The BALANCED Project

Practice, Harvest and Exchange: Exploring and Mapping the Global Population, Health, Environment (PHE) Network of Practice

April 2011

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For more information contact:

Coastal Resources Center

University of Rhode Island
Narragansett Bay Campus
South Ferry Road
Narragansett, Rhode Island 02882, USA
Tel: (401) 874-6224
Fax: (401) 874-6920
Email: balanced@crc.uri.edu

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Cover Photo (top) Caption: Fish landing site, Bagamoyo Beach, Tanzania
Cover Photo (top) Credit: Elin Torell

Cover Photo (bottom) Caption: Couple peer educators in front of a community-based distribution outlet
Cover Photo (bottom) Credit: Path Foundation Philippines

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Executive Summary

The U.S Agency for International Development (USAID)-supported *Building Actors and Leaders for Advancing Community Excellence in Development (*BALANCED) is a five-year Population, Health and Environment (PHE) technical leadership project, funded by the United States Agency for International Development (USAID) Office of Population and Reproductive Health and implemented by the Coastal Resources Center (CRC) at the University of Rhode Island (URI), its global partners Conservation International (CI) and PATH Foundation Philippines, Inc. (PFPI), and regional and local organizations. The BALANCED Project champions the integrated PHE approach by advancing and supporting wider use of effective PHE worldwide.

As part of this work, BALANCED has mapped out the existing PHE network and developed a 'PHE Toolkit'. The latter is an online repository of selected documents authored by individuals throughout the global network of practice that includes practitioners, leaders and researchers addressing the need for, theory of and practice in the PHE approach. It is housed on Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs (JHU/CCP) Knowledge for Health (K4Health) website at http://www.k4health.org/toolkits/phe. This PHE Toolkit addresses one part of the need for information on PHE methods, experience and resources. However, to fully advance current knowledge on PHE, it is important to identify the global network—where people have face-to-face interactions—and understand who the members are, how they are connected, and the knowledge they have.

Social ties, involving alliances and networks are a hallmark in how PHE concepts and approaches are being formulated, implemented and refined. The purpose of this paper is to describe the global PHE network of practice as it currently exists and to explore methods of communication, shared learning and further advocacy and promotion of PHE approaches to new audiences. As an example, the report highlights the emerging PHE network of practice in Tanzania and how relationships are formed among diverse stakeholders. Finally, the report makes recommendations for the further exploration of emerging partner networks for better understanding the network characteristics of champion individuals and communities, and for tracking the emergence of social capital and the role of networks in scaling-up PHE worldwide.

Introduction

Population, health, and environment approaches support the interrelationships between population, health, and environment dynamics. The approach has two complementary goals—first, improving the well-being of people living in critical landscape, watershed and coastal areas of high biodiversity by providing them with access to family planning and reproductive health services. At the same time the approach seeks to protect and make more resilient the biodiversity-rich ecosystems upon which these same individuals depend for food, income, livelihoods, and other goods and services. While a growing body of development practitioners sees value-added benefits in the integrated PHE approach, others believe there is too little empirical evidence pointing to PHE as a cost effective approach to make it worthy of increasing support. Since many of the designs of first and second generation PHE initiatives were in a testing or demonstration phase, implementing organizations did not prioritize two things we need now—i.e., to adequately make operational the linkages between and the P, H, and E interventions and/or to demonstrate the importance of those linkages and the added value generated by their integration.

Within the history of development assistance, PHE is still considered an 'emerging' approach. As such, the capacity to implement PHE programs is still unfolding and best practices for its effective implementation are still being experimented with and learned. The conceptual and operational framework of the PHE approach continues to be debated and evolve. However, common to all PHE efforts is the importance of social capital and ties and the need to understand, utilize and help create networks of social and political relationships to assemble and foster understanding of needs and the PHE approach, political support, material resources and technical expertise. D'Agnes and Margoluis (2007) point out that conservation groups are improving their working relationships with communities; health organizations are gaining access to communities and clients that otherwise cannot be reached; and problems are being addressed in ways that leads to more permanent, wide -reaching solutions through the involvement of regional and national actors.

Oglethorpe, Honzak and Margoluis (2008) find that "a common denominator of success in all sites was effective collaboration with health partners" in their experience in eight countries, and compare the advantages of partners operating at different scales in part by referring to network attributes. At the local level, they note that social ties offer the possibility of high commitment, detailed knowledge of local conditions, and access to human and financial resources. Tapping national organizations can bring stronger technical skills and larger funding sources to bear as well as serve as a channel for communicating to other areas. International organizations as potential partners would allow for access to potentially greater sources of funding, and additional technical support and knowledge from experience in other countries. Government actors and institutions that have long-term presence potentially bring more sustainable funding, and in any case are responsible for the policy framework for addressing aspects of problems that cannot be solved through local action alone. Government actors also have knowledge of local actors throughout a region, and can contribute technical assistance that is unavailable locally. Oglethorpe et al. also point out that the private sector has expertise, facilities and training that

can advance a population, health and environment approach. Universities may offer technical capacity and training.

Each of these actors faces disadvantages as well. Thus, the leaders of a local PHE initiative have much to think about in formulating a strategy for generating a network of relationships that contributes to local success (Margoluis, 2007). De Souza (2008) shows how leaders interested in regional or countrywide adoption of the PHE approach have utilized a variety of ways to strengthen interest and exchange of ideas as well as the flow of resources through political networks, conferences, and alliances. Looking to the future in the case of the Philippines, he suggests, "strengthening of the national PHE network would enable it to position itself as the formal national advocacy network and scaling-up mechanism for PHE integration. The network has a key role to play: providing training, technical assistance and documentation to local advocates; and rapidly responding to emerging national issues."

Other than in a handful of countries such as the Philippines and Madagascar, the capacity of developing country practitioners to implement PHE in the field is very limited and often requires bringing in international expertise and resources. While significant investment has been made in organizing existing and potential PHE practitioners into coalitions and networks at both the regional and national levels, it is not clear to what extent these networks are functioning as mechanisms for knowledge-sharing within their countries or across regions. There is, however, an emerging *global* network of practice that is testing, implementing, assessing and promoting the PHE approach. Fostering networks of PHE practice across regions and continents is motivated by the need to reduce the profound isolation that practitioners feel and to build their personal knowledge and social capital (Robadue et al. 2010). The *global* PHE network is comprised of several thousand loosely linked professionals, researchers and leaders from a variety of fields and organizations who are 'tied together' through a network of loosely related, continually interacting individuals, potentially comprising a dynamic, living repository of knowledge, skill and expertise in the PHE approach. These regional and global PHE networks are especially important because PHE is still being piloted and best practices continue to be under development. Without knowledge sharing, PHE implementers risk the chance of reinventing the wheel or missing out on using the best available PHE knowledge, tools and practices. Another challenge for PHE as a still-emerging approach is in finding a common language for the practice—one that 'speaks to' PHE practitioners that collectively come from very different backgrounds.

This paper explores the global network, which is comprised of a strong core made up of the members of the US-based PHE Policy and Practice Group, in addition to other individuals that form a more loosely connected periphery spread out throughout the world. The first step in defining this global PHE network of practice was to conduct a mapping exercise of its approximate 3,500 members drawing exclusively on publicly available secondary sources. The goal is two-fold: 1) to identify the scope and reach of the PHE community worldwide; and 2) to identify entry points where BALANCED can support communications and knowledge-sharing across members of the network—helping to reduce the sense of isolation felt by many emerging PHE practitioners across the world. This paper also introduces some basic concepts about how knowledge sharing happens and how information flows within and across a simple network of practice. It describes the process used to collect information about the network and the types of

information collected in order to create a PHE network map. It also offers a profile of certain characteristics of the global PHE network that emerged from analysis of data available as of April 2010. This includes an estimate of the size and structure of the PHE network, and some illustrations of important relationships.

The paper illustrates some ways networks can be analyzed. One method is the 'affiliation network' method, for which we provide examples. In one example, we compare who is participating in face-to-face events and track changes in the status of members of the BALANCED Project team within the network. We also include an example of a place-based mapping of the PHE network of practice—using Tanzania as the example. The paper recognizes the limitations of the affiliation network method and suggests how more direct methods can be used to map local and regional networks. The paper concludes with a discussion of findings and suggestions for future mapping of the PHE global as well as national networks, addressing the questions of — "What can network analysis tell us?", and "How can we use network analysis to facilitate communications with and amongst network members?"

Knowledge Sharing in a Network of Practice

Both developed and developing country organizations and professionals that participate in the PHE networks of practice—defined as a self-selected group that shares a concern about a topic and deepens its expertise through ongoing interactions[1]—have opportunities to not only learn from each other, but also to join together to advocate for more sustainable and resilient communities. Documentation and communication are important strategies for sharing knowledge on how to broaden the application of PHE approaches, in generating a new understanding of the value of integrated PHE approaches, and in spreading 'know-how' about PHE implementation. There is an important social dimension to such knowledge sharing as well. "Knowledge creation and utilization are fundamentally human and above all social processes."[2] Knowledge on paper or in digital form can be accessed directly, including by communities or networks of practice, such as through the PHE toolkit; and the websites of donors and organizations active in advancing the PHE approach.

However, communities or networks of practice most crave and benefit from access to what is referred to as *tacit knowledge*—i.e., knowledge that is only known by an individual and is not readily available to the rest of an organization or network except through personal sharing of that knowledge. Tacit knowledge is generally considered to be *the* sought-after ingredient in knowledge sharing. It is particularly important to new disciplines such as PHE, where best practices are yet to be documented. Tacit knowledge-sharing is a core function and advantage of membership in a community of practice. Tacit knowledge sharing requires face-to-face engagement because of the nature of the knowledge and experience that is being exchanged, which centers on 'knowing-in-action.' That said, individuals may have trouble gaining access to a 'community of practice,' including what is often referred to as the PHE community of practice. As such, a more appropriate term to use for the larger collective of PHE practitioners may be the

[1] Wenger, McDermott and Snyder, 2002: 4
[2] Borgatti and Foster (2003: 997)

PHE '*network* of practice'—as its members are not based in a specific geographic location, they continue to emerge over time, and inclusion in the network is completely voluntary.[3] Hence, for the remainder of this paper, that is the term that shall be used in reference to those practicing PHE around the world.

