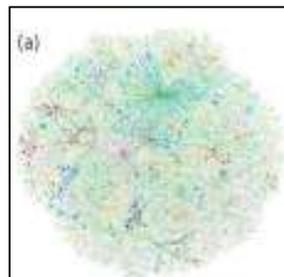


Figure 3: World Wide Web



As shown in the pictures above, network analysis provides visual maps of the linkages between people, groups, organization or institutions. These types of analysis allows us to understand networks overall and their participants. Not only does network analysis provide visual maps, but it also allows for mathematical analysis of these maps. For example, at the network level, we can assess the degree of interaction between network members by calculation of the network density or calculate the degree to which a network is highly centralized (all or most connections are to one or few members).

At the individual level, we can assess the location of members within the network. For example, we can see if a member is central or peripheral; if a member is a broker or bridge between other members; or if members clusters together into smaller groups (cliques).

In this handbook, the focus will be on the visual mapping and its related concepts and much less on mathematical analysis.

3. Network Analysis as an Analytical Tool

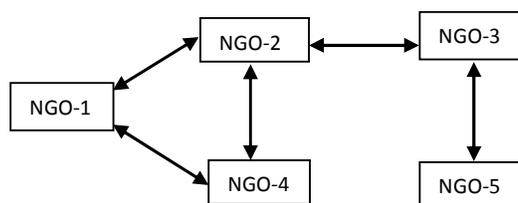
Network analysis is an analytic tool to assist in understanding and help in decision-making. As with any tool, one must understand what its basic components are and how to use them.

As stated above, a network is a set of relationships between individuals, groups, organizations or institutions. In network terminology, these individuals, groups, organizations or institutions represent “nodes” and the relationship linking them, whether informal or formal, represents “ties.”

To illustrate this, let’s start with an example of five NGOs. Let’s say that we asked these five NGOs if they have cooperated with each other in the past 6-months on a project. The table below shows a matrix of the five NGOs. The “✓” in the cells of the table represents that the two NGOs have cooperated with each other in the last 6-months on a project. This table shows that NGO-1 and NGO-2 had cooperated with each other in the past 6-months on a project, as well as NGO-1 and NGO-4, and so forth.

	NGO-1	NGO-2	NGO-3	NGO-4	NGO-5
NGO-1		✓		✓	
NGO-2	✓		✓	✓	
NGO-3		✓			✓
NGO-4	✓	✓			
NGO-5			✓		
Total	2	3	2	2	1

This table can be converted into a map of the relations between these NGOs to show who has cooperated together over the last 6-months on a project.

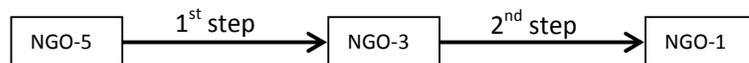


Though difficult to see from the table, from this map it is easy to see which NGOs have cooperated with whom. The map shows that NGO-1, NGO-2 and NGO-3 form a sub-group and that NGO-3 is a “bridge” between the sub-group of NGOs and NGO-5. Also, the map shows that

NGO-2 is the most central NGO among this network, in that it has a total of 3 links, the most of any NGO in the network.

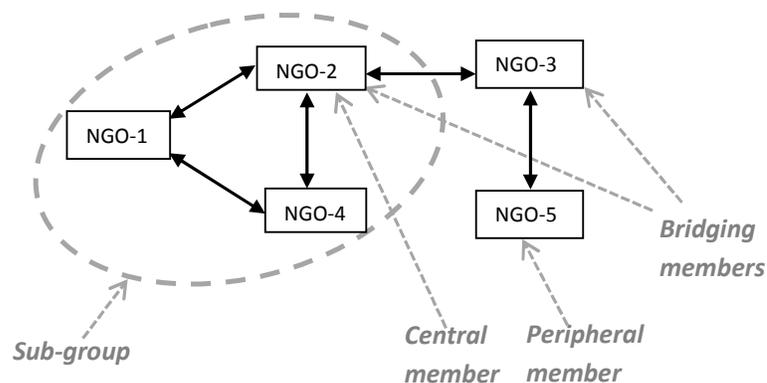
The table also allows us to understand some mathematical characteristics of this network. That is, all the cells in the table represent the total possible number of links between the NGOs. Among these 5 NGOs there is a possibility of 20 total links [that is, 5 NGOs x 4 NGOs (to exclude themselves)]. If all the NGOs had cooperated with each other in the last 6-months all the cells in the table would be filled with “✓” and there would be 20 links, or this network would completely linked or in network terms, a density of 100%. However, in this example there are only 10 of the possible 20 links; thus, the density of this “project cooperation” network is 50% (10/20*100). Network density can range from 0% (no links between any network members) to 100% (all members are linked to each other). The denser the network, the easier information and resources flow through it.

Furthermore, we can learn other things from mapping the network. For example, NGO-5 is the most “distant” NGO in the project cooperation network. That is, NGO-5 is “2-steps” away from other members in the network map because in order for NGO-5 to reach NGO-1 it must go through NGO-3 (1st step) and then NGO-2 (2nd step). So, NGO-5 is the most peripheral member in the NGO project cooperation network.



NGO-2 is the most central NGO in the network. Why? Because NGO-2 was mentioned by 3 other NGOs (an in-degree of 3) which is more than any other NGO. Also, NGO-2 is a “bridge”; that is NGO-2 “bridges” NGO-3 and NGO-5 to NGO-1 and NGO-4.

In summary, from this one map of NGO project cooperation, we can easily understand the roles of individual NGOs: NGO-3 who is a “bridge”, NGO-2 who is central, NGO-5 who is peripheral. In addition, we understand characteristics of the network: the NGO network density is 50% and that the longest distance between any two members is 2-steps.



Of what importance do these member roles within the network and the overall network structure and characteristics mean in the practical world of working with NGOs? The next chapter will discuss this.

4. Measuring & Mapping NGO Networks: more than metaphor

All too often we talk about “the network of NGOs” working on a particular issue, for example on poverty, or early education, or on an advocating for child protection. However, the saying “the network of NGOs” is primarily used as a metaphor---a figure of speech---that we use to refer to the group of NGOs but rarely do we have any real understanding of the structure or characteristics of the NGO network. The network metaphor conjures images of cohesion and interaction; however, if we move beyond the metaphor to actually study the network it could be very cohesive with many connections or very fragmented; it could be dominated by one member or very decentralized; or it could be have many factions (sub-groups) or it could be a well-connected whole.

Why should be study a network? The primary reason, generally, is that we want to improve the network. In a sense, we want to understand the network so that we can “weave” it into a better network. Understanding the network requires knowing: are there enough connections; are some or the majority of the members isolated (disconnected); are the right connections present or are key connections absent; who are the central members; and who are the “bridges.”

So, the next question is, why improve or weave a better network? The basic reason is that when networks of people or organizations are better connected they are more cohesive, productive and resilient. Also, the denser the network, the easier it is for information to spread and coordination to occur. However, the network should have not only internal connections but also some degree of external connections to get new information and access different types of resources.

Finally, who should be weaving better networks? Network weaving involves donors, project managers, and the NGOs themselves. And, it requires understanding the current condition of the network, intentionally wanting to improve it, curiosity to understand why the network is currently the way it is, and the energy and time to help improve it.

The following section is a step-by-step account of how SC’s project, *Understanding and Improving the Impact of Youth Confidence-Building Initiatives*, attempted to measure and map the network of youth-focused NGOs working in the Samegrelo and Gali regions. The project wanted to understand the status of the youth-focused NGO network on three issues related to youth tolerance and conflict resolution: 1) formal information sharing, 2) formal resource sharing, and 3) cooperation on formal advocacy activities.

By measuring and mapping this youth-focused NGO network, the project would use the findings to help weave a more cohesive and productive NGO network.

5. NGO Network Analysis: Step by step

The study of the youth-focused NGO network began in March 2011. The study involved the following steps: a) study design, b) data collection tools and data collection, c) creating a database, d) drawing the network, e) analyzing the network, and f) plans to weave the network.

A. The Study Design

One of the first steps in conducting a network analysis is to determine who to “include” and who to “exclude”, this is called, establishing the boundary. And, unlike other survey research, social network analysts rarely draw samples; rather, network analysts identify a “population of interest” than EVERY one in that population.

Determining the Population – For this study, the “population” was: *all NGOs working (having projects) in either Samegrelo or Gali regions that have a youth-focused and/or confidence-building mission statement*. The boundaries of this network study were: Included - only NGOs, whether local or international; Excluded – any government agencies or departments, church organizations, or educational institutions even though they may serve youth.

Compiling a Complete List – The next step, after establishing the population and creating the boundary, was to collect the most complete list of NGOs working in Samegrelo and Gali regions that have a youth-focused and confidence-building mission statement. The first step involved using the directory of NGOs in western Georgia, “Samegrelo Region NGO Directory – 2009.”¹ Since this Directory was published in 2009, updates were obtained by attending the monthly “Zugdidi Information Sharing Meeting for Organizations Working in Samegrelo Region,” held at the EUMM Field Office in Zugdidi, in which attending organizations were able to update this list. Finally, each NGO on the list was visited and only those that were involved in youth and/or confidence-building activities were included.

To get a complete list in the Gali region, the booklet, “Directory of Non-Governmental/Non-Profit/Civil Organizations of Abkhazia”² was used. This list was updated based on the knowledge of NGO ALERT that works in the Gali region.

The resulting list of NGOs working on youth conflict/tolerance issues was:

- 25 NGOs in the Samegrelo region
- 6 from Gali region
- 6 international NGOs and donor organizations

A pilot-test of the questionnaire was sent by email to 3 NGOs in the Samegrelo region in order to get feedback on the clarity of the questions and if the formatting of the questionnaire made responding easy. Once feedback was received from these NGOs, the final questionnaire was developed. In the final questionnaire NGOs were allowed to identify other NGOs that they had exchanged information, resources or participated in advocacy activities with that were not on the NGOs list.

