Article

Network Governance for Collective Action in Implementing United Nations Sustainable Development Goals

Naim Kapucu [1,]* and Sean Beaudet [2]

[1] School of Public Administration, University of Central Florida, Orlando, FL 32801, USA
[2] Florida Department of Environmental Protection, Orlando, FL 32801, USA; seanbeaudet@knights.ucf.edu
* Correspondence: kapucu@ucf.edu; Tel.: +1-407-823-6096

check for updates

Abstract: As the number of complex transnational problems have continued to grow, so too has the desire to combat them through global partnerships and collective action. In response, the United Nations (U.N.) and member states created the Sustainable Development Goals (SDGs) in 2015. This study provides a background on international organizations and efforts in collectively moving towards sustainable development goals. It examines the SDGs (specific emphasis on Food–Energy–Water (FEW) Nexus) and means of governance and implementation at the global level. It also seeks to describe and visualize partnerships and collective action using network analysis tools and techniques. The network visualization demonstrates the organizations working together and towards the SDGs, which provides the type of structure and key actors and arrangements for implementation at the global stage.

Keywords: Sustainable Development Goals; network governance; partnerships; collective action; Food–Energy–Water (FEW) Nexus

1. Introduction

As the number of complex transnational problems have continued to grow, so too has the desire to combat them through global partnerships and collective action. Sustainable development has gained notoriety in society and has been discussed on the global stage for decades. Sustainable development seeks to address many of these wicked problems that are difficult for any one nation, sector, or governmental body to tackle and requires collective action at all scales ranging from global, national, to local. Sustainable development takes a holistic focus through the three interconnected economic, environmental, and social pillars (Biermann et al. 2017; Lubell 2015).

The concept of sustainable development primarily surrounds the goals of responsible economic activity, prevention of environmental degradation, and more equitable social development. A few examples of desirable outcomes include elimination of poverty, ensuring a quality education for all, gender equality, moving toward cleaner energy, halting biodiversity losses, and careful management of natural resources (Lim et al. 2018; United Nations 2015). These examples are just a sampling of the numerous issues that fall under the realm of sustainable development. The idea is that past and current practices present unsustainable and/or undesirable conditions that could eventually lead to a greater loss of life and greater levels of conflict in the pursuit of obtaining vital resources leading to political, environmental, social, and economic instability within and between countries around the globe.

As a result, sustainable development has received even greater attention and has been elevated on the global stage as arguably the most critical modern challenges facing humanity and the planet. In an effort to address these most pressing challenges, the United Nations and member states created the

Sustainable Development Goals (SDGs) in 2015 and included major milestones to be met by the year 2030. The special focus of this paper is to examine the partnership or network of organizations, specialized agencies, and funding organizations at the global level. This entails the network, its structure, the key actors in the sustainability goals implementation, and those whose work has a specific focus on the food–energy–water resources sub network.

The following research questions were examined in the study: What is the role of partnerships in implementing the United Nations SDGs at the global scale? How does network governance contribute to implementation of the SDGs and global collective action? What are the key actors in the SDG implementation networks? What units contribute to the FEW nexus for collective action and integration? Secondary data were collected from the U.N. SDG website and other relevant documents which identified the departments, specialized agencies, and initiatives all working toward specific SDGs and with each other. The data were then coded and entered into the software programs UCINET and NetDraw for calculations and visualizations.

This study contributes to the literature on sustainability by understanding and reinforcing the critical role of partnerships for the SDGs, network governance in implementing the SDGs, collective action at the global level, and the key actors in the global network (Bryson et al. 2006; Emerson et al. 2011; Kapucu and Hu 2020; Wong 2019). The literature and background section briefly explore the historical foundation of international organizations within the context of the U.N. SDGs, collaboration for collective action, and network governance in implementing the SDGs. In addition, a more thorough review is provided on the SDGs and governance of sustainability development with a network perspective. Following, the methodology of content analysis and network analysis is employed to study the current governing mechanisms and network characteristics. The findings and conclusion provide insight into the current state of sustainable development governance at the global stage.

2. Context of the Study: SDGs and FEW Nexus

The contemporary definition of sustainable development and its origins can be traced to 1983, when the U.N. General Assembly passed a resolution to establish a special commission to report on environment and global 'problematique' (United Nations 1987). The commission subsequently adopted the title World Commission on Environment and Development and in 1987 transmitted to the U.N. General Assembly the foundational report, "Our Common Future" or the Brundtland Report named after the chairperson of the commission (United Nations 1987). It is here that the now familiar explanation arises: "Humanity has the ability to make development sustainable—to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations 1987, p. 24). Likewise, the report affirmed the three interconnected principles or pillars of sustainable development—economic growth, environmental protection, and social equity (Shah 2008).