The fact that successful networks of practice are voluntary in nature seems to clash somewhat with the preceding broader discussion on how PHE leaders try to understand and utilize networks to carry out their goals. Anklam (2007) takes the viewpoint that leadership is required for networks of practice and sets out six guiding principles that inform the discussion in this paper:

Box 1 Anklam's Leadership Principles for Networks of Practice

1. If it is a network, you can draw it.
2. Every network has an underlying purpose, and every network creates value.
3. Once we learn to distinguish and identify the unique and individual characteristics of networks we can create, examine and shape their properties, boundaries and environments
4. Everyone in a network influences the relationships in and the outcomes of the network
5. A leader's work is to create and maintain the conditions that enable productive and innovative relationships.
6. Successful networks are reflective and generative[4]

Mapping the Global PHE Network

Information flow in a simple network

Social network analysis begins with the simple idea of visually representing individuals as nodes and the connection or relationship between individuals as lines or arcs. A simple network graphic can show not only the nodes, but can use lines, line thickness and arrows to also show the direction and strength of the relationships among nodes. The distance between nodes or people is measured as the count of the number of line (arc) segments separating them. It is possible to compute other aspects of the relationships amongst individuals and to compute various characteristics of the overall network. The simplest indicator is 'degree of centrality', that is, the number of people directly tied to someone. These relationships have directionality. Many people in a network may report a relationship to a single individual when asked 'who is the most knowledgeable person', thus giving that individual high inward directed centrality, while the prominent individual herself may have very limited or no contact with the majority of people

[3] Wasko and Faraj (2008: 497))
[4] Ankam, 2007, pp. 4-7

holding her in high regard. Another social network indicator is 'information centrality.' This indicator reflects the amount of information an individual would be likely to receive based on their position (i.e., central or on the periphery) in the network.[5]. Often, people with relatively low degree centrality who are not well known, are well placed to receive and transmit information within a group.

A success story found many times in the PHE literature is how a leader overcomes the problem of an individual or organization stopping progress by blocking the flow of information, denying access to resources or actively undermining the effort. For example, PATH Foundation Philippines Inc. (PFPI) was able to win the support of a mayor who had previously objected to condom distribution in her municipality as part of the Integrated Population and Coastal Resource Management (IPOPCORM) initiative. Mayor Monina Camacho's support was critical to the success of the innovative project that incorporated family planning and reproductive health in coastal resource management. As part of the strategy to garner greater support from the mayor, IPOPCORM staff engaged the mayor in educational dialogues and invited her to participate in a PHE study tour in Thailand in 2002. Based on her experiential learning, the mayor forged a bond between IPOPCORM and the local government, which ultimately led to the success of the project in the region (Hernandez, 2006).

The network diagrams shown in Figures 1 and 2 represent this situation and its potential solution. The arrows indicate the direction of information flow.

In Figure 1, A is a PHE champion who is foiled by the fact that B is opposed to family planning, for example. Individual B has more power and higher 'information centrality' than does individual A. Thus, B has a much better 'view' of the network overall and can manipulate the flow of information and influence within it. Four nodes—A, C, D, J—connect directly to B. Another four nodes are two steps away. In order for A to find out anything about G, D, F, K, E, or J, he/she must go through B. Meanwhile, B may choose to or chose *not* to provide information or support. B could also decide to deliberately provide misinformation and thus act in opposition to A's program. Humans may not be faithful or reliable transmitters of knowledge. This is in part due to poor memories or, at worst, a result of malicious intent.

[5] Wasserman & Faust, 1994: 196

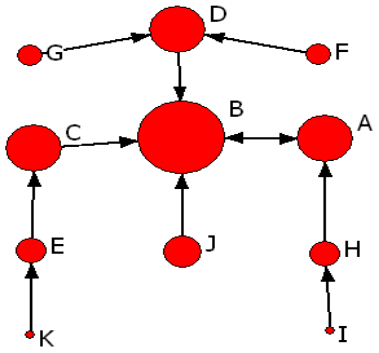


Figure 1 "B" blocks PHE information flow to "A"

Figure 1 Network where "B" has the highest access to information, "A" depends on "B", but "B" can block information flow. Node size measures information access.

In Figure 2 "C" and "D" build relationships to "A" in order to increase the flow of information and bypass B

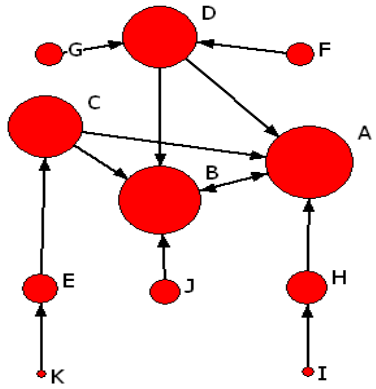


Figure 2 "C" and "D" work to overcome the blockage to "A'

One solution is for A to establish independent relationships with other influential actors D and C. However, so she can also gain an equal footing with B and overcome the blockage. Alternately, as in the case described by Hernandez, A can mobilize C and D to influence or change the opinion of B through peer pressure and the fact that they have more credibility or respect from B. *Affiliation networks* are one method used by social network analysts to infer relationships among network members. We employ this method in the paper, drawing mainly from secondary data sources. The other main approach is 'egonetwork' analysis, which is not employed here. PHE leaders do egonetwork analysis naturally as they determine how to create the alliances and decide with whom to work in their local settings. Social scientists do this in a more formal way by utilizing simple questionnaires and interview techniques to generate very powerful descriptions and models of these networks. This type of analysis is more time consuming as it involves interview-based research

The affiliation network method looks at how the network members are affiliated, or 'related' through 'event(s)'. An event, in this context, is any way in which one or more candidate members of the PHE community can be tied to others in generating or disseminating PHE knowledge. This includes being:

- mentioned in a PHE-related book, article or document, peer-reviewed or 'gray' literature; included as part of a publicly available mailing or contact list; listed as an author, co-author, or acknowledged individual in a cited work; or acknowledged as part of a project, place or organization that is featured in the cited document;
- part of a PHE-related conference or meeting, training program or seminar as an instructor or participant;
- a member of an organization or project that promotes, utilizes, funds or supports PHE;
- located in a place that has a PHE project or activity.

We used the affiliation network approach to map the global PHE network. We collected publicly available information from secondary sources to identify individuals who were linked through PHE-related 'events.'

One advantage of using affiliation techniques and secondary data for mapping is that information can be collected relatively quickly and inexpensively. That said, key PHE events frequently do not make their participant lists publically available. Further, many key PHE events remain unknown to us. Also, 'events' are often biased toward including already established individuals and/or include attendees who are there only by virtue of their position in their organization or agency vs. their commitment to or interest in PHE. In our analysis of the PHE community, BALANCED activities show up as heavily represented. This helps us in tracking the reach of events and activities in the broader PHE network of practice. Without question, utilizing similar types of information from other organizations and their events would both expand the number of nodes and 'fill in' the ties among the network participants.

The affiliation technique employed here using global information sources does not create a realistic portrait of the web of relationships within countries. To do that would require a combination of affiliation and egonetwork analysis techniques, which together could visually map out the network for those countries with a history of experience in PHE and help identify new areas where it is important to understand the existing/emerging network of actors. To date we have not found any specific examples where this combination of methods has been used and produced such a mapping.

Events

We collected information from two major sources to generate names for the map. The first source was the document collection from the original USAID PHE website plus the subsequent collection now included on the K4Health PHE Toolkit http://www.k4health.org/toolkits/phe. We identified authors and co-authors; people specifically listed in the acknowledgements, and in some documents, also included the names of other cited authors.

Attributes

We also collected and included additional information about PHE actors (the nodes), which can be treated as special 'attributes'. In the data set, 35 organizations—mostly well known—plus several lesser known Tanzania organizations are included as 'organization events' in that example This covers 314 individuals or approximately10 per cent of the mapped portion of the network. In fact, the PHE global network members work for several hundred different organizations, which also could be mapped out in more detail to answer questions about which organizations are sustaining their commitment to PHE approaches and which no longer utilize them. We also attempted to associate a country with each network member, and succeeded 50 percent of the time, which allows us to offer some portrayal of the geographic distribution of the global community.

Data Collection and Storage

The basic data set of 'citation events' and 'meeting events', along with organizational and country attributes, are stored in a single Excel 2003 spreadsheet, 252 columns (for the events and attributes) and 3,241 rows (for the data pertaining to each node). Since Excel 2003 is limited to 256 columns, the information was transferred to a database format, and is being converted into a matrix format that can be utilized by UCINET, a social network analysis software, which does not have the limitations of Excel. We are retaining the references from which the names were

collected, as many of those documents include additional attributes and details that could be useful in case studies in developing more complete attribute information for network members.

Potential size of the PHE network

The analysis reported here includes 187 events that generated names for 3,240 unique members. As of April 2010, there were 154 documents included as '**citation events**'. These 154 documents generated 961 names, with the oldest dating to 1987 but the vast majority from the past 10 years. The second source of names for the map was a series of 33 PHE '**meeting events**' defined as meetings, conferences, and contact lists from trip reports where in-person meetings had occurred. The most important of these were the international conferences on PHE-related topics held in recent years, primarily those from 2005 onwards. These meeting events generated 2,512 names. Only 233 of these names overlap and appear in both documents and events. The final network map includes 3,240 nodes (unique individuals) with each node associated with at least one meeting or document citation. The map includes the date of each publication or event, since one important type of analysis is looking at how networks evolve over time and the relative strength or impact of different events. Table 1 provides an example of a data table, including a few names and different types of events.