The final NGO Network questionnaire was sent to 31 local NGOs in the Samegrelo and Gali regions on 26 April 2011. All NGOs were asked to send the completed questionnaire by 2 May 2011.

On 3 May 2011, 16 NGOs from the Samegrelo region and 6 NGOs from the Gali region responded.

¹ Published by ATINATI for the “Inter-sectoral Co-operation for Democracy” project funded by the National Endowment for Democracy.

² This booklet was published for the project “Directory of Public Organizations of Abkhazia” funded by the Heinrich Boell Foundation.

Determining the Critical Issues – As we mentioned earlier, the links between the actors in the network, in this case NGOs, must represent some type of relationship. This is one of the most critical steps; that is, we had to determine which relations between the NGOs were the most important to understand.

Since the goal of this project was “understanding and improving youth confidence-building initiatives,” we decided to examine three types of relations between youth-focused NGOs in these two areas, which were:

- 1) formal **information sharing** on youth tolerance and/or conflict resolution, which included exchanging emails, attending workshops, meetings, telephone conversations, or visits;
- 2) formal **resource sharing** related to youth tolerance and/or conflict resolution, which included sharing projects, exchanging staff, or providing space; and
- 3) formal **advocacy activities** related to youth tolerance and conflict resolution, which included supporting and/or running campaigns on youth tolerance or conflict resolution, promoting youth conflict/tolerance strategies or policies to institutions or the government, and collecting data on problems/solutions related to youth tolerance and conflict to decision-makers.

Establishing a Relevant Timeframe – Just as boundaries must be set on whom to include in the study, also time boundaries must be set on which links to include and which to exclude between those in a network. For example, should all links between network members over the last 5 years, the last 3 years, the last year, or the last 6-months be included? This is a very important question that will drastically affect the results you obtain.

In our study, the NGO network will look much different if the timeframe is “for the last 5 years” than it would look if the timeframe is “for the past 6-months.” What is the best timeframe? This depends on what you are interested in. For our project we were not interested in what the network looked years ago, especially with many large changes occurring, but rather what the NGO network looked like most recently. Therefore, we decided that the timeframe for the links would be “since the beginning of this year (1 January 2011).

Consequently, the issues we are interested in will be asked in the following way, with the first issue as an example:

“Since the beginning of this year, please tell me which of the following NGO on this list have you formally shared information on youth tolerance and/or conflict resolution, which included exchanging emails, attending workshops, meetings, telephone conversations, or visits?”

B. Data Collection

After the important design aspects of determining the population, compiling a complete list, determining the issues, and establishing the relevant timeframe, the next step is *data collection*. And, the first step in data collection is questionnaire development.

Questionnaire development – in network analysis the questionnaire can be quite simple compared to other types of survey data collection questionnaires. At the top of the

*node data
 Name type
 NGO-1 local
 NGO-2 local
 NGO-3 international
 NGO-4 local
 NGO-5 international

After listing the NGOs (nodes) next we must list the links between them. The links between the NGOs will come from the questionnaires. The following tables represent the completed questionnaires by each of the five NGOs which asked them “which of the other NGOs on the list have you exchanged information, resources or advocacy activities in the past 6-months?” The row that is darkened is the NGO itself so this row is not used.

The completed questionnaire for NGO-1 shows that it exchanged information with NGO-1, NGO-3, and NGO-4 and resources with NGO-2 and NGO-4.

NGO-1 Questionnaire

	Information	Resources	Advocacy
NGO-1			
NGO-2	✓	✓	
NGO-3	✓		
NGO-4	✓	✓	
NGO-5			

This is the questionnaire completed by NGO-1. NGO-1’s row is dark because it will not be used since NGO-1 would not answer if it had exchanged information, resources or advocacy activities with itself. The questionnaire shows that NGO-1 has exchanged information with NGO-2, NGO-3 and NGO-4. NGO-1 has also exchanged resources with NGO-2 and NGO-4.

NGO-2 Questionnaire

	Information	Resources	Advocacy
NGO-1	✓	✓	
NGO-2			
NGO-3	✓		
NGO-4	✓	✓	
NGO-5	✓		

NGO-2 reported that it had exchanged information with all the other NGOs. In addition, it had exchanged resources with NGO-1 and NGO-3.

NGO-3 Questionnaire

	Information	Resources	Advocacy
NGO-1	✓		
NGO-2	✓		
NGO-3			
NGO-4			
NGO-5			

NGO-3 reported that it had exchanged information with only NGO-1 and NGO-2.

NGO-4 Questionnaire

	Information	Resources	Advocacy
NGO-1			
NGO-2			
NGO-3	✓		
NGO-4			
NGO-5	✓	✓	✓

NGO-4 reported that it had exchanged information with only NGO-3 and NGO-5. In addition, NGO-4 exchanged resources and been involved in advocacy issues with NGO-5.

NGO-5 Questionnaire

	Information	Resources	Advocacy
NGO-1			
NGO-2			
NGO-3			
NGO-4	✓	✓	✓
NGO-5			

NGO-5 was linked only to NGO-4 for all three issues.

The next part of the data file should be Node Properties; however, these are more easily done in the Netdraw program and thus it is not necessary to write these in the data file.

Next, we will input the tie data, which represent the links or ties between the nodes or in our case the NGOs. We will use the 5 completed questionnaires to input the tie data.

Similarly, the first line must contain an asterisks (*) followed by *tie data*. The next line specifies *what* tie data will be in-putted. In this example, there will be *From* (which NGO is responding), *To* (the other NGOs) and the types of links (*Information, Resources, Advocacy*) based on the issues from our questionnaire. Then all the NGOs and their links to other NGOs are listed.

The first data entered in our tie data above shows NGO-1 to NGO-2 and that they are linked (having a value of 1) on Information and Advocacy issues but not Resources (a value of 0). The next line shows NGO-1 to NGO-3 and that they are linked on Resources and Advocacy issues (values of 1) but not Information (value of 0).

```
*tie data
From To Information Resources Advocacy
NGO-1 NGO-2 1 1 0
NGO-1 NGO-3 1 0 0
NGO-1 NGO-4 1 1 0
NGO-1 NGO-5 0 0 0
NGO-2 NGO-1 1 1 0
NGO-2 NGO-3 1 0 0
NGO-2 NGO-4 1 1 0
NGO-2 NGO-5 1 0 0
NGO-3 NGO-1 1 0 0
NGO-3 NGO-2 1 0 0
NGO-4 NGO-3 1 0 0
NGO-4 NGO-5 1 1 1
NGO-5 NGO-4 1 1 1
```

Putting both together, the *node data and the *tie data, the complete data file would look like this:

```
*node data
Name type
NGO-1 local
NGO-2 local
NGO-3 international
NGO-4 local
NGO-5 international
*tie data
From To Information Resources Advocacy
NGO-1 NGO-2 1 1 0
NGO-1 NGO-3 1 0 0
NGO-1 NGO-4 1 1 0
NGO-1 NGO-5 0 0 0
```

```

NGO-2 NGO-1  1  1  0
NGO-2 NGO-3  1  0  0
NGO-2 NGO-4  1  1  0
NGO-2 NGO-5  1  0  0
NGO-3 NGO-1  1  0  0
NGO-3 NGO-2  1  0  0
NGO-4 NGO-3  1  0  0
NGO-4 NGO-5  1  1  1
NGO-5 NGO-4  1  1  1

```

This file must be in ASCII/ANSI format, which means that it is best to either write the file in Notepad that comes free with PC computers or write it in a word processing program, such as MSWord, and then save the file in ASCII/ANSI format.

Anonymity & Confidentiality – In the data file the NGOs were identified as only NGO-1, NGO-2, NGO-3 and so forth. However, the questionnaire contained the actual names of the NGOs that participated in the study. An important issue to discuss with participants in a study is to get their permission or consent to participate, but in network analysis is also important to determine if the members of the network consent to being identified in the network maps. Some participants may not want to be identified in the network maps for various reasons.

D. Drawing the Network for Visual Analytics

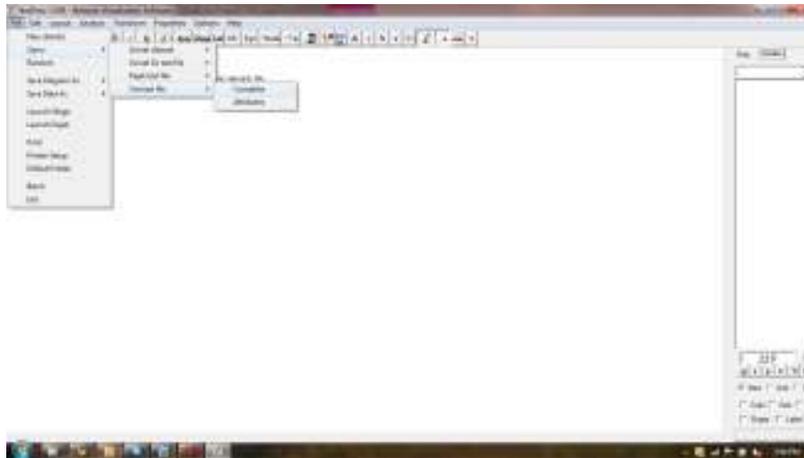
The actual data collected, using the questionnaire above, for the Improving the *Impact of Youth Confidence-building Initiatives* project is in Appendix 1. This section will use these data, which represents:

- **31 NGOs in the Samegrelo and Gali region** originally identified and completed the questionnaire and who identified an additional 13 NGOs;
- **8 international NGOs (INGOs)**; and
- **3 donor agencies.**

To draw and analyze the **Youth-focused NGO Network in Samegrelo and Gali regions**, we will use the free-of-charge software program, Netdraw, which can be downloaded at: <http://www.analytictech.com/netdraw/netdraw.htm>

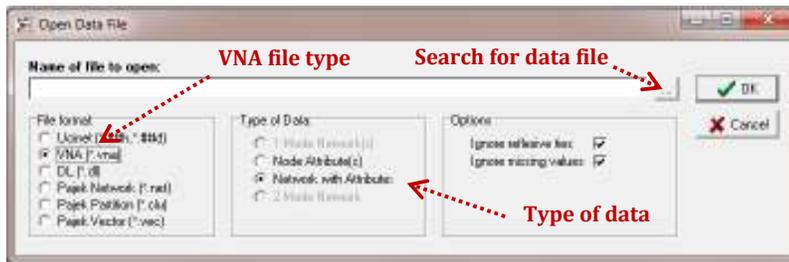
Once you have downloaded and installed it on your computer, open Netdraw. We will import the data file that was created and it will start drawing the network.