Since the Bruntland Report, numerous global summits, reports, and agencies have been held and created. While these have all aided in the current actions and efforts surrounding sustainable development, we turn our attention to the most recent strategies—the Sustainable Development Goals (SDGs). The SDGs were an established through *Transforming our world: the 2030 Agenda for Sustainable Development* (United Nations 2015). The SDGs consist of 17 individual goals and 169 targets with the intent to reach the goals by the year 2030 (Table 1). Within the agenda, previous shortcomings were noted, the means to improve implementation were defined, and the goals were to be cross-cutting and deeply interconnected (United Nations 2015, 2019).

Creation of the SDGs was a historic shift towards a comprehensive and collective effort to incorporate the three pillars of sustainable development into one guiding agenda and through goal setting (Biermann et al. 2017). Further, this goal-based approach has been applauded as being universal, integrative, and transformative (Bowen et al. 2017). Researchers have sought to illustrated how the 17 goals are integrated and tied together using network analysis techniques (Le Blanc 2015). Others

believe the SDGs were not integrated enough and identified seven overarching themes that needed to be addressed for the SDGs to be realized (Lim et al. 2018).

The SDGs are ambitious in their outlook and seek to combat a plethora of global challenges. The overall agenda calls for 'common but differentiated responsibilities,' which entails countries determining their own path with the U.N. acting as a coordinator (Wong 2019). Thus, the implementation of the SDGs and the governance of the global network places the U.N in a unique position. Part of this process requires reliance on partnerships to achieve the SDGs. In fact, partnerships are deemed a prerequisite and mechanism in the fulfillment of the other SDGs. As explained under SDG 17—'Partnerships for the Goals'—partnerships between all sectors and the civil society are required at all spatial scales for the goals to be fully realized. This ensures 'no one is left behind', as was expressly stated in the document creating the SDGs, *Transforming our world: the 2030 Agenda for Sustainable Development* (United Nations 2015).

The 2030 agenda states it is a call to action with all countries and stakeholders working in collaborative partnership on a collective journey (United Nations 2015). This approach recognizes that the input and efforts of multiple stakeholders is required for effective problem solving and achievement of joint outcomes (Ostrom 2009). Yet, many issues within the arena of sustainable development are wicked problems and may bring together actors with conflicting views and interests which is an inherent challenge (Bowen et al. 2017). Thus, mechanisms need to be in place to mitigate or minimize these conflicts. Coordination is required and involves a situation where all or most actors in a network agree on the end goals, and orchestrating the actor's activities in an efficient manner lies at the heart of the process (Bodin 2017). The U.N. and member states also recognized that "each country has primary responsibility for its own economic and social development" (United Nations 2015, p. 10). Part of this process is individual member states being responsible for reviewing and following up on their progress (United Nations 2015). The role of the U.N. is to oversee the follow ups and reviews at the global scale. This naturally leads to questions of governance, coordination, and collective action, which are further explained in the literature review.

Lastly, one other concept that has received growing attention in recent years, and is partially examined in this paper, is the Food–Energy–Water (FEW) Nexus. The basic idea is that these resources are interconnected and the overuse of one resource can also negatively impact the other resources. Global trends and challenges such as population growth, urbanization, and climate change have been driving forces to better understand how these resources will be impacted and scholars have argued that access and management of the resources arises from issues of governance (Marker et al. 2018). Further, the FEW nexus approach seeks to reduce tradeoffs and enhance synergies among the resources to ensure the security and lasting availability of each (Pahl-Wostl 2017).

Table 1. Sustainable Development Goals (SDGs) (adapted from United Nations 2020c).

Number	Goal	Description
1	No Poverty	End poverty in all its forms everywhere.
2	Zero Hunger	End hunger, achieve food security, and improve nutrition and promote sustainable agriculture.
3	Good Health and Well-Being	Ensure healthy lives and promote well-being for all at all ages.
4	Quality Education	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.
5	Gender Equality	Achieve gender equality and empower all women and girls.
6	Clean Water and Sanitation	Ensure availability and sustainable management of water and sanitation for all.
7	Affordable and Clean Energy	Ensure access to affordable, reliable, sustainable, and modern energy for all.

Table 1. *Cont.*

Number	Goal	Description
8	Decent Work and Economic Growth	Promote sustained, inclusive, and sustainable economic growth, full and productive employment and decent work for all.
9	Industry, Innovation, and Infrastructure	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation.
10	Reduced Inequalities	Reduce inequality within and among countries.
11	Sustainable Cities and Communities	Make cities and human settlements inclusive, safe, resilient, and sustainable.
12	Responsible Production and Consumption	Ensure sustainable consumption and production patterns.
13	Climate Action	Take urgent action to combat climate change and its impacts.
14	Life Below Water	Conserve and sustainably use the oceans, seas and marine resources for sustainable development.
15	Life on Land	Protect, restore, and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.
16	Peace, Justice, and Strong Institutions	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels.
17	Partnerships for the Goals	Strengthen the means of implementation and revitalize the global partnership for sustainable development.