Table 1 Excerpt of the network analysis data table

	EVENT																			
Name	_cAlcala_A_2007	_cAlcala_A_2007b	_cAlcala_A_2007c	_e_PHE_EthiopiaConference2007	_e_PHE_PhilippinesConference_2008	_e_PHETanzaniaWorkshop_2005	_e_SSEParticipantsActual_Feb2010	_oCARE	_oCI	_oCRC	_oFHI	_oJGI	_oPFPI	_oTZ_EngHealth	_oWWF	_xEthiopia	_xMadagascar	_xNepal	_xPhilippines	_xRwanda	_xTanzania
Abaja_Mir	0	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0
Abate_S	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	**1**	0	0	0	0	0
Abbas_F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Abbas_H	0	0	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**1**

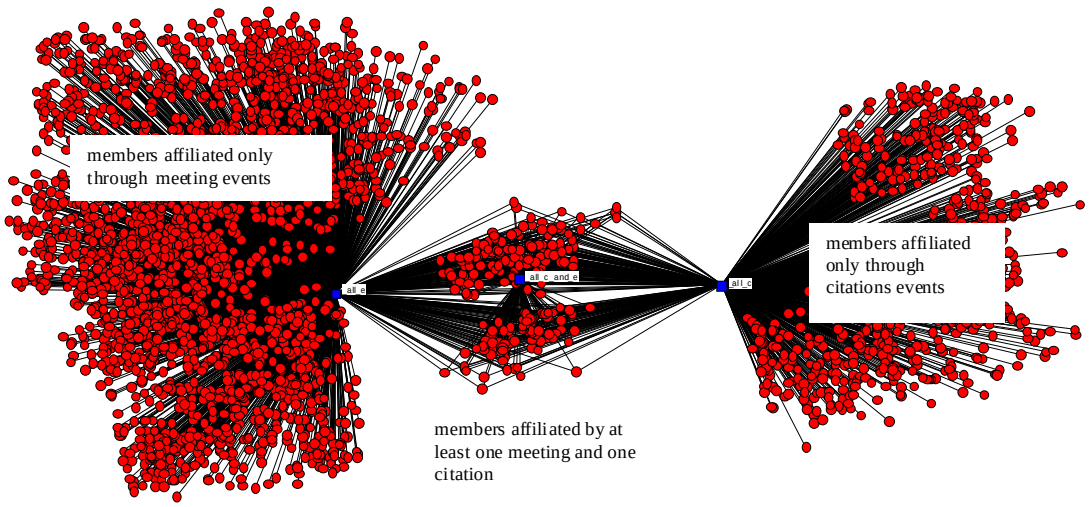
NOTES: Prefixes:_c: citation 'events'; _e: meeting 'events'; _o: organization (when known); _x: country (when known). Relationships: "0" indicates no relationship; "1" or greater indicates a relationship; ">1" (when utilized) reflects strength of the tie based on criteria**.**

The Structure of the Global PHE Network

There are many possible forms for a social network. A very low density of ties among network members still allows information to flow. This owes to the 'small world phenomenon', known popularly as 'six degrees of separation'—or the idea that a message can, on average, be conveyed from one individual anywhere on the globe to another in just six steps or less[6]. 'Collaborative distance' is a similar concept—i.e., that when you look at a network of authors who may not know each other, they are, by virtue of being part of a particular community or network of practice, often separated from each other by only a few steps. At another extreme, cliques are small, tight knit groups that share relationships with each other and communicate intensively, and offer comparatively little information flow outside the group. The PHE network is dispersed globally, but also has a highly interconnected core group as well as regionally important cores.

[6] Watts, D. 2003. Six Degrees.

Figure 3: PHE network members identified, by type of event. Meeting events, on the left side, generated 2,512 names, while citation 'events' generated 961 names. These two groups are largely isolated from each other, since 233 names are linked to both a citation and a meeting.



Affiliations with meeting and document citation events

Figure 3 illustrates an important attribute of the members in the affiliation network we have constructed for PHE. As noted above, the largest proportion of nodes are associated with a meeting event; the second largest group are co-authors, acknowledged individuals or key cited authors in a document; and a very small portion—less than 10% or approximately 233 members—shown in the center, have both attributes. We would expect that this smallest group is probably better connected than those in the larger categories, and will appear as central members of the network in other views. In fact, this turns out to be the case.

Core and Periphery of the Global network

The PHE network has a core and periphery structure, as illustrated in Figure 4. The thin outer band is, for the most part, comprised of co-authors of documents related to the environment, biodiversity and eco-health. We included eco-health and biodiversity-focused meetings and citations in the analysis, which are clustered in the upper left side of the network map. There are relatively few members of the global PHE network who participate both in those environment and eco-health oriented events as well as in other mainstream PHE efforts. In keeping with the spirit of the concept of a network of practice, and the fact that our data on the organizational affiliation of member nodes is incomplete, this paper does not explore the identity or relationships among the organizations that fund or implement PHE programs.

At the center of the PHE network is the PHE Policy and Practice Group, an informal gathering of professionals working for organizations in the US and internationally that meet on a regular basis in Washington D.C. to discuss PHE topics and provide updates on each other's activities. Most of the participants have a very high level of degree centrality as well as 'betweeness' within the

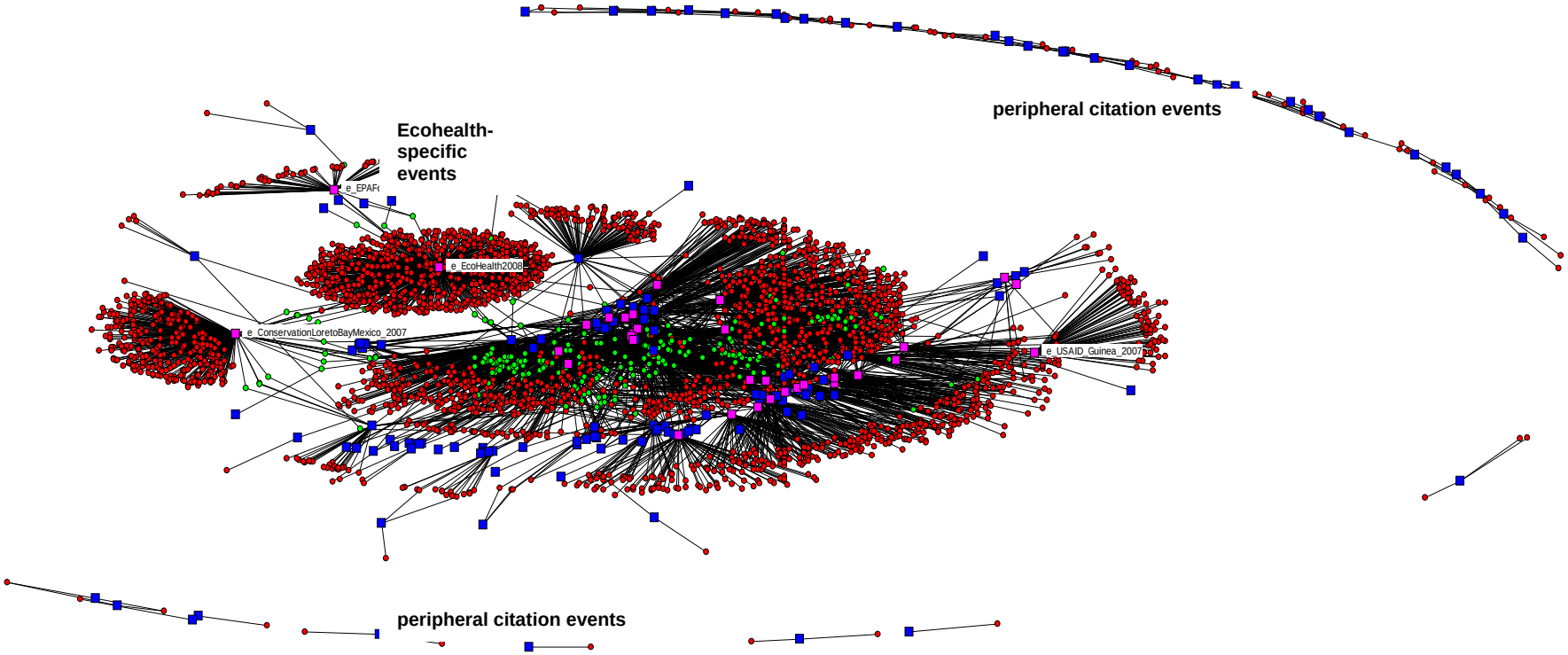
global PHE network of practice. The Policy and Practice group had 32 members receiving minutes from the meetings in April 2009 (this has increased to 55 by December 2010), 18 of whom are associated with one or more major PHE meeting events and are co-authors or are acknowledged in one or more PHE-related documents, as shown in Figure 5.

The members of the Policy and Practice group are collectively only two degrees of separation from 2,573—or 80 percent—of the 3,240 members of PHE global network, as shown in Figure 5. For example, a member interested in information about PHE in the Philippines could ask any one of several members. Some members will ask Joan Castro, the Executive Director of PATH Foundation Philippines and the member of the PHE global network with the highest degree centrality, directly for information or an introduction since they are likely to have met her personally. Or, they could ask someone with lower degree centrality, such as Elin Torell, who has ties to Joan Castro since they work on the same project, has visited the Philippines and both share knowledge about PHE project activities in Tanzania.

Some key events are highly central to the network because some members of the Policy and Practice Group were directly involved in them. This includes the PHE conference held in Ethiopia in 2007—especially its organizing committee—and the University of Michigan Population and Environment Fellows program.

The concept of 'betweeness' is illustrated by a closer view of the core of the overall PHE network of practice as shown in Figure 6. For example, nodes Honzak_H, D'Agnes_L, D'Agnes_H and Castro_J have very high 'betweeness' scores. In the diagram, they are among the few individuals who have attended some major eco-health PHE events. The United Kingdom attribute node is located near the EcoHealth portion of the network as members from that country appear to be most interested in that particular facet of PHE and do not appear frequently at other PHE events. Meanwhile, members of the Tanzania, Ethiopia and Philippines networks are clustered near the main meeting events. While it appears that well-connected members of groups with frequent interactions, such as the Policy and Practice group, have a potentially broad and clear view of much of the global network, the affiliation network approach cannot provide us with a great deal of information about actual communication patterns and the directionality of communication among them. That would be the function of egonet analysis, which as noted above is carried out through an interview process.

Figure 4 The Global PHE network. Red nodes are members; green nodes are members that are tied both through a meeting and a citation event. Blue nodes are citation events, and pink nodes are meeting events. Labeled events and network members in the upper right hand corner are related to one facet of PHE, eco-health. There are relatively few ties between these members and the core of the network.