Importing the Data – The first thing you need to do is to open the *.txt data file you created using Netdraw. When you open Netdraw it should look like this.



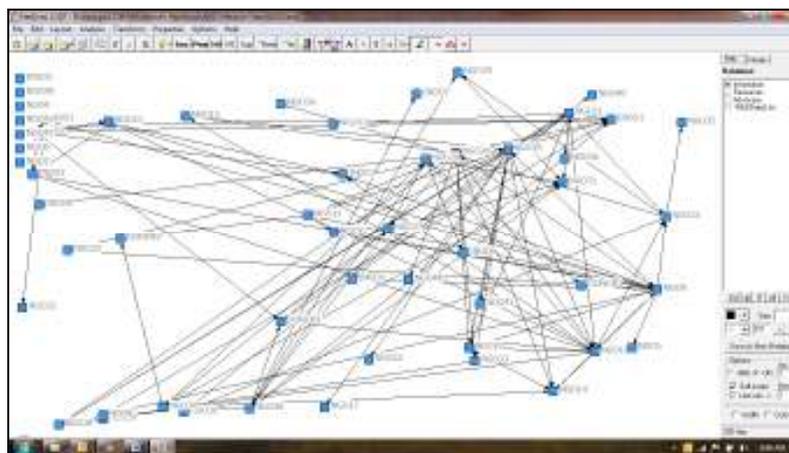
First, go to **File** ---> **Open** ---> **Vna text file** ---> **Complete**.

After this, you will see this menu box. Be sure that under File Format the Vna is chosen.



To select the data file you have created, select the small square box with dots that is just left of the OK button. Another menu box will open. Find your data file and press open. When this dialog box will be closed, press OK in the current box.

Once your data file is loaded the initial layout of the NGOs (nodes) will be completely random and will look quite messy.

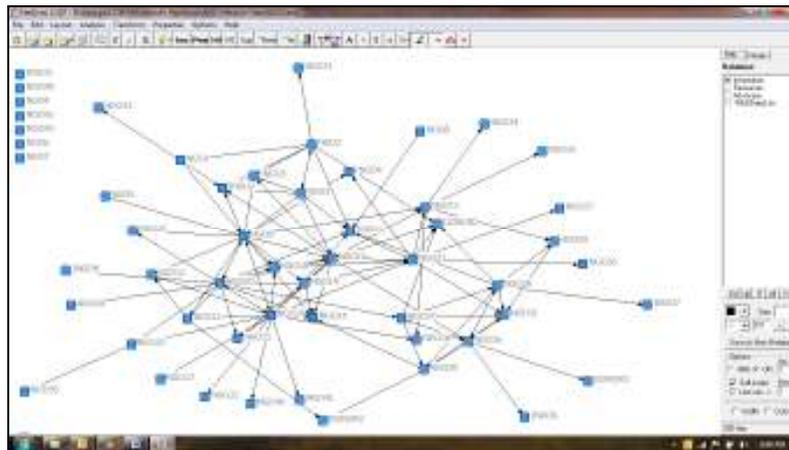


The next step is to do initial network visualization. Initial network visualization uses an algorithm to make the network map look a little more organized. To do this, click on the flash

icon  or you can use the menu by clicking on **Layout ---> Graph-Theoretic layout ---> Spring embedding**.

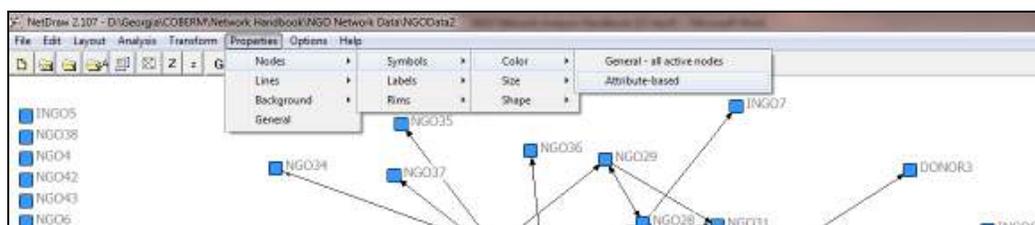


Spring embedding is a process that “fits” nodes in the network that are connect close to each other and not connected to each other further apart. Once this is done, the **Youth-Focused Network in Samegrelo and Gali regions** should look a little more organized.



Even though the network is a little more organized, to make the visualization a more informative we can modify the color, shape and size of the nodes to distinguish them from each other. In our study we have NGOs operating in Samegrelo, NGOs operating in the Gali region, as well as additional ones that were identified as operating other regions, such as Svaneti (upper Samegrelo), Kutaisi (east of Samegrelo), and in the capital, Tbilisi. Let’s make each of them a different color to understand the Youth-focused Network by geographical location.

In order to do this, go to **Properties ---> Nodes ---> Symbols ---> Color ---> Attribute-based**.



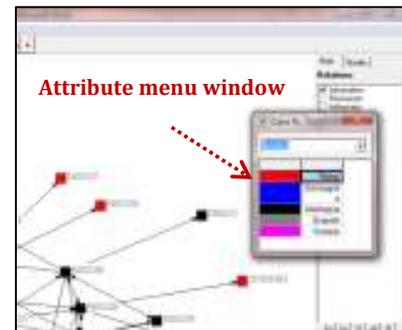
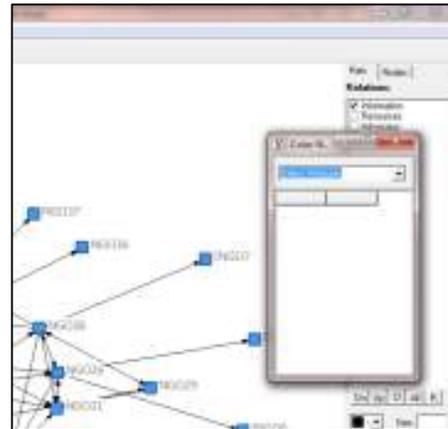
A new menu window will appear on the right side of the screen. Click on the dropdown list tab and it will show a list of attributes that were specified in the data file: Name, Type and Location. Select Location. The colors will be automatically selected, however, click on the color box and you can manually change the colors to something different.

If you did not change the colors, your network map should show:

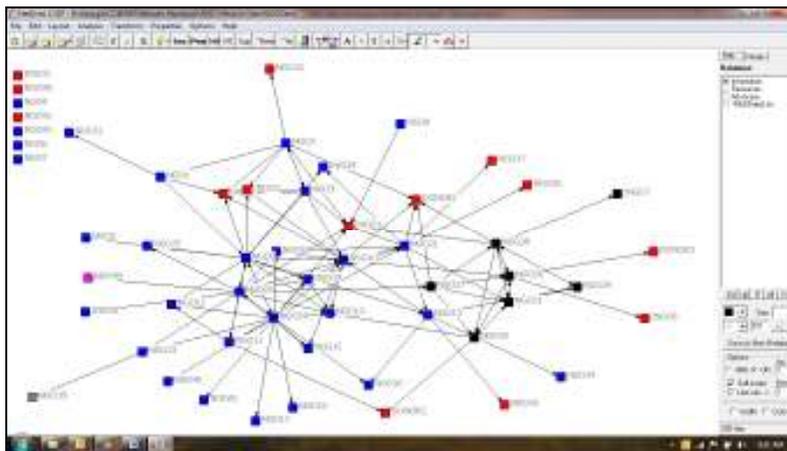
- Tbilisi – red nodes;
- Samegrelo – blue nodes;
- Gali – black nodes;
- Svaneti – gray nodes; and
- Kutaisi – pink nodes.

Below is the **Youth-focused Network**, for sharing information, color coded by location.

In the color coded network map (below), several characteristics of the Youth-focused Network, for sharing information, become noticeable. The first is the number Samegrelo (4) and Tbilisi based NGOs (2), and an INGO (1), that were not involved in the exchange of information regarding youth tolerance and conflict since the beginning of the year. These are on the upper-left corner of the map. On the other hand, this does mean that 40 of the 44 Samegrelo and Gali NGOs had exchange information since the beginning of the year with at least one other NGO, thus an inclusion rate of 90%.