Several studies sought to quantify the resource and technical aspects of the FEW nexus, while not accounting for the challenges of governance, management, and policy integration (Daher et al. 2019; Yung et al. 2019). For instance, Newell et al. (2018) conducted a systematic review by examining the existing literature on the FEW nexus and found that a clear and consistent gap surrounded studies on institutional structures, governance, equity, resource access, and behavior; and contributions from the social science fields were underrepresented. Thus, to partially address this gap, we examine the units or organizations at the global level to illustrate the existing structure and governing process for SDG implementation.

3. Literature and Background: Network Governance for Collective Action

In this section we provide an explanation on the importance of interorganizational coordination, collective action, and network governance. We also included a background on self-governing network, lead organization network, and network administrative organization as three major structures of network governance from the literature.

Interorganizational coordination. For the better part of the past five decades, interorganizational studies, or the study of relations between organizations, has been a major area of examination in organizational theory and has evolved to become intricately linked to network theory and analysis (Milward and Provan 1998; Nowell et al. 2019). Interorganizational networks are composed of organizations as actors (nodes) and the relations (links) that connect the organizations (Kapucu and Hu 2020, p. 22). The framing of issues on a global scale and the occurrence of globalization has been accelerating research on global governance. In the absence of a world government, international organizations and especially intergovernmental organizations have tremendous clout in steering and coordinating the international system as a complex structure of international relations (Chidozie and Aje 2017).

Some scholars note the origins of intergovernmental organizations can be traced to 1815 with the founding of the Central Commission for the Navigation of the Rhine (CCNR) (Ingram and Torfason 2010). Others point to the establishment of the International Telecommunications Union in 1865 and the Universal Postal Union in 1874 (Weiss 2015). Many decades later, the more

commonly known League of Nations was formed after World War I and ultimately the United Nations following World War II. Ingram and Torfason (2010) explain that over 500 separate intergovernmental organizations were founded between 1815 to 2000 alone; and the U.N. remains the largest with its conglomerate of bureaucracies and treaties.

While the specific reasons for the development of each intergovernmental organization varies, there is one constant. Intergovernmental organizations were born out of necessity with the goal of pursuing common interests through formal, continuous structures established by agreements between members of sovereign states (Chidozie and Aje 2017). Many modern wicked problems transcend national borders. Thus, problems such as climate change, chronic poverty, depletion of natural resources, and many others require countries to work together (Auriacombe and Vyas-Doorgapersad 2019). This has resulted in the pursuit of sustainable development to combat these complex challenges.

One obstacle is that there is no global or international convention regarding the sustainable use of natural resources and researchers have suggested coordination is warranted and possibly through a lead agency (Bringezu et al. 2016). Another issue in the literature on global issues and governance deals with responsibility in terms of cause, obligation, and accountability (Bexell and Jonsson 2017). In relation to these concerns, we are entering an era of global governance built more on trust, shared values, and objectives, rather than on traditional legally binding frameworks (Stafford-Smith et al. 2017). Indeed, the latest approach by the U.N. and member states appears to have taken this approach in the development of the Sustainable Development Goals (SDGs), which are based on voluntary action rather than legal or coercive measures. This is the appropriate position for the U.N. as advocated by others as a central coordinating actor in the global governance process (Wilkinson 2005).

Collective Action. The original intent of the U.N. can be found in Article I of the Charter which envisions the organization bringing countries together to 'take effective collective measures' and 'To be a center of harmonizing the actions of nations' (United Nations n.d.). In other words, the purpose was to enable the pursuit of common universal goals through the organization itself as the coordinator of collective action. This helped to create a network of sovereign nations.

Organizations and networks are governing systems that enable collective action (Nowell et al. 2019). The role of networks can assist in studying collective action and how important network structure is to participation in a particular case (Siegel 2009). Solving collective action problems requires learning, adaptation, cooperation, and distribution (Lubell 2015). In addition, the performance of networks involves a process to which goals are established and clear, resources are mobilized, formal structures are adopted, internal operations are made more efficient, and the network exhibits resilience (Sovacool and Van de Graaf 2018).

Scholars have theorized how governance issues of collective action problems within complex systems can be generally classified as coordination and cooperation issues (Bodin 2017). Coordination involves agreement by actors on what they wish to accomplish and is a matter of orchestrating the actors activities in in efficient ways; as to where cooperation involves bringing together different actors who have different interests, goals, culture, and opinions and would involve deliberations and negotiations to reach some common ground or consensus (Bodin 2017). Due to the fact that the *2030 Agenda for Sustainable Development* was passed unanimously by all member states, it could be argued that the issue of cooperation was partially overcome