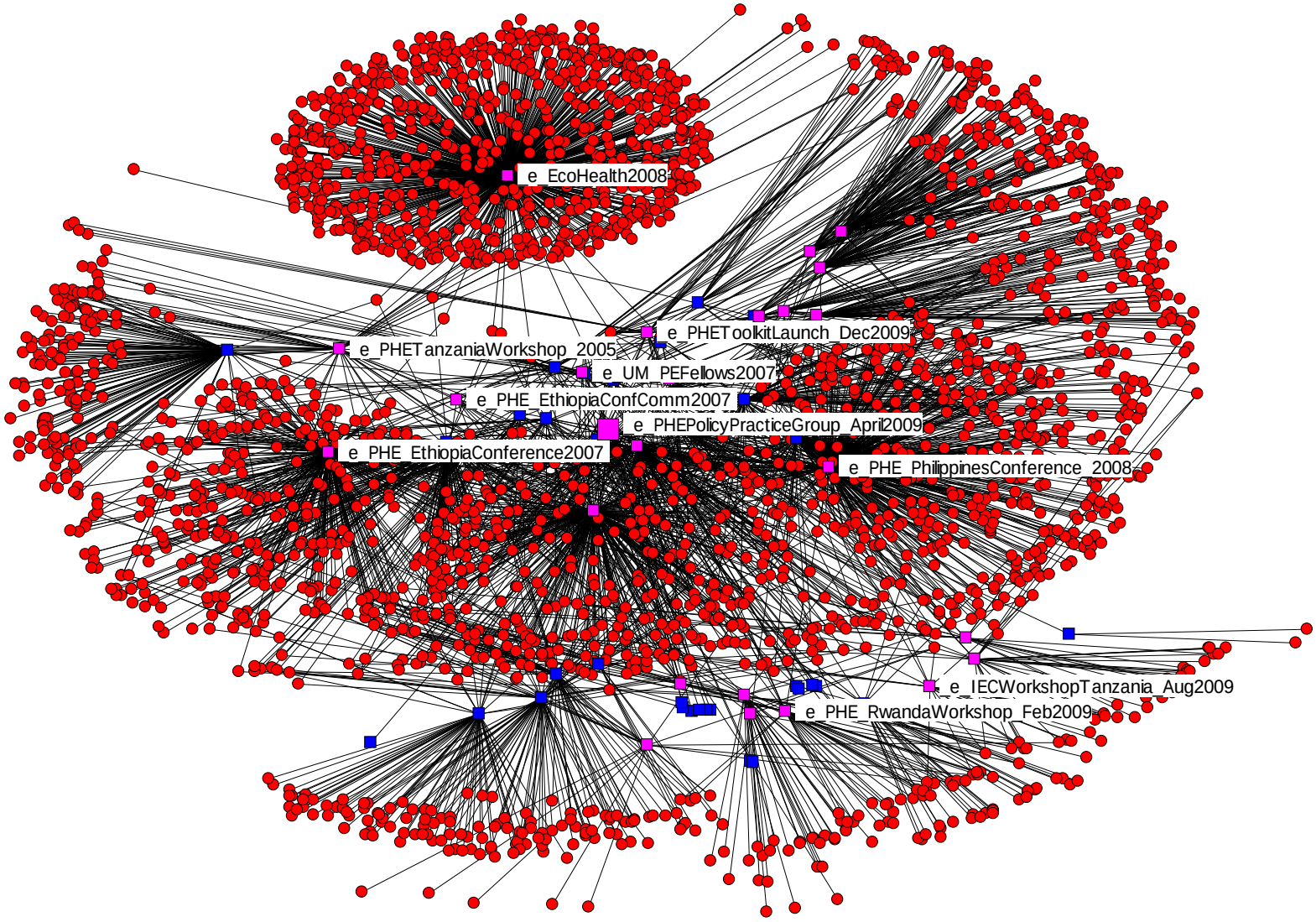
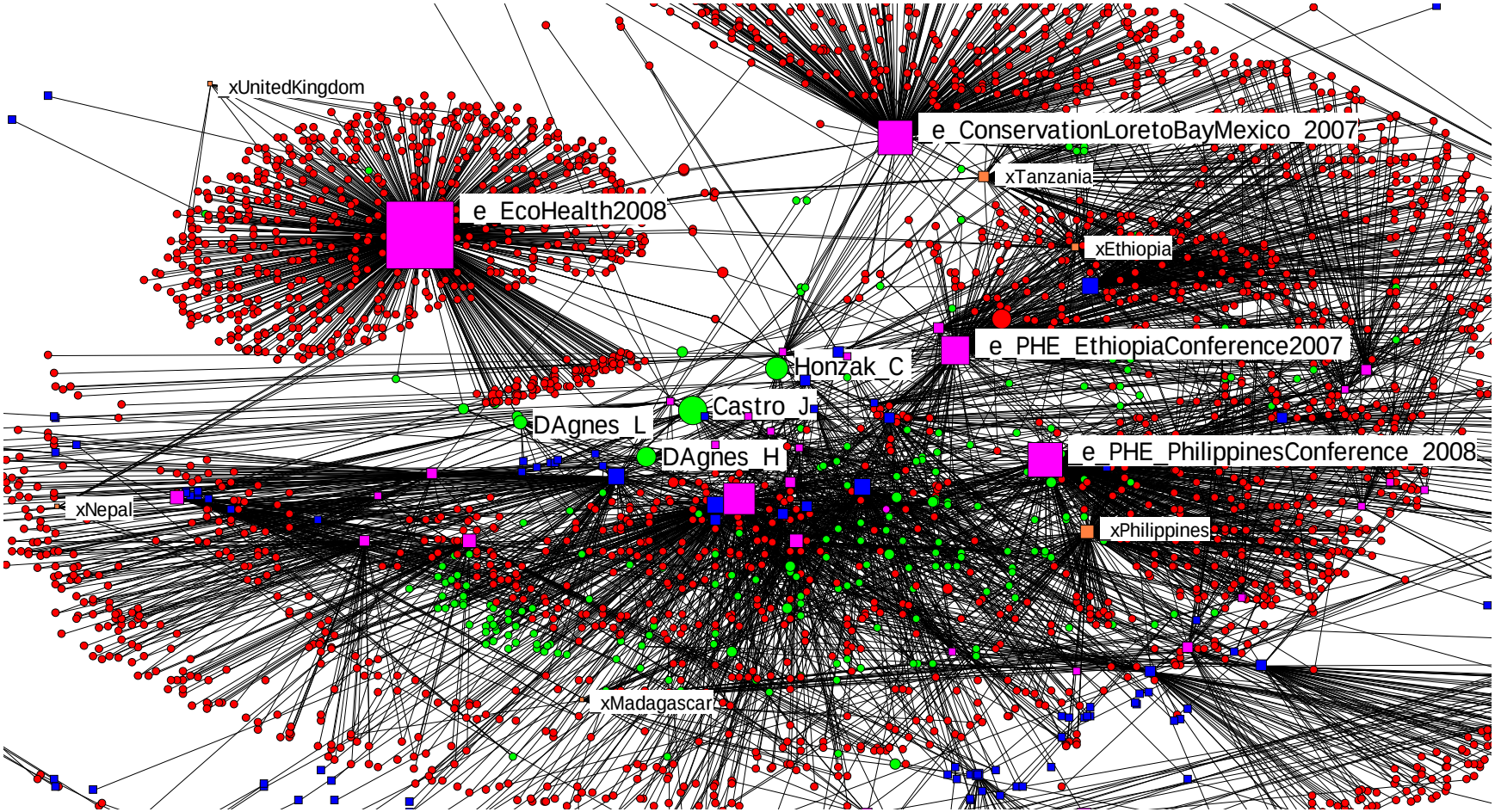


Figure 5 Two Degrees of Separation: Members of the Policy and Practice group are collectively only two degrees of separation from 2,573 or 80 percent of the 3,240 members of the PHE global network. Some key events are highly central to the network, such as the PHE conference held in Ethiopia in 2007, especially its organizing committee, and the University of Michigan Population and Environment Fellows program.

Figure 6 Core of the PHE network: Events, attributes (country) and highly central members of the PHE network. Node size indicates the level of 'in-betweeness', that is, how well the event or network member might be able to connect sub-groups within the overall network.



Communicating Know-how and the PHE Network of Practice

Knowledge generated by the PHE global network of practice that is codified in printed and electronic form is increasingly available online (see the PHE Toolkit on the K4Health.org internet portal as one example http://www.k4health.org/toolkits/phe). The information, publications, and tools residing on the site are, however, only part of what PHE practitioners know and are interested in learning from each other.

Above all else, sharing 'knowing how' is important. "It is a process of helping others develop the ability to enact—in a variety of contexts and conditions—knowing-in-practice"[7]. Sharing know-how is in large measure a social act. The benefit of a community, such as the PHE community, is that relationship distances are shorter (ties are closer) than typically found in organizations[8] making knowledge sharing easier. Communities of practice also have a greater density of ties yet ideally do not act as cliques.

One issue within any network is that individuals or groups may simply never fully reveal their tacit knowledge or concerns—something that increases the chances for a project's failure or lack of replication elsewhere. Knowledge that is difficult to articulate cannot easily be communicated through electronic channels (email, internet, phone). Face-to-face contact, events and meetings, and continued proximity may all be required to create both the opportunity and the level of trust needed for tacit information to become articulated and revealed. 'In-betweeners' are those individuals with relatively loose or weak ties who have the propensity to link otherwise separated groups. They can play a positive 'bridging' role in helping professionals from different fields make more effective contributions of knowledge sharing with each other. While much the same sharing might occur within the context of specific projects— during work planning, training and team work—within voluntary networks such sharing can also function at the regional and country levels.