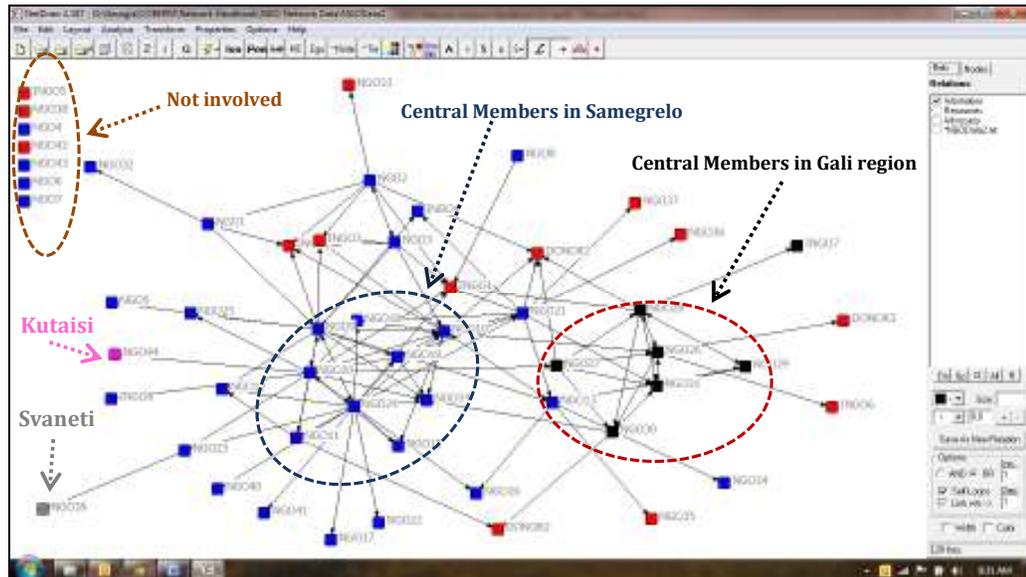
Next we notice that the blue nodes (Samegrelo NGOs) are close to each other and the black nodes (Gali NGOs) are close to each other, which shows that interaction of sharing of this type of information is very much dependent upon location.



Another feature to notice is that within each location there is a cluster of NGOs that interact more intensely with each other and others that interact less often in sharing this information. The blue dotted circle shows a small percentage (core) of Samegrelo NGOs that have exchanged information on youth tolerance and conflict; many of the Samegrelo NGOs have been on the periphery of exchanging this type of information.

For the Gali NGOs, all but one forms the “core” group; however, this one is an INGO (INGO7) and not a local NGO. Also, one Samegrelo NGO (NGO13) has been interactive with Gali NGOs. With the majority of Gali NGOs in the “core” this indicates that the Gali NGOs have been more

inclusive than the Samegrelo NGOs on exchanging information on youth tolerance and conflict issues.



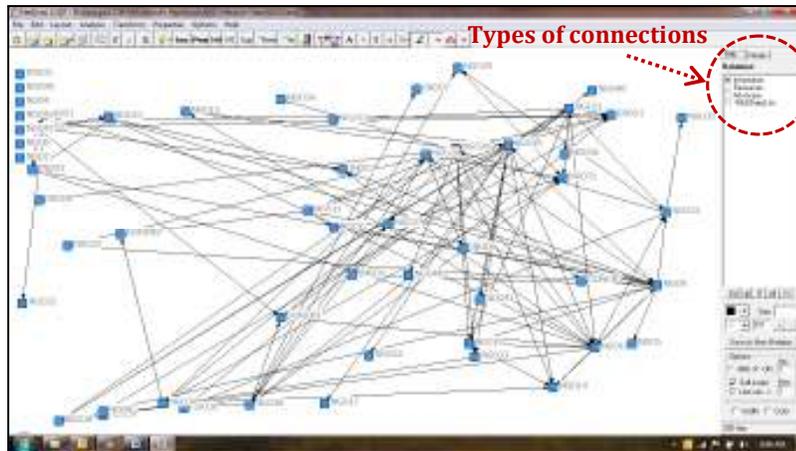
It is also interesting to note that there are two NGOs not located in Samegrelo or Gali regions that were identified by Samegrelo NGOs as having been involved in exchanging this type of information; one in Svaneti and one in Kutaisi. These NGOs are part of the periphery.

Finally, the map shows that the Tbilisi-based NGOs, INGOs and Donors are distributed. Most (7) of them are connected to only Samegrelo based NGOs, two (Donor3 and INGO6) are connected only to Gali NGOs, and 1 donor (Donor2) is connected to both Samegrelo and Gali NGOs.

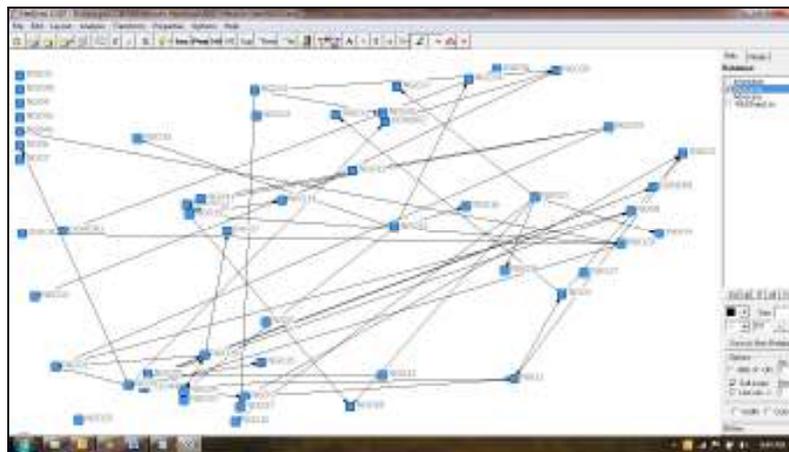
Sharing Resources

The above network map was for exchanging information on youth tolerance and conflict issues between **Youth-focused NGOs in Samegrelo in Gali region**. Now let's do the same for sharing of resources.

Going back to the original network map, when loaded into Netdraw (go to **File** ---> **Open** ---> **Vna text file** ---> **Complete** and be sure that under File Format the Vna is chosen) there is a menu in the top right corner of the screen with two tabs, Rels and Nodes. If the Rels tab is not selected or showing, select the Rels tab. You should see a list of the three types of relations NGOs were asked on the questionnaire— Information, Resources and Advocacy—with a check box next to each. Click on the checkbox next to Information to turn it off. Then click on the checkbox next to Resources to turn it on.

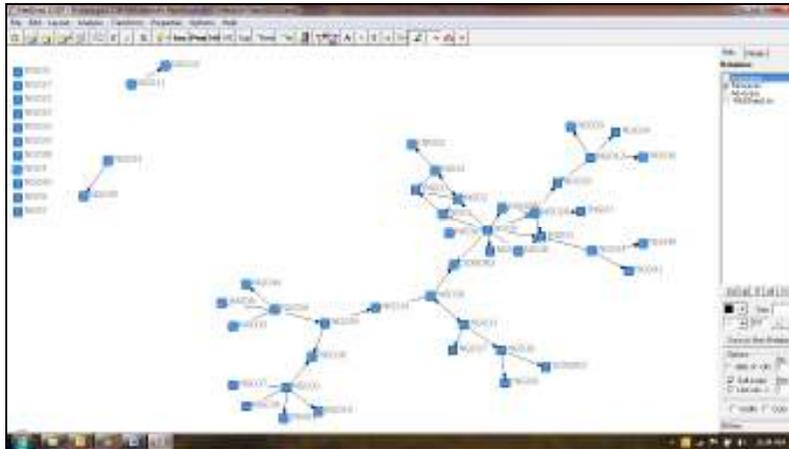


After clicking on the Resources checkbox you should have the following NGOs network map (below). It is already possible to see that the number of relations between NGOs sharing resources is much fewer than sharing information.

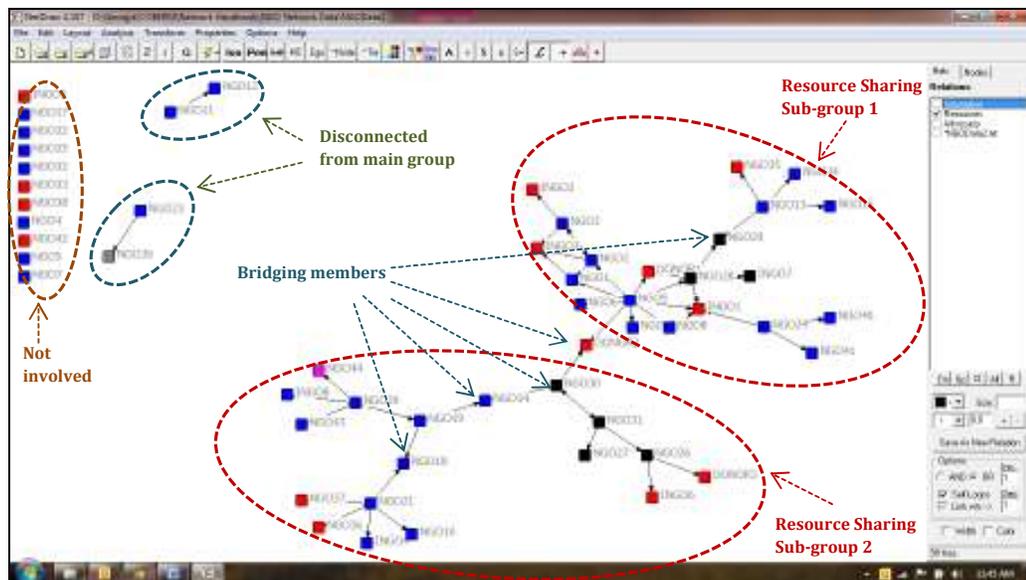


As was done previously to make network look more organized, click on the flash icon  or use the menu by clicking on **Layout** ---> **Graph-Theoretic layout** ---> **Spring embedding**.

The sharing of resources among **Youth-focused NGO Network** looks quite different than the network of sharing information. Rather than having clusters of NGOs that allows for multiple communicating between network members, sharing of resources is an elongated chain network in which sharing of resources must pass through a single NGO at one end to get to other NGOs at the other end. This type of network is not advantageous for mutual sharing but represents a series of gatekeepers and brokers.



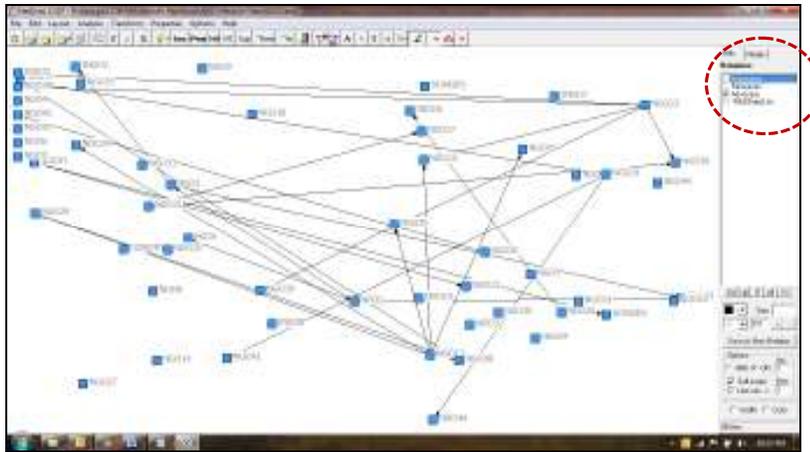
Again, to help us understand a little about the resource sharing network, color coding by location has been added (**Properties---> Nodes --->Symbols ---> Color ---> Attribute-based**). The first apparent characteristics of this network are that it has more “noninvolved members” than the information sharing network; 7 NGOs had not been involved in sharing resources (giving or receiving) since the beginning of the year, which means that 37 of the 44 (or 84%) of the NGOs had.



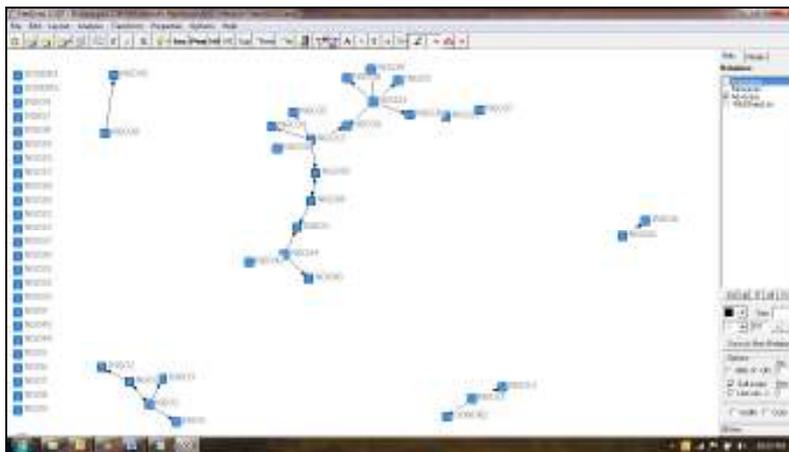
There are several noticeable characteristics of this resource sharing network. First, is that there is one larger group and two smaller groups not connected to each other. The two groups are comprised of NGO23 and NGO39 and NGO11 and NGO12. Second, is that the majority of NGOs only have one other NGOs they share resources, which makes the network look like a long string which is quite different than the interconnected web between NGOs in the information sharing network. Finally, the one main group of NGOs is two sub-groups connected only by Donor2; thus, without Donor2 the resource sharing network would be disconnected more.

Advocacy Coordination

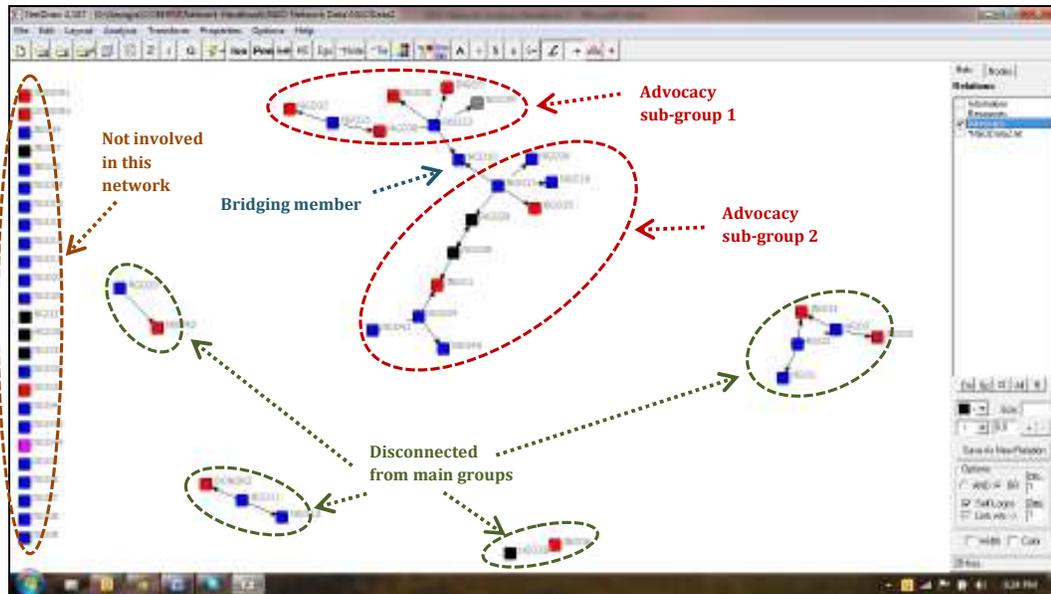
Now, let's look at the NGO Advocacy Coordination Network. Go to **File** ---> **Open** ---> **Vna text file** ---> **Complete** and be sure that under File Format the Vna is chosen.—and then just click on the Advocacy checkbox in the Rels menu on the right side of the screen.



Use the menu by clicking on **Layout** ---> **Graph-Theoretic layout** ---> **Spring embedding** or, click on the flash icon  to organize the network.



As before, go to **Properties** ---> **Symbols** ---> **Color** ---> **Attribute-based** to colorize location. After doing these steps you should have a network map similar to the one below. The results are somewhat similar to the NGO Resource Sharing Network in that there are numerous “non-involved” NGOs and a chain-like pattern for those NGOs that are involved in Advocacy Coordination.



Properties of the Youth-focused NGO Information, Resource and Advocacy Networks – an important characteristic about a network is the amount of connectivity between all the members, which is referred to as network density. Network density indicates if the network is sparsely or densely knitted together. In mathematical terms, network density is the proportion of actual ties in a network relative to the total number possible.³ In the Youth-focused NGO Network of 44 members, if every member was connected to every other member, there would be a total of 1892 connections. To calculate the density of the information, resource and advocacy networks among these NGOs, the actual number of ties were divided by the total possible, 1892.

	Information	Resources	Advocacy
Total # of ties possible (44 X 43= 1892 possible ties)	1892	1892	1892
Actual # of ties	91	50	28
Network density	5%	3%	2%
Inclusiveness	90%	84%	57%

In summary, drawing the network and adding color coding even one characteristic of the **Youth-focused NGO Network**, it is possible to understand some initial aspects of its structure.

E. Analyzing the Network Members Roles

When analyzing an NGO network, or any network, there are several important characteristics to examine. The first set of characteristics is related to the entire network. One of the primary characteristics of the entire network to examine is density, which has been mentioned early but is describe in a little more detail below.

³ The formula to calculate network density for directed tie network is, $D = AT / (N * N - 1)$, where D is for density, AT=actual ties, N=number of network members.

The second set is related to characteristics of individual members of the network. Individual network member characteristics include a) non-involved members, b) prominent members, c) influential members, and d) bonders.

a) **Non-involved members** are those NGOs that did not mention any other NGO nor did any NGO mention them for information or resource sharing, or advocacy coordination.

b) **Prominent members** are NGOs who other NGOs named (known as *in-degree*). Those named the most by others are often said to *be prominent*, or to have *high prestige* in a network. That is, since many other NGOs seek to direct ties to them, this may indicate their importance.

c) **Influential members** are NGOs who report many interactions with other NGOs (known as *out-degree*). NGOs who have unusually high out-degree report interacting with many other NGOs, which may indicate they make many others aware of their views, and thus can be instrumental in persuading.

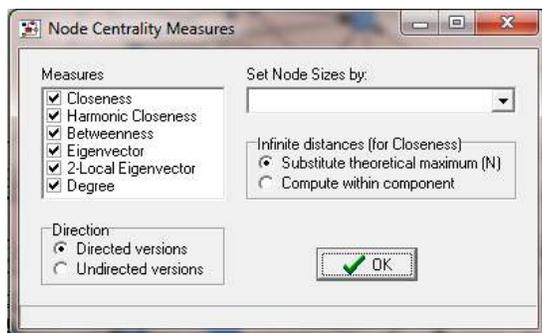
Finally, there are d) **bonding members**. Bonding members are NGOs in a network that if removed would fragment the entire more than any other member(s); that is, most links in the network pass through them and thus they are considered “bonders.”

Non-involved members are easy to identify in that Netdraw places them in a column on the left side of the screen. However, to identify prominent, influential and bonders, we will need to use the Analyze command in Netdraw.

Also, it is necessary to analyze each network (information, resource, advocacy) separately. Let’s start by analyzing NGO roles in the information network.

First, load the Youth-focused NGO Network data into Netdraw. In the Rels tab on the top right corner of the screen and click the checkbox next to Information if it is not already selected.

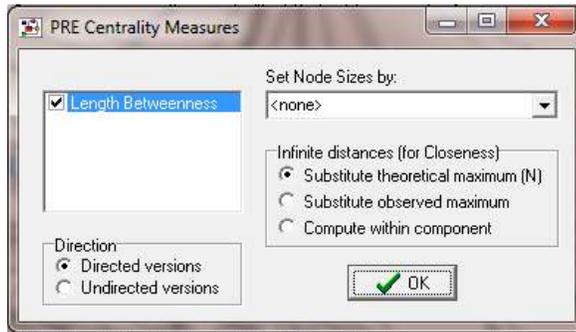
Then go to **Analyze ---> Centrality Measures** and the menu below will appear.



It is important that in the **Direction** section “Directed Versions” is selected. Then, just select Ok. You will get a Msg window that the centrality measures have been added to the database. Just click Ok until the Msg Window closes.

As before when we colorized by attribute, go to **Properties ---> Symbols ---> Size ---> Attribute-based** to colorize by In-Degree. The NGO of the largest size represent the most prominent (in-degree). To find the most influential NGOs, follow the same steps above except select Out-Degree. Again, the largest size NGOs will be the most influential.