Communicating with global PHE network members

There are currently 55 names on the email list for the Policy and Practice Group, which meets regularly in different venues in Washington, D.C. and is alternately hosted by one of the member organizations. It is used primarily for setting the meeting agendas and distributing minutes among the participants. Meanwhile, the PHE listserv hosted by the Woodrow Wilson International Center for Scholars Environmental Change and Security Project is used to disseminate broader announcements, share PHE information, and generate discussion on PHE topics and issues writ large. This listserv is comprised of 572 anonymous subscribers. The BALANCED Project maintains its own general purpose a 284-name email list for selected distribution of Project communications. Members on this listserv are shown in Figure 7—a reduced version of the PHE network—as black and yellow nodes (_e_BALANCED) that fall largely within the yellow circle at the core of the network. Most of the core, highly-central

[7] Orlikowski, 2002: 271.
[8] Teigland, 2003.

members of the network are included within this yellow circle/core of the network. However, there are also large clusters of network members—primarily those with weak ties to the core—that are not represented within this circle/core of the network. One example is the eco-health related scientific community, shown as a cluster in the upper right hand corner of the network map. Other examples include the conservation science group that attended the Loreto, Mexico meeting (clustered on the right hand side or the map), and the Southeast Asian and Philippines members. Also missing, on the left side of the map, are local participants in the PHE conference held in Ethiopia, and in the lower left, the social scientists who participated in the 2001 RAND workshop on Population, Health and the Environment (see "The Environmental Implications of Population Dynamics, Hunter, 2000). It may be neither necessary nor desirable to put resources into extending communication to groups of researchers or practitioners at the periphery of the PHE network of practice. The main point here is that it is possible to visually represent and relatively easy to identify some of the members of groups that might be of strategic importance.

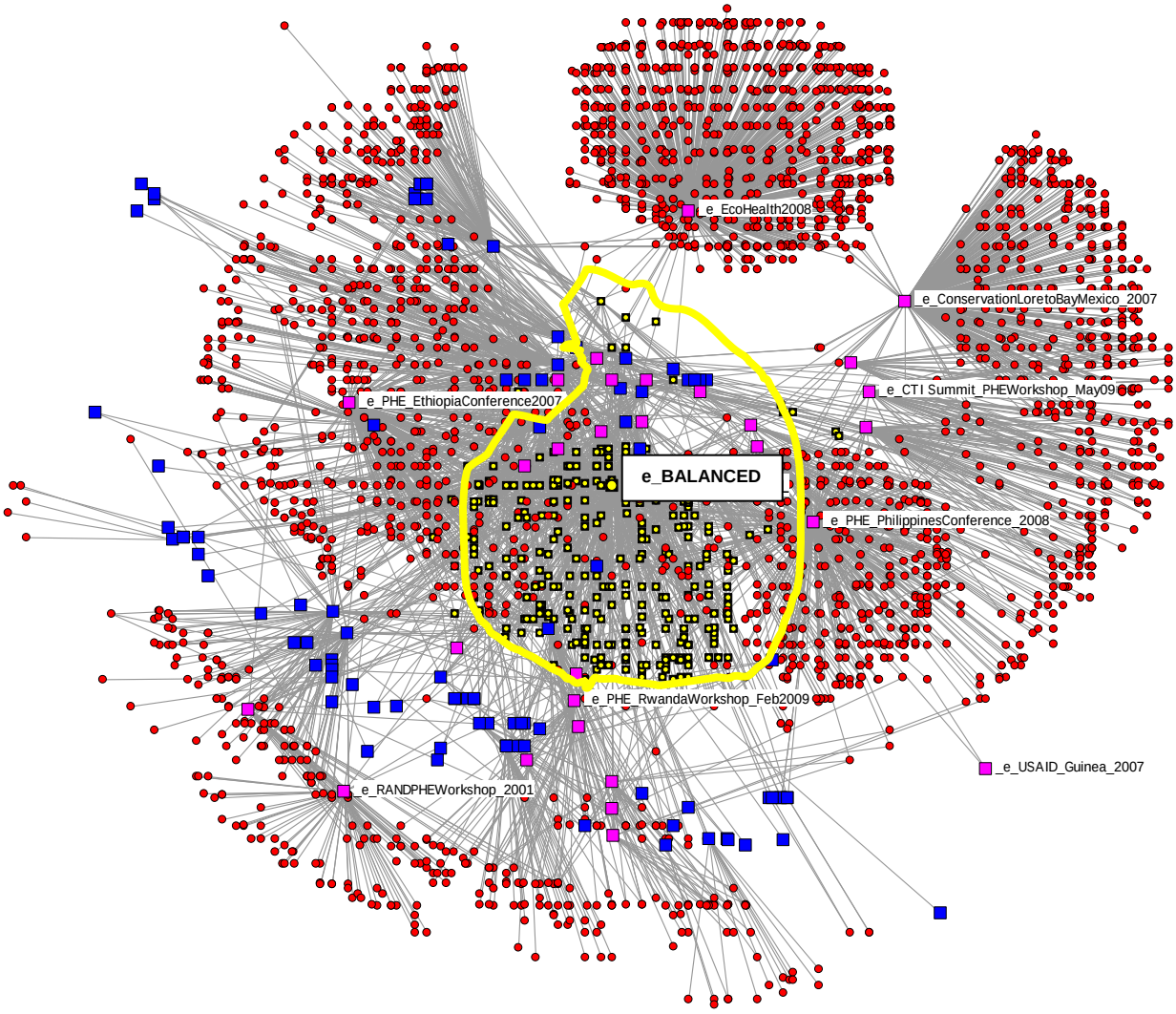


Figure 7 Reach of BALANCED Project General Purpose Email Contact List. Yellow nodes are on the BALANCED general-purpose email list. Pink nodes are PHE meeting events, blue nodes are citation events. The yellow shape highlights the location of the members of the contact list within the overall PHE network.

Figure 8 provides a different and more complete picture of the communication reach of the BALANCED Project. The Project's 12 core staff members combined have been directly involved in at least 30 of the 33 meeting events used to define the global PHE network of practice, have likely interacted directly with 460 people from more than 30 organizations in more than nine countries, and are tied to 58 of the 154 citation events used to help map the entire PHE network. Yet, only 52 of the 460 individuals shown to be engaged directly by the BALANCED Project also appear in the Project's general-purpose email list. This highlights the fact that the Project team reaches 88 percent of its immediate network through face-to-face communications versus electronic forms of communication. This indicates the value of encouraging the in-person participation at regional and international PHE or PHE-related conferences and workshops of individuals who have weak ties within the larger community of practice network. It is such face-to-face interactions that build the strongest ties.

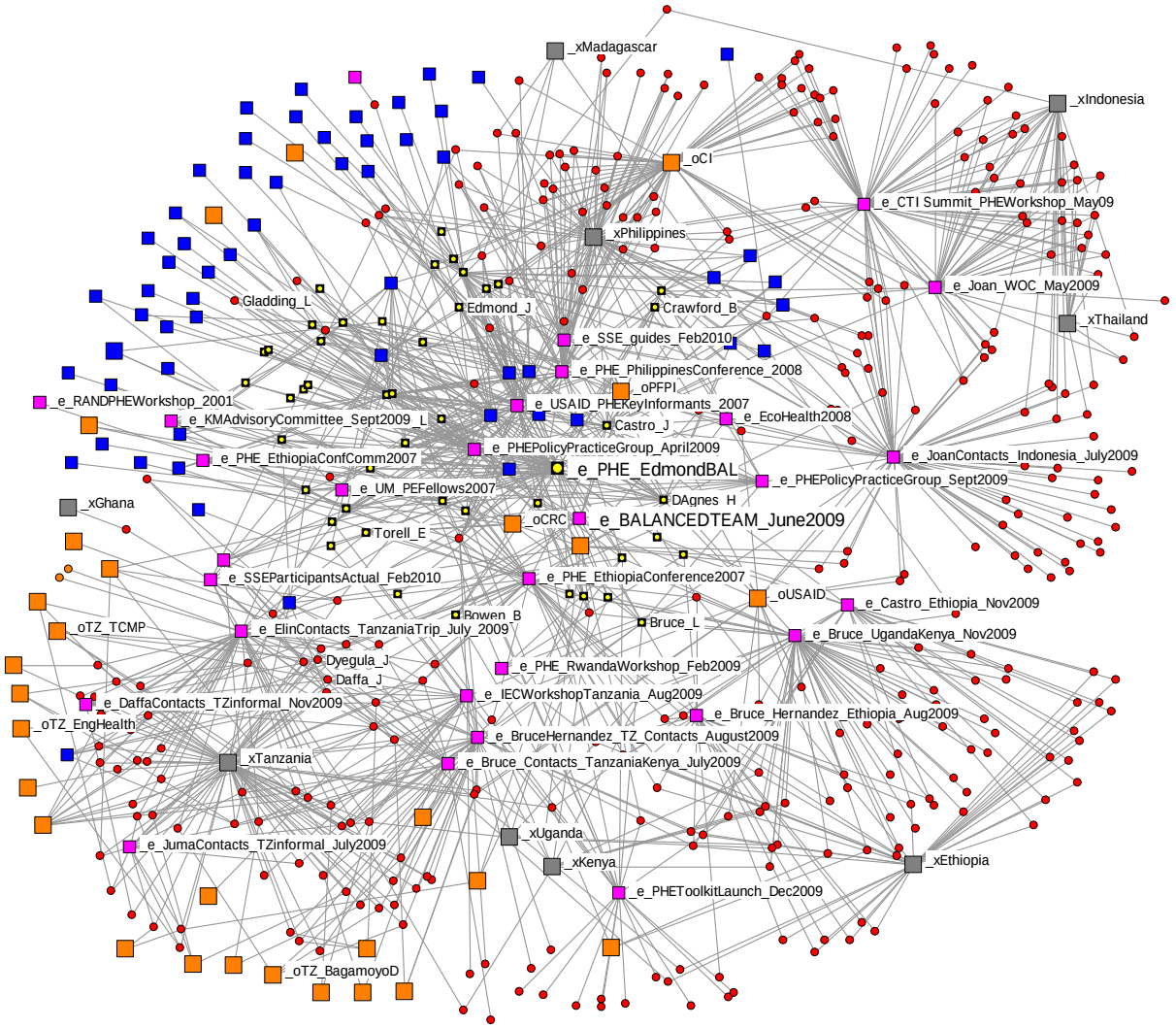


Figure 8 BALANCED Project Interactions with the PHE Network of Practice. Pink nodes are BALANCED meeting events, blue nodes are citation events, orange nodes are organizations, red or yellow/black nodes are network members directly tied to a BALANCED event (as of April, 2010), and grey nodes represent countries.

Place-based Mapping of the PHE Network of Practice: Example from Tanzania

We noted earlier that strong ties, and relatively few 'degrees of separation' may exist between the most central members of the network and PHE champions working in the most remote areas of the field. O'Brien and Richey (2010) offer an enthusiastic exposition on the power of virtual communities of practice that rely on information technology in the case of family planning and the global reproductive health agenda, particularly in the dissemination of evidence-based reproductive health guidance as well as two-way communication. They also indicate that virtual networks can be used to help organize as well as to maintain the momentum of face-to-face meetings, such as the 2009 International Conference on Family Planning: Research and Best Practices, held in Kampala, Uganda.

However, often the direction of the flow of information and the exchange of know-how can be unequal and the psychological distance between the nodes may be great, even if in network terms two individuals are very close. We will use as an example the situation of a close colleague, Juma Dyegula, a PHE champion in Tanzania. Dyegula and Robadue, both work for the URI Coastal Resources Center, share a relatively low degree centrality in the PHE network (they are directly connected to only four and 19 network members respectively) compared to the highly central Dr. Castro (who has 40 direct connections according to the affiliation network analysis). However, even though we are colleagues, Dyegula and Robadue are each located in a very different part of the PHE network of practice with the result being that Robadue's 'betweeness' is somewhat higher—.23 as compared to .01 for Dyegula—and his perspective on the network of practice somewhat wider than that of Dyegula, while Dyegula's personal network and role within the Tanzania community of practice is likely to be much higher. (Recall that we cannot know who the members of this personal network are without personal interviews, we only infer them from the affiliation network approach).

If Dyegula needs specialized information and insight to help him in his role as PHE Champion, he would not ask Robadue for advice, rather he might seek out a personal or virtual contact with Roger-Mark De Souza. His strategy for doing this might be to ask Robadue for suggestions on how to make this connection, but not for an introduction, since even the affiliation network analysis shows that Robadue probably has no personal connection to De Souza. Rather, Dyegula would be better off seeking out one of three other people he knows—Torell, whom he has worked with for some time; Bruce, whom he knows through the BALANCED Project; or Castro, who he also knows through the BALANCED Project. Any of these individuals, according to the simplified view of the PHE network of practice—has more direct and indirect ties to De Souza than Robadue. (See Figure 9, which uses affiliation network information to map out potential relationships among these PHE network members). Dyegula might also consider contacting Edmond, whom he has never met, but whose tie strength (line thickness) to De Souza is also greater. Again, however, since Dyegula is more likely to see Robadue or Torell face-to-face in the near future as part of their ongoing work relationships, it is these individuals he would likely seek out for initial advice and contact with DeSouza. From Dyegula's perspective, several highly central members of the PHE network occupy structurally similar positions, so it is highly likely he will use additional criteria to choose his ultimate communication channel, beginning with any local contacts that exist.

This example is based on information from the affiliation network analysis, so it is by definition 'coarse' and does not take into account any other relationships among the node members mentioned above. However, the written description does in fact take advantage of knowledge the authors have through their face-to-face relationship with Mr. Dyegula. The main point is that affiliation mapping as a technique can allow for some exploration of information flow within the community of practice but also point out to some limits of a virtual approach to networking.

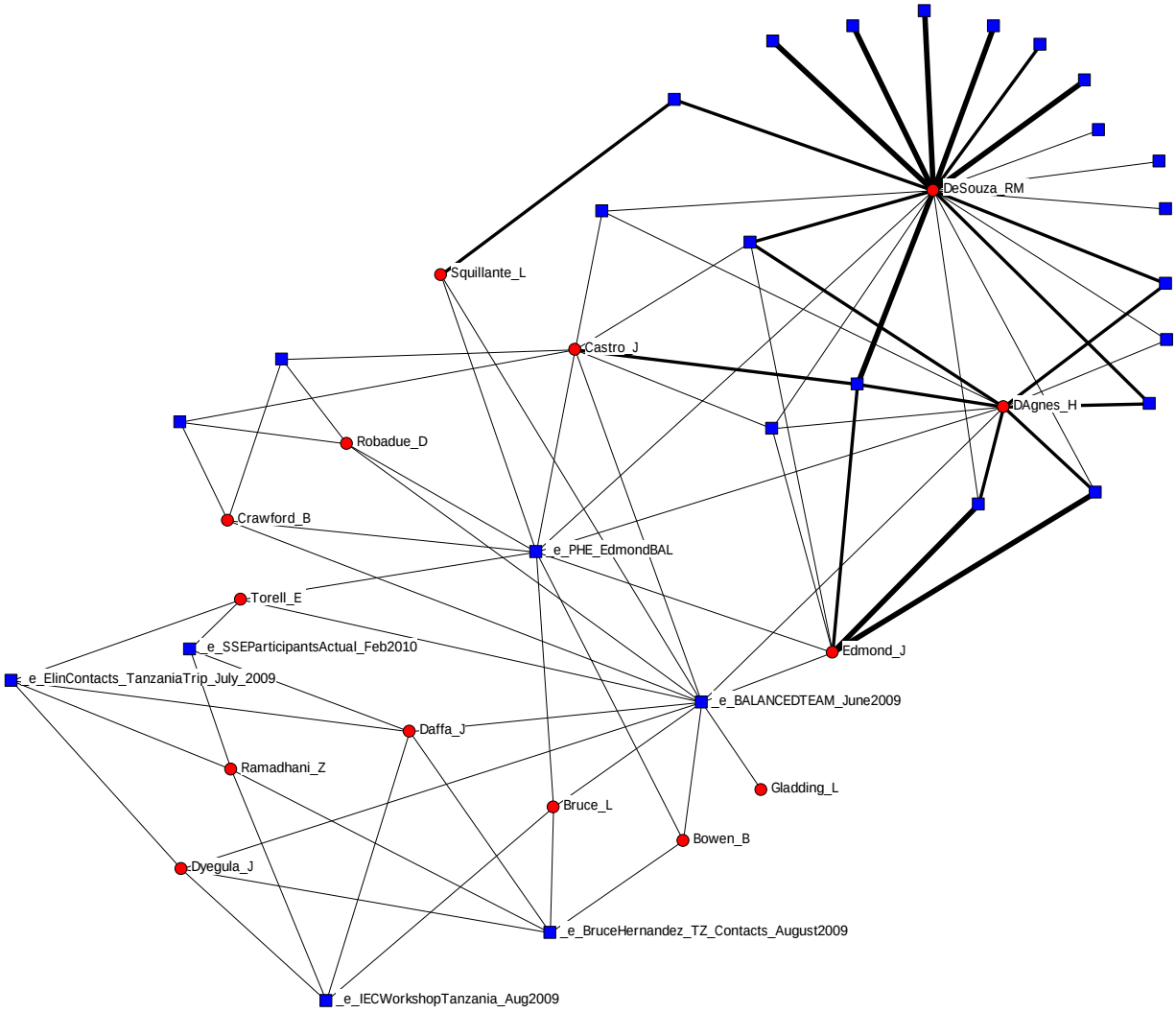


Figure 9 Structural Options for Making Contact with Roger-Mark De Souza. Dyegula, based in Tanzania, has several potential pathways for making a personal contact with DeSouza, based in Washington, D.C. This is due to Dyegula's advantageous position in the structure of the Tanzania network. Interestingly, Dyegula may be unaware of this.

When we turn the question on its head, a different set of challenges emerge. Suppose Roger-Mark De Souza wants to make a detailed comparison of the experience of PHE champions in the Philippines—where he is an expert—and Tanzania, which he may not know as well. He has many people he could engage with first hand to begin to gather this information. However, those individuals would, in turn, have to collect detailed information mainly by asking Tanzanian colleagues directly. In that respect, data on the global PHE network of practice can be a useful starting point for reaching out to those who have the information (in this case the Tanzanians) even when there are many degrees of separation. De Souza might rely on Bruce, Edmond or Torell to find key informants, such as Dyegula. Each would rely on their personal contact lists in the absence of a network map. We prepared a coarse map of likely members of a PHE community of practice in Tanzania in Figure 10. This April 2010 snapshot of the PHE network map identifies 107 Tanzanians who had participated in PHE events, conferences and reports.

Individuals (red circles) active in PHE in Tanzania are so identified through their participation in publications, attendance at local and international events, and ongoing projects (blue squares) as shown in the network diagram. In this 'loose' network, there are clusters of people that are active in PHE but who may have little or no contact with each other.

It should be noted that this Tanzania PHE network map is incomplete, as it is comprised only of names generated through the affiliation network method, with additional information/details added to the database as a result of the BALANCED Project team being personally familiar with many of the locations, organizations and their members.

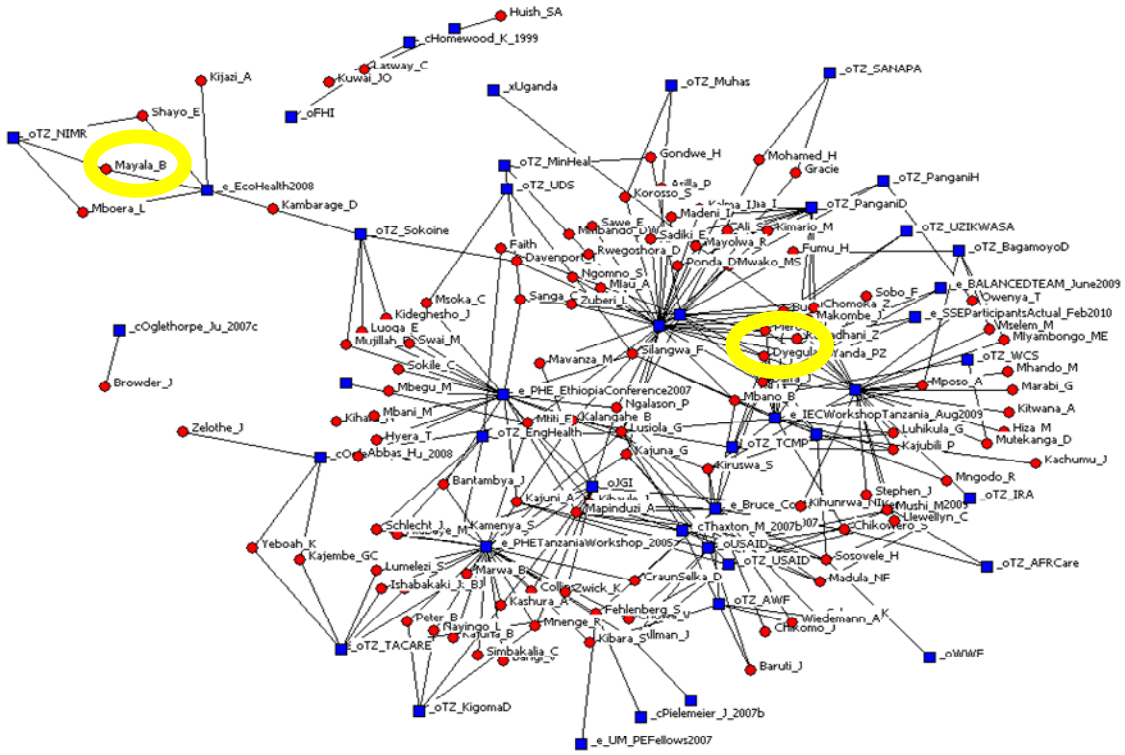


Figure 10 Preliminary Map of the PHE Network of Practice in Tanzania. Dyegula and Mayala are circled in yellow.