In order to identify the bonders in the network, go to **Analysis** ---> **PRE measures**. Again, be sure that under the Direction section that “Directed version” is selected. Click on Ok and this measure will be added to the network database.

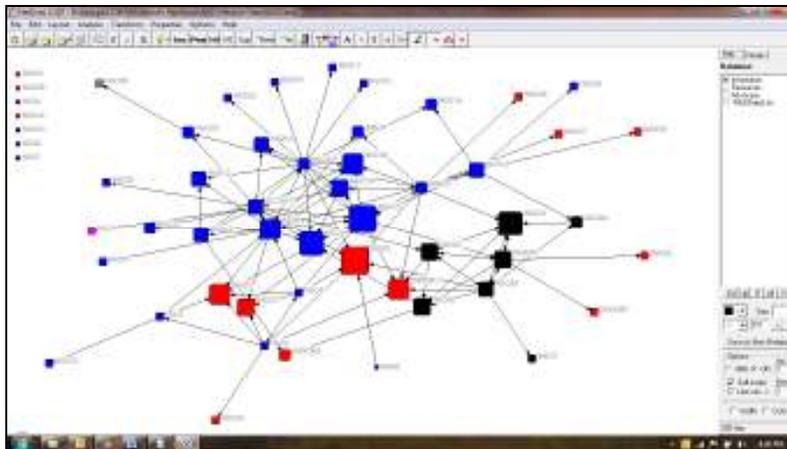


As before, go to **Properties** ---> **Nodes** ---> **Symbols** ---> **Size** ---> **Attribute-based** and select **Length Betweenness**. The largest NGOs will be the bonders.

Let’s analyze the roles of the NGOs for each of the networks.

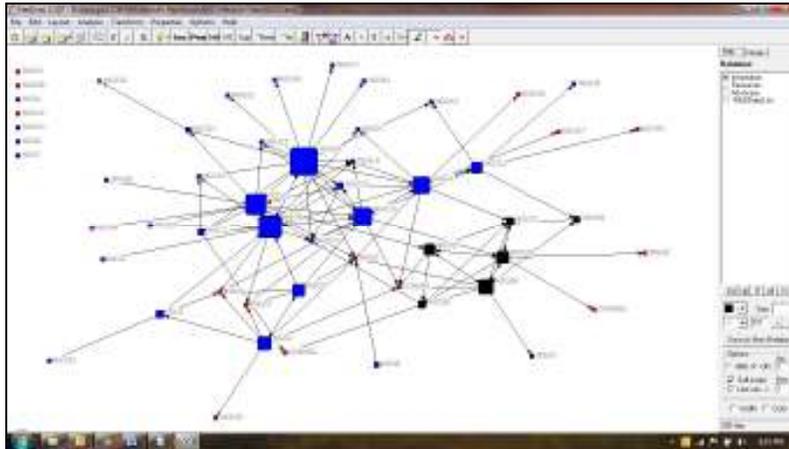
Sharing of Information Related to Youth Tolerance Issues and/or Conflict Resolution

The network map below shows the *prominent* NGOs in the information sharing network (in-degree). The NGOs that are the largest in size are the most prominent in that they were named by the most NGOs. For information sharing among Youth-focused NGOs, the most prominent members are: NGO10 (7), INGO1 (7), NGO14 (6), NGO31 (6). The number in parenthesis after each NGO is the number of NGOs who named them; thus, NGO10 (Disabled Women and Disable Children’s Mothers’ Association DEA) and INGO1 (sc) are the most prominent since 7 other NGOs named them, the most any NGO in the network received. Of the Gali NGOs, NGO31 (Democracy Institute) is most prominent.



The network map below shows the *influential* NGOs in the information sharing network (out-degree). The NGOs that are the largest in size are the most influential NGOs in that they reported going to and interacting with other NGOs. For information sharing, the most influential members are: NGO24 (18), NGO9 (14) and NGO20 (13) and NGO28 (8). All of the most influential NGOs are Samegrelo based most likely because they have more opportunity to

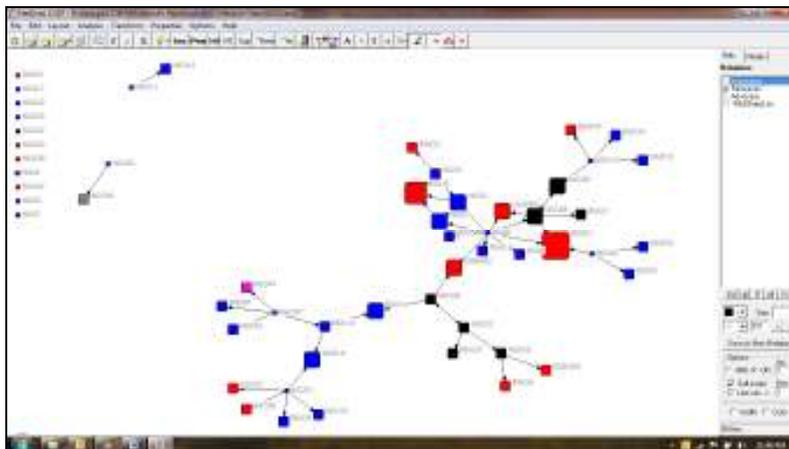
interact with more NGOs. Among these NGOs, NGO24 is the most influential (Human Rights Defense Center, Zugdidi branch).



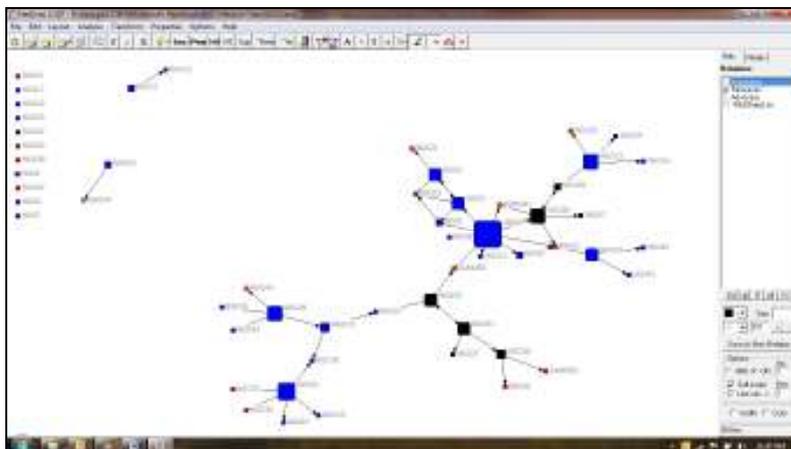
The key “bonder” NGO in the information sharing network is NGO24 (Human Rights Defense Center, Zugdidi branch), in that the most links within this network go through NGO24.

Exchange of Resources Related to Youth Tolerance Issues and/or Conflict Resolution

The network map below shows the *prominent* NGOs in the resourced exchange network (in-degree).

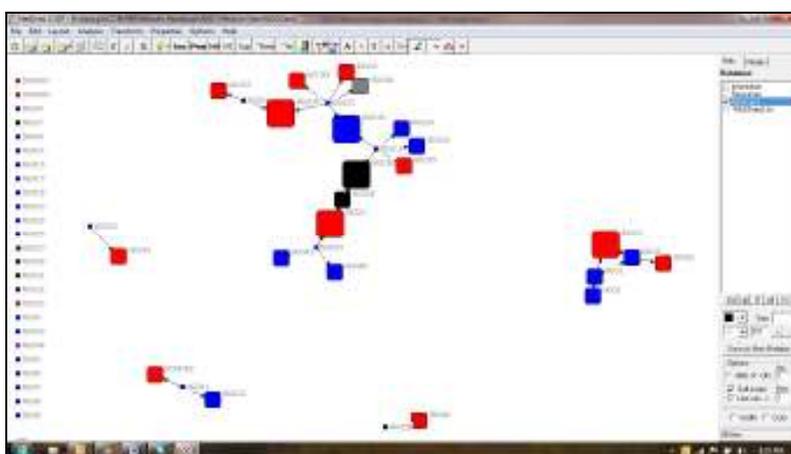


The most prominent NGOs are both international NGOs: INGO1 (4) (sc) and INGO3 (3) (DvV). The most influential NGO, as well as the key bonder for exchanging resources, is NGO9 (9) (ATINATI).

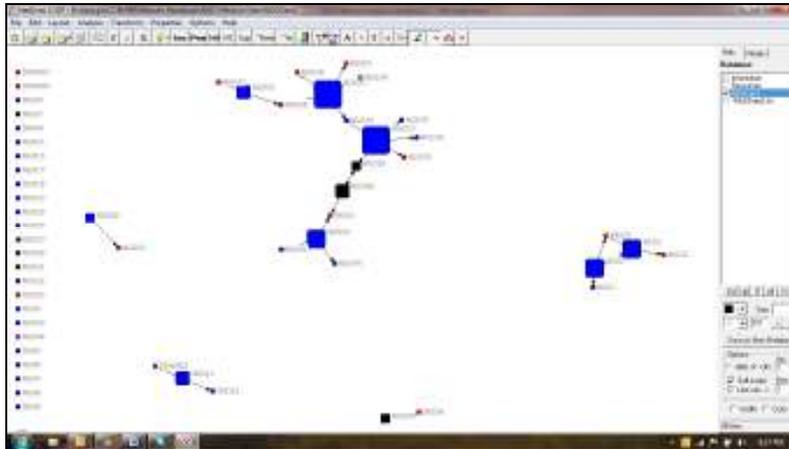


Advocacy Coordination Related to Youth Tolerance Issues and/or Conflict Resolution

The network map below shows the most prominent NGOs in the network for advocacy coordination, which are: NGO36 (2) (Peace, Democracy and Development Caucasian Institute - Tbilisi), NGO10 (2) (Disabled Women and Disable Children’s Mothers’ Association DEA), NGO29 (2) (Movement for Development), INGO1 (2) (Save the Children) in the main group and INGO3 (2) (DvV) in the smaller group.