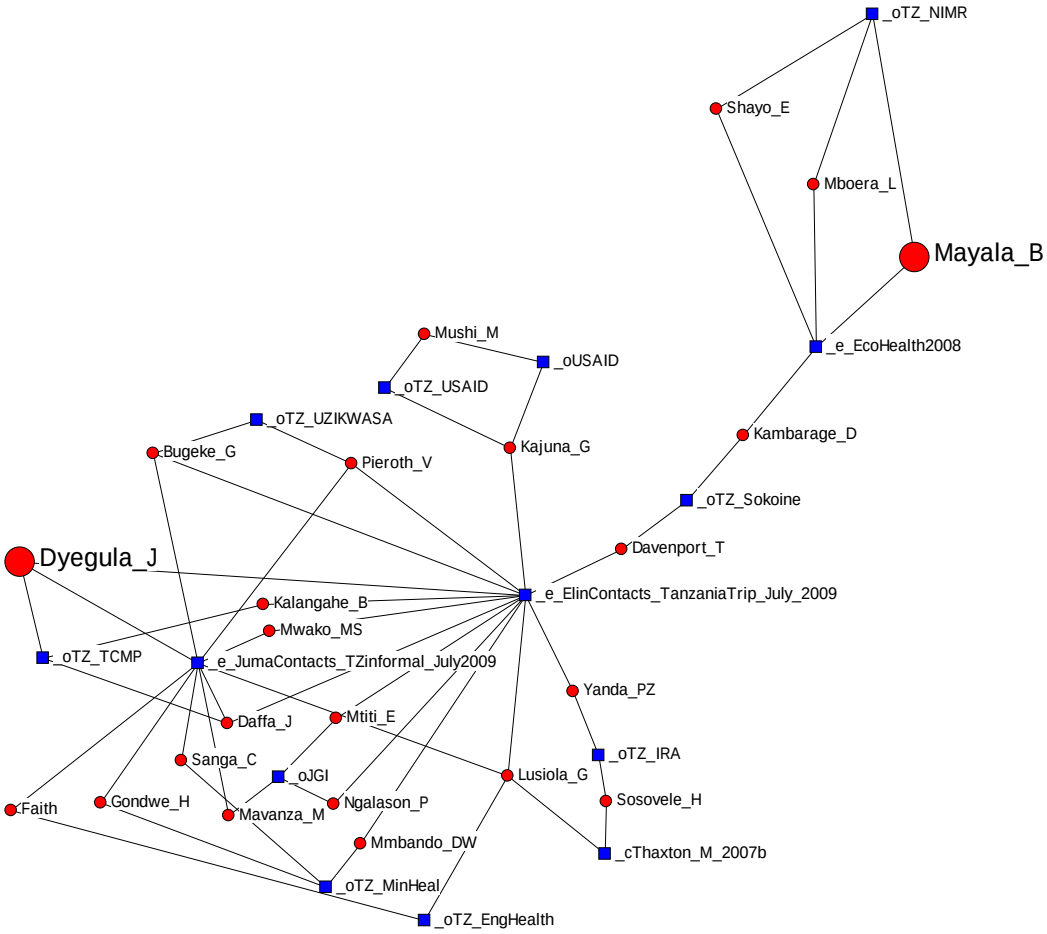


Figure 11 Juma Dyegula and Benjamin Mayala. Dyegula does not have direct contacts with Davenport, who is associated indirectly and probably unknowingly to Mayala through Kamabarage of Sokoine University, who also attended the EcoHealth 2008 meeting in Mexico.

The diameter of the PHE network in Tanzania is wide. We will again use Juma Dyegula in a hypothetical example. Suppose Dyegula wants to reach Benjamin Mayala, who is with the Tanzania National Institute of Medical Research. Mayala participated in the EcoHealth 2008 meeting in Mexico (along with H. D'Agnes, C. Honzak, L. D'Agnes and J. Castro) and, as such,

appears in the preliminary PHE community of practice map for Tanzania (Figure 10). Mr. Mayala is also an expert in geographic information systems (GIS) that are being used to help map health care facilities in Tanzania[9]. Meanwhile, BALANCED has charged Dyegula with collecting such information for areas of high biodiversity so it might be valuable to have the two meet and share information.[10] Figures 10 and 11 show, however, that Mayala and Dyegula are likely separated by several degrees and it is only Torell who can make the introduction between these two persons who are three steps removed from each other. If Torell is not physically in Tanzania, the introduction could not be made personally and face-to-face. However, Dyegula shares other contacts with Torell who may know Davenport, Kambarage, or Mayala himself. This possibility arises for two reasons. First, because Mayala's GIS work is funded by USAID (a link that is not shown but that would appear if more affiliation research had been done to identify other meetings or citation events). Second, because Mayala works nearby the Dar es Salaam office of the Tanzania Coastal Management Partnership (TCMP), for which Dyegula works.

A more robust set of approaches combining virtual and face-to-face communication methods might help advance PHE in Tanzania by supporting the emerging community of practice, utilizing the various network strategies employed successfully in other mature health and development programs. In fact, face-to-face interviews and discussions with current community, program and organizational leaders is presently underway through the BALANCED Project, aided by the assignment of Dr. Enrique Hernandez (PFPI) to spend six months providing technical assistance in PHE to Tanzania and other countries in the East Africa region. The advantage of this is two-fold. Since Dr. Hernandez is a leading global expert with vast field experience in the Philippines, and he is based at Dyegula's organization, TCMP, placing him in a unique position to bring global experience to bear in each conversation he holds in the region, including in Tanzania, where he can utilize the weak ties that Dyegula and the BALANCED team already have in that country.

Discussion

This paper explains the process of using the basic affiliation analysis technique to develop an initial picture of the size, structure and membership of the global PHE network. A limitation of this technique lies in its attempt to infer ties among individuals simply by their affiliation in events. The fact that it can generate a plausible initial understanding of the network of practice at a country level, as in the case of Tanzania, is encouraging but is clearly no substitute for using stronger techniques at the local level. We have included both documents and meetings within the definition of 'event'. For documents, we maintain it is valid to include on the network map those individuals who are co-authors or are cited in the acknowledgements. Less useful/valid for gaining local level network insight is to include names of authors of publications referenced in a document.

Like the PHE network itself, the mapping of any network is a work in progress. The affiliation technique employed in this paper provides an incomplete and limited view of the PHE network

[9] Todd, S., Brubaker, G., Chand, S., Franzén, C., Hafner, C., Kimambo, A., Pamba, P. 2009. . .
[10] Robadue, Gladding, and Crawford, 2010

of practice at the country level—in part due to its focus on the activities and contacts of the BALANCED Project team and because of the need to use interview rather than desktop techniques. Global in scope and comprised of many weak ties, the PHE network of practice has a core of 200-300 individuals who appear to have relatively strong ties to each other. Looking at the network map, PHE champions in the field may not be separated from the most central individuals in the network by an extraordinary number of degrees, however, in terms of personal familiarity and comfort in communication, the distance may be quite large. For example, Dr. Joan Castro of PFPI in the Philippines is separated by no more than three or four steps from nearly everyone in the global network. Yet most network members are likely unaware of their closeness to this distinguished member of the network.

The use of secondary sources to create this portrait of the global network probably obscures a great many of the local PHE champions who are unlikely to be included in published works or funded to attend a national or international conference. Our portrayal of the PHE network focuses on professionals leading PHE projects, documenting PHE experience and writing grey and peer-reviewed PHE literature, rather than focusing on community leaders and agents that are providing PHE information and services at the local level. While we can infer how De Souza in Washington, D.C. and Dyegula in Tanzania are positioned relatively close to each other within the network, and show that they have multiple channels for attaining a personal introduction through multiple opportunities for a face-to-face exchange, we have no way of knowing *if* they have, in fact, already met or communicated with each other, whether they have other mutual acquaintances that only could be revealed through personal interviews that would map out these two individuals' egonets (i.e. personal networks). This technique does not allow us to peer very deeply into the operation of a PHE approach in a particular place, however given new, more detailed information, the network analysis, and the data set behind it, can help put newly discovered and mapped networks into the global context.

We observed that the BALANCED Project has attained a central position in the global PHE network of practice and through its communications reaches about 88 percent of the most central members of the network. With the network map in hand, we can also gain a better sense of who is *not* connected to BALANCED and who we *should* be attempting to communicate with in order to reach the network's periphery. Network maps allow us to identify those individuals or organizations that are the most connected and to potentially tap them as resource persons, and to identify potential participants for future face-to-face events (possibly overcoming the issue of having participants who simply participate because it was their 'turn' to attend a training or conference). For example, the large majority of individuals who author or contribute in some way to preparing documents and studies cited by the PHE community do not appear to have participated in a PHE meeting-type event or project in the fields of eco-health and population and environment. "In-betweeners" such as researchers Dr. Lori Hunter or Dr. David Carr are among the small group who regularly publish as well as participate in PHE events and are already a channel for such communications in demography, for example, while some probing would be needed to figure out which eco-health experts would be interested in making connections to PHE approaches. The network database and maps in its present form has limited information about the knowledge and expertise of various PHE network members (e.g., from which sector—P, H, or E—do they come? Are they practitioners, donors, or academics?). The maps also do not tell us the types of information that network members are seeking from their

participation in the network. It is this type of information about the needs of PHE network members that will be captured by an upcoming survey that the BALANCED team will issue to network members, and could be compiled more systematically from public sources.

Our simple analysis can prompt specific questions (see Box 2), the answers to which could potentially help direct how the PHE network members go about receiving and sharing knowledge and which could help improve overall communications throughout the network. We have emphasized the knowledge-sharing aspect of the PHE network of practice—just one example of which is the PHE document collection on the K4health.org PHE Toolkit. We could equally emphasize knowledge-codification—since citation analysis and co-authorship patterns are key ways in which a discipline defines its boundaries, theoretical foundation and scope. The PHE community itself has organized highly important conferences in different regions creating opportunities for sharing know-how and helping promote the creation or strengthening of local efforts. Examples are the Africa PHE Network that emerged from the 2007 Conference on Integrated Development for East Africa, held in Addis Ababa, Ethiopia; the supporting events organized by the Population Reference Bureau and others; and the PHE-Ethiopia Consortium.

Box 2

Knowledge sharing and information flow questions related to networks of practice

- What are the most effective and efficient ways to communicate PHE successes?
- What tools and resources do field practitioners need to improve PHE implementation?
- What different types of information do network members need—based on their respective roles in the PHE community?
- What information is needed by policy advocates to convince policymakers to promote and adopt PHE policies at the national level?
- What are the most effective mechanisms for building a sense of "community" within the global PHE community of practice?
- How do we reach remote, rural audiences that have limited virtual connections?

A pressing question that remains unanswered at the global level is: "Who are the up-and-coming PHE champions?" In April 2009, we conducted an exercise with the PHE Policy and Practice group that used standard name generation questions to elicit new names for the PHE network database, which at the time included just 380 names gleaned from participant lists from past PHE events. The exercise, however, generated only nine new names. While publications—especially the acknowledgments section—could be a source of names of future PHE champions, publications often take years to go to press and by that time the information may be outdated. There are a few large, well-funded PHE meeting events that produce carefully documented proceedings. However, attendees at such meetings are not always PHE champions in the field. Rather, they may simply be well-connected individuals who are adept at securing the funding to participate in such events. One indicator of the limitations in using affiliation data to identify champions is the fact of the two PHE champions featured in the BALANCED newsletter, only one, Zuberi Ramadhani, is in our network database. The other, Mr. Gezahegh Guedta Shana of Ethiopia, unfortunately, is not.

Information and communication technology can be an aid to a network of practice. However, as highlighted in this paper and as documented elsewhere[11], despite the apparent promise of the internet Web 2.0 sites and social networking for sustaining a community of practice at low cost, there is also strong interest for the type of face-to-face encounters represented by the Policy and Practice group and national PHE networks such as those in Ethiopia or the Philippines. Although the documents available on the K4Health PHE Toolkit offer a collection of the best available printed information on PHE, as best practices in PHE continue to be honed and as additional research is conducted on the added value of the integrated PHE approach, participants in the PHE networks continue to express a strong need to also meet in person to share experiences and discuss what works, does not work, and why.

[11] Robadue, D., Bowen, R., Caille, G., Paez, D., Mmochi, A., 2010

A communications question is whether and/or how to engage professionals who are involved in development assistance from a health or an eco-health perspective? It appears that very few of the core PHE network members are in contact with the eco-health community through co-authorship or meeting events, as illustrated by Figure 6. The eco-health group appears isolated from, and even capable of overwhelming the PHE network, which is focused on the integrated aspects of practice. Hence, it might have been better to exclude the eco-health group from the network analysis.

Recommendations for Further Application by the PHE Community

Based on the information presented in this report, the authors recommend several steps or actions for the PHE community, including the BALANCED Project, to further this analysis. These recommendations range from exploration of emerging partner networks in order to better understand the network characteristics of champion individuals and communities, to strengthening the role of networks in scaling-up PHE worldwide.

Adopt Leadership Roles Based on PHE Network Goals

PHE leaders and practitioners should utilize network analysis findings to better understand the community dynamics and create effective management approaches for PHE networks. Anklam emphasizes the importance of leadership in creating and sustaining networks of practice and Table 2 describes how PHE leaders can adapt her purpose-oriented perspective to the PHE network and its intended goals and objectives.

Table 2: PHE Network Characteristics and Examples of Existing Activities

NEED RELATED TO ADVANCING PHE PRACTICE AND APPROACH	HELPFUL NETWORK CHARACTERISTICS	EXAMPLE
Simple knowledge-sharing	A network with many members, connected by weak ties	Philippines PHE network
Complex knowledge-creation and sharing	A network with few members that have strong ties, who are aware of each other's knowledge	PHE policy and practice group
Simple coordination	Hub and spoke network	Staff working for a single leader on a single activity
Fostering transformation and managing change	A hub is strongly tied to at least one member of each sub-network	Field programs in different countries managed by a central office
Complex coordination	A dense, highly decentralized network	Field programs in different countries managed by different organizations and funded by different donors

NEED RELATED TO ADVANCING PHE PRACTICE AND APPROACH	HELPFUL NETWORK CHARACTERISTICS	EXAMPLE
Innovation	Extensive weak ties to diverse groups engaged in PHE activities	Cross-cutting learning studies such as Pielemeier, 2005
Creating public goods	Strong ties, embedded within external groups	Foundations of Success
Gaining information from external sources	Diverse external ties	Personal contacts/ word of mouth, Policy and Practice Group meetings, conferences, meetings, subscriptions, listserv

Combine Country and Place Analyses to Leverage PHE Network Stakeholders and Activities

PHE leaders and practitioners should ground-truth network information by conducting several analyses at different scales in a given country or geographic zone. Many of the issues around mapping of the PHE practitioner network would be resolved by using a combination of methods to map networks at the regional and country levels. For example, it makes it much easier to map out the practitioner network connections in Tanzania only, and to identify the specific places where PHE approaches are being formulated and PHE champion individuals or communities are emerging. Once these types of information are gathered and synthesized, PHE leaders will be able to identify opportunities to strengthen knowledge sharing, leverage existing PHE resources and identify common goals and opportunities for collaboration.

For example, the BALANCED Project used the map and related data in its capacity building strategy, to 'overlay' and ground-truth whether BALANCED is reaching the periphery of the PHE network (a much neglected part of the network) with capacity building and technical support. This review shows that we are in fact reaching this periphery, including the African Wildlife Foundation, Wildlife Conservation Society/Zambia, Uganda, FHI Kenya, and others. Our maps can also help us identify potential PHE trainees, although such selection is often opportunistic in nature.

Foster Expanded Partner Networks

PHE practitioners and leaders should increase their reach and develop new relationships with other PHE partners and colleagues in the global PHE community of practice. Discussions among newly acquired peers can be insightful and lead to new learning opportunities for all involved.

We acknowledge that the examples and information collected on affiliation meeting events (not citation events) is over-represented by BALANCED Project activities. This is motivated in part by the easy availability of the information and the interest in generating practical applications for the information. Other partners might be interested in exploring their own network ties at the

global and field site levels and in sharing some of the results as part of fostering practitioner-to-practitioner and practitioner-to-expert interactions beyond the boundaries of their current project portfolios. This could include exploring the areas of expertise of various network members and better understanding who the 'go to' experts are for various topics within PHE (e.g. Who knows how to design a PHE project with conceptual links and operational coordination between P, H, and E? Who has experience with PHE scale-up? Who knows how to speak with policy makers about PHE?).

The BALANCED Project employed this strategy in determining the participants for its February 2009 South-South Exchange on PHE. The network diagram reinforced for the team the value of linking potential south-south practitioners and advocates and prompted BALANCED to strongly advocate for the PHE South-to-South Exchange (SSE-PHE). The SSE-PHE, in turn, not only resulted in tangible PHE products (publication, videos, blogs, etc.), but led to PHE capacity building opportunities with participants and their organizations in both East Africa and the Philippines.

Develop Multi-dimensional Communication Strategies and Approaches to Reach Diverse Audiences

As indicated in the earlier analysis, communications among PHE network members varies and is hard to describe concretely in the absence of egonet analyses. However, we do know that target audiences for PHE messages and communications are diverse and some are located in hard to reach areas of high biodiversity, and therefore may not be virtually accessible. We therefore recommend that PHE network members employ a combination of virtual and interpersonal communication methods to reach key target audiences. For example, the BALANCED Project has worked with JHU and the K4Health project to distribute portable drives with the contents of not only the PHE Toolkit but also the whole K4Health toolkit collection for rural, remote NGO partners in Africa as part of our Toolkit promotion activities.

Increase Understanding of the Network Characteristics of Champion Individuals and Communities

The PHE community leaders should develop a list of key characteristics or “enabling factors” present in existing PHE champions—both individual champions and community champions. These criteria for successful champions could be used to identify newly emerging PHE leaders to tap as candidates for training and leadership courses.

Finding potential PHE champions is not dissimilar to the process used by individual projects or country programming teams to identify good staff and the most promising locations for introducing or scaling-up PHE approaches. The comparison of start-up and scale-up in PHE in specific locations merits its own analysis. This could draw upon the lead taken by efforts in value-added research, which compares locations with and without PHE elements.

Document and Disseminate Findings on the Emergence of Social Capital and the Role of Networks in Scaling-up PHE

Leaders and stakeholders in the PHE community should utilize existing communication fora, such as the PHE Toolkit and PHE listserv, to broadly disseminate lessons learned and findings on efforts in PHE scale-up and on the role of networks in the scaling-up process.

The increased number of ties amongst local professionals, PHE service providers, community leaders and families are part of what is required to sustain the innovations or improvements introduced with a PHE project. The messages, testimonials and word-of-mouth communications about the success of the PHE approach in one location can encourage other communities to adopt PHE or elements of the approach. The BALANCED Project shares success stories of individuals and communities that are successfully advocating for and the projects that are successfully implementing PHE in biodiversity-rich countries around the world with this objective in mind—that such stories will inspire others to embrace the approach as well.

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Appendices

Citation Events Bibliography

Meeting Events Listing

Potential members of a Tanzania PHE network

Coastal Resources Center
University of Rhode Island
Narragansett Bay Campus
South Ferry Road
Narragansett, Rhode Island 02882
USA

Tel: (401) 874-6224
Fax: (401) 874-6920
Web: www.crc.uri.edu