The map below shows that the main influential NGOs in the advocacy coordination network are NGO23 (5) (DIOSKURIA), NGO13 (5) (Association of Disabled People and Development of Art “HANGI”). In addition to being an influential, NGO13 is also the key bonder in this network.



In summary, the table below shows the overall results of the roles of NGOs in the three types of Youth-focused NGO networks. These results will be crucial in understanding how to “weave” the network, which we will discuss below.

Characteristics	Information	Resources	Advocacy
Most members not involved	Samegrelo NGOs	Samegrelo NGOs	Samegrelo NGOs
Have prominent role	NGO10 (Association DEA) INGO1 (Save the Children)	INGO1 (SC) INGO3 (DVV)	NGO36 (PDD- Caucasian Institute) NGO10 (Association DEA) NGO29 (Movement for Development) INGO1 (SC) INGO3 (DVV)
Have influential role	NGO24 (Human Rights Defense Center) NGO9 (ATINATI)	NGO9 (ATINATI)	NGO23 (DIOSKURIA) NGO13 (HANGI)
Are a network “bonder”	NGO24 (Human Rights Defense Center)	NGO9 (ATINATI)	NGO13 (HANGI)

Before we discuss, weaving the network, it is important to know how to save the various network maps presented above so they can be used in reports or presentations.

Once you have a map in Netdraw that you are happy and would like to include in a document or presentation there are two methods for doing this. First, it is possible to enlarge the network map on your monitor screen, press the PrtSC key on your keyboard, and then you can paste the image into a document or PowerPoint slide.

Another way is to save the image as a separate file and Netdraw offers three different image formats: Jpeg, Bitmap and Metafile.

Jpeg files are one of the most common formats for images. They are typically smaller in file size, but the problem is that they can become coarse if you resize manually afterwards. Bitmaps are better in terms of resizing, but are relatively larger file sizes and take up a lot of space. Metafiles are probably the best as they scale really well and are also quite small in size.

In order to save the network map go to **File ---> Save Diagram As** and then select the file type you prefer.

Alternatively, you can just press Ctrl-C in Netdraw. It copies the picture, exactly as you have it, to the Windows clipboard. Then you can paste it into Powerpoint or into an MSWord document.

F. Weaving the Network

+ Finding **ways to engage non-involved NGOs**.

+ **Encouraging prominent members to promote** information sharing, resource exchange and coordinating advocacy efforts.

+ **Increasing the reach of influential members** to the non-involved NGOs.

G. Monitoring & Evaluating a Network

Monitoring and evaluating networks will focus on two areas: 1) the changing structure of the network and 2) the changing roles of NGOs in the network.

Monitoring a network entails establishing a baseline as a beginning reference point and then periodic mapping of the network to monitor its potential transformation, using the methods describe in this handbook.

The table below shows two measures of network structure that can be monitored over time and evaluated for change: 1) network density and 2) inclusiveness.

	Information		Resources		Advocacy	
	Baseline	End-line	Baseline	End-line	Baseline	End-line
Network density	5%		3%		2%	
Inclusiveness	90%		84%		57%	

The results of the end-line should be placed in the gray cells.

The table below shows four measures of the roles of network members that can be monitored over time and evaluated for change: 1) who are the members not involved in the network, 2) who are the most prominent, 3) who are the most influential, and 4) who are a network “bonders.”

Characteristics	Information		Resources		Advocacy	
	Baseline	Follow-up	Baseline	Follow-up	Baseline	Follow-up
Most members not involved	Samegrelo NGOs		Samegrelo NGOs		Samegrelo NGOs	
Have prominent role	NGO10 INGO1		INGO1 INGO3		NGO36 NGO10 NGO29 INGO1 INGO3	
Have influential role	NGO24 NGO9		NGO9		NGO23 NGO13	
Are a network “bonder”	NGO24		NGO9		NGO13	

The results of the end-line should be placed in the gray cells.

Finally, it is important to monitor and evaluate if the network is accomplishing its intended results. In this study, the intended results for the youth-focused NGO network is increased information sharing, resource exchange, and cooperation on advocacy activities related to youth tolerance and conflict resolution. Without a doubt, change takes time.

Of course, any evaluation of a network will ask if using the network approach is more effective and efficient than, relying, for instance, on a single organization.

6. Last Thoughts, Conclusion & Recommendations

Certainly, trying to measure and map an NGO network has its challenges. One of the first challenges is determining the boundary of the NGO network; that is, trying to determine which NGOs should be included in the study and which ones should not. In this study, since the objective of the project was youth conflict and tolerance issues, only NGOs with mission statements similar to this objective were included.

The second challenge is determining the length of time to study relational links to establish a network. In this study the length of time was approximately 4-months (since 1 January 2011). More often than not, the longer the period of time studied the more linkages/ties will be found in a network. Every study will need to determine what time period to report relational linkages between network members “best” represents the current network of relations.

The third challenge is having the time and opportunity to identify and meet with NGOs to discuss the study so they clearly understand the purpose of the study and how to complete the questionnaire. In this study, this was especially the case for NGOs in the Gali, which meant restricted access due to the administrative border.

The fourth challenge is getting all the identified NGOs to respond correctly to the questionnaire and to do so in a timely manner. Ideally, each NGO should be interviewed face-to-face by a trained interviewer but due costs, time and logistics this was not possible in this project; therefore, the questionnaires were sent via email. Follow-up phone calls are generally required to get completed questionnaires.

The fifth challenge is data entry. Network data are not like conventional data sets and require special data entering techniques as described in this handbook and illustrated in Appendix 2.

The sixth challenge is data analysis, again which is different than conventional data analysis in that it involves producing multi-colored and shaped maps as well as descriptive statistics (e.g., inclusiveness, density, betweenness) that must be learned.

Finally, the last challenge is being able to present the network findings to the NGOs, discuss the findings, and deciding on a plan to “weave” the network in the future. In this study, when the responding NGOs in Samegrelo were invited to meet and discuss the findings, very few (only 4) showed up, but in Gali 6 NGOs attended which is quite a large number for Gali.

At these meeting NGO representatives were asked to discuss the Youth Conflict and Tolerance NGO Network findings. Some of the comments by NGO representatives were:

“The analysis looks interesting. I think that it is not reflecting real situation. Sure it is just my opinion since I miss some NGOs which are leaders in information sharing and see the ones with I have never had such experience. Beside the fact that questionnaire was very simple and clear it would be better if SC representative came and helped to fill it instead of sending via email; I guess I myself missed some things when I was filling it. So my suggestion is to do the process again and then compare the results. I was happy to see my organization in the list of central members we work actively for 4 years and result of it is reflected in the map. Networking is real problem with local NGOs it should be grown the interest of them.” Olga Kikava, Association MERKURI.

“The fact that analysis [of the NGO network] will be published, at list is a clear picture what we have now. It’s for sure that these maps are reflecting current

situation among and with NGO community in remote parts of the region. I feel I should point out to you that many are with one arm behind one's back, depending on the limited resources. And based on proven maps by the "Save the Children", we should deal with the existing defects, to find adequate and right tools for better communication and collaboration. In one word, it is good opportunities for all improve own capacity and capability in aim to meet peace and development. Perhaps we could move on the next stage where all of us are in collaboration. We do our first step, to build the "Collaboration Samegrelo" web site. Please, don't be alone with your innovation and join smart". Davit Patsatsia, Human rights defense center, Zugdidi branch

"I think the map reflects reality, IMEDI has ongoing project focused on youth in the process of confidence building and we are sharing the information and resources with other NGOs in the frame of the project as well." Leila Qurkhua, Association Imedi- IDP Women Movement for Peace.

"The first step, in the reality, to wave the network is to finance joined projects. The results since they reflect contacts from January 2011 are real." Tamar Tskhondia, Community Development Center CDC.

When asked how to better weave the youth-focused NGO network together, the NGO representatives identified the following:

- NGOs need to cooperate in implementing joint projects. If projects are small and do not require partnering among NGOs, then weaving the NGO network is more difficult.
- NGOs need to recognize the unique skills and abilities of different NGOs and there needs to be a willingness to share these.
- Those NGOs that are "prominent", "influential" and "bonders" need to make greater effort to reach and build linkages to those NGOs that are "isolates; that is, not connected to the network.

In conclusion, this handbook emphasizes that developing an NGO network requires to on-going steps:

1. **Know the network** – conduct network analysis to evaluate the status and progress
2. **Knit the network** – a concerted effort needs to be expended by the core members to develop and create linkages to those members on the periphery of the network or completely disconnected to the network.

Network Analysis Terminology

Attribute – a characteristic or property of a person, group, organization, etc.

Betweenness – the node(s) in a network in which the shortest connections to all other nodes pass through them.

Bonder – members in a network that if removed would fragment the entire network more than any other member.

Bridge – a node that connects/links two different groups together in a network.

Cluster – a group of nodes in a network that are more densely connected to each other than to other nodes in the network.

Density – the number of actually-occurring relations or ties as a proportion of the number of theoretically-possible relations or ties.

In-degree (prominence) – nodes that are identified/named the most by others in a network.

Inclusiveness – the percentage of nodes that are connected to other nodes in the network. The more nodes are isolated (no connection to any other nodes in a network) the lower the inclusiveness.

Node – represents a person, group, and/or organization in a network.

Out-degree (influential) – nodes that report many interactions with other nodes.

Tie/Links – represents the connections between nodes in a network.

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Appendix 1: NGO Network Questionnaire

<p>Youth-Focused NGO Network in Samegrelo and Gali Regions</p> <p>Since the beginning of this year (1 Jan 2011), please tell us which of the NGOs listed below has your organization contacted for the following three issues: Information Sharing, Resource Sharing, and Advocacy Activities related to Youth Tolerance and/or Conflict Resolution. Please do not answer these questions according “to whom should I to go,” but rather “to whom HAVE YOU or CURRENTLY go to.” (The spaces associated with your organization leave empty.) Please put an “X” in the space that intersects the NGO and Issue. Leave the space empty if your organization has not contacted any NGOs for these three activities. And, if an organization is not on the list, please mention it and the issue(s).</p>			
<p>Youth-Focused NGOs Supporting or Conducting Projects in Samegrelo and Gali Regions on Youth Tolerance Issues and/or Conflict Resolution</p>	<p>Formal <u>Information Sharing</u> on Youth Tolerance Issues and/or Conflict Resolution: Workshops Emails Meetings Telephone Visits</p>	<p>Formal <u>Resource Sharing</u> Related to Youth Tolerance Issues and/or Conflict Resolution: Shared projects Exchanged staff Provided space</p>	<p>Formal <u>Advocacy Activities</u> Related to Youth Tolerance Issues and/or Conflict Resolution: Supporting and/or running campaigns on youth tolerance or conflict resolution). Promoting youth conflict/tolerance strategies and/or policy options to institutions/gov’t). Collecting data on problems/solutions to present to decision-makers.</p>
Samegrelo			
Senaki Community Educational Center			
Jvari Community Educational Center			
Future Partners			
The Association Mega			
Neighborhood Development Association of Nabada NINA			
Civil Development and Integration Center			
Youth Development Center			
Community Development Center CDC			
Association ATINATI			
Disabled Women and Disable Children’s Mothers’ Association DEA			
Association GAENATI			
CBO “MIZANI”			
Association of Disabled People and Development of Art “HANGI”			
Association Imedi- IDP Women Movement for Peace			
Charity Humanitarian Center ABKHAZETI, Zugdidi Branch			
Abkhazians and Georgians Reconciliation Society GIENOSI			
Charity Humanitarian Association “MY ABKHAZIA”			
Association Samegrelo-MEDEA			
Rehabilitation and Development Charity Center TANAZIARI			
Association MERKURI			
Save The Future Generation			
Medical-Psychological Center TANADGOMA			
DISKURIA			
“Human Right Center “Zugdidi Branch			
Association of Disabled People of Tsalenjikha			
Abkhazia			
Samurzakan Organization of disabled			
Cultural Charity Foundation “RADUGA”			
ALERT			
Movement for Development			
AVANGARD			
Democracy Institute			
International organizations			
Save the Children			
UNDP			
UNHCR			
ACF			
DVV			
PIN			

Appendix 2: NGO Network ASCII Data

The data below can be copy/pasted into Notepad and saved as a ASCII file, which then can be imported into Netdraw.

```
*node data
Name type location
NG01 local Samegrelo
NG02 local Samegrelo
NG03 local Samegrelo
NG04 local Samegrelo
NG05 local Samegrelo
NG06 local Samegrelo
NG07 local Samegrelo
NG08 local Samegrelo
NG09 local Samegrelo
NG010 local Samegrelo
NG011 local Samegrelo
NG012 local Samegrelo
NG013 local Samegrelo
NG014 local Samegrelo
NG015 local Samegrelo
NG016 local Samegrelo
NG017 local Samegrelo
NG018 local Samegrelo
NG019 local Samegrelo
NG020 local Samegrelo
NG021 local Samegrelo
NG022 local Samegrelo
NG023 local Samegrelo
NG024 local Samegrelo
NG025 local Samegrelo
NG026 local Abkhazia
NG027 local Abkhazia
NG028 local Abkhazia
NG029 local Abkhazia
NG030 local Abkhazia
NG031 local Abkhazia
NG032 local Samegrelo
NG033 local Tbilisi
NG034 local Samegrelo
NG035 local Tbilisi
NG036 local Tbilisi
NG037 local Tbilisi
NG038 local Tbilisi
NG039 local Svaneti
NG040 local Samegrelo
NG041 local Samegrelo
NG042 local Tbilisi
NG043 local Samegrelo
NG044 local Kutaisi
ING01 international Tbilisi
ING02 international Tbilisi
ING03 international Tbilisi
ING04 international Samegrelo
ING05 international Tbilisi
ING06 international Tbilisi
ING07 international Abkhazia
ING08 international Samegrelo
DONOR1 donor Tbilisi
DONOR2 donor Tbilisi
DONOR3 donor Tbilisi
*tie data
From To Information Resources Advocacy
NG01 NGO9 1 0 0
```

NGO1 ING02 1 0 0
NGO1 ING03 0 1 0
NGO1 NGO32 1 0 0
NGO2 NGO1 1 1 1
NGO2 NGO3 1 1 1
NGO2 ING01 1 0 0
NGO2 DONOR1 1 0 0
NGO2 ING02 1 0 0
NGO2 ING03 1 1 1
NGO2 NGO33 1 0 0
NGO3 NGO2 1 1 1
NGO3 NGO9 1 0 0
NGO3 NGO10 1 0 0
NGO3 ING01 1 0 0
NGO3 ING02 1 1 1
NGO3 ING03 1 1 1
NGO8 ING01 1 1 0
NGO9 NGO1 0 1 0
NGO9 NGO2 0 1 0
NGO9 NGO5 1 0 0
NGO9 NGO6 0 1 0
NGO9 NGO8 0 1 0
NGO9 NGO10 1 0 0
NGO9 NGO11 1 0 0
NGO9 NGO12 1 0 0
NGO9 NGO13 1 0 0
NGO9 NGO14 1 0 0
NGO9 NGO15 0 1 0
NGO9 NGO18 1 0 0
NGO9 NGO19 1 0 0
NGO9 NGO20 1 0 0
NGO9 NGO24 1 0 0
NGO9 NGO25 1 0 0
NGO9 NGO28 0 1 0
NGO9 ING01 0 1 0
NGO9 DONOR1 0 1 0
NGO9 DONOR2 0 1 0
NGO9 ING02 1 0 0
NGO9 ING03 1 0 0
NGO9 ING04 1 0 0
NGO10 NGO9 1 0 0
NGO10 NGO13 1 0 0
NGO10 NGO14 1 0 0
NGO10 NGO15 1 0 0
NGO10 NGO18 1 0 0
NGO10 NGO19 1 0 0
NGO10 NGO21 1 0 0
NGO10 NGO26 1 0 0
NGO10 DONOR1 1 0 0
NGO10 ING02 1 0 0
NGO10 ING03 1 0 0
NGO11 NGO12 1 1 1
NGO11 DONOR2 1 0 1
NGO13 NGO10 1 0 1
NGO13 NGO16 1 1 1
NGO13 NGO29 1 1 1
NGO13 NGO34 1 1 1
NGO13 NGO35 1 1 1
NGO19 NGO14 1 1 0
NGO19 NGO18 0 1 0
NGO19 NGO20 1 0 0
NGO20 NGO9 1 0 0
NGO20 NGO10 1 0 0
NGO20 NGO11 1 0 0
NGO20 NGO14 1 0 0
NGO20 NGO15 1 0 0
NGO20 NGO18 1 0 0

NGO20 NGO19 0 1 0
 NGO20 NGO23 1 0 0
 NGO20 NGO24 1 0 0
 NGO20 NGO25 1 0 0
 NGO20 NGO27 1 0 0
 NGO20 INGO1 1 0 0
 NGO20 NGO42 0 0 1
 NGO20 NGO43 0 1 0
 NGO20 INGO8 1 1 0
 NGO20 NGO44 1 1 0
 NGO21 NGO10 1 1 0
 NGO21 NGO13 1 0 0
 NGO21 NGO18 1 1 0
 NGO21 NGO19 1 0 0
 NGO24 NGO10 1 0 0
 NGO21 NGO31 1 0 0
 NGO21 INGO1 1 0 0
 NGO21 DONOR1 1 0 0
 NGO21 INGO4 1 1 0
 NGO21 NGO36 1 1 1
 NGO21 NGO37 1 1 1
 NGO23 NGO10 0 0 1
 NGO23 NGO38 0 0 1
 NGO23 INGO5 0 0 1
 NGO23 NGO36 0 0 1
 NGO23 NGO39 1 1 1
 NGO24 NGO9 1 0 0
 NGO24 NGO10 1 0 0
 NGO24 NGO11 1 0 0
 NGO24 NGO12 1 0 0
 NGO24 NGO14 1 0 0
 NGO24 NGO15 1 0 0
 NGO24 NGO16 1 0 0
 NGO24 NGO17 1 0 0
 NGO24 NGO18 1 0 0
 NGO24 NGO19 1 0 0
 NGO24 NGO20 1 0 0
 NGO24 NGO21 1 0 0
 NGO24 NGO22 1 0 0
 NGO24 NGO23 1 0 0
 NGO24 INGO1 1 1 1
 NGO24 NGO40 1 1 1
 NGO24 NGO41 1 1 1
 NGO26 NGO27 1 0 0
 NGO26 NGO28 1 0 0
 NGO26 NGO30 1 0 0
 NGO26 NGO31 1 0 0
 NGO26 DONOR3 1 1 0
 NGO26 INGO6 1 1 1
 NGO27 NGO26 1 0 0
 NGO27 NGO28 1 0 0
 NGO27 NGO30 1 0 0
 NGO27 NGO31 1 0 0
 NGO27 DONOR1 1 0 0
 NGO28 NGO26 1 0 0
 NGO28 NGO27 1 0 0
 NGO28 NGO29 1 1 1
 NGO28 NGO30 1 0 0
 NGO28 NGO31 1 0 0
 NGO28 INGO1 1 1 1
 NGO28 DONOR1 1 1 0
 NGO28 INGO7 1 1 0
 NGO29 NGO28 1 1 1
 NGO29 NGO31 1 0 0
 NGO30 NGO14 1 1 0
 NGO30 NGO31 1 1 0
 NGO30 DONOR2 1 1 0

NGO31 NGO26 1 1 0
NGO31 NGO27 1 1 0
NGO31 NGO30 1 1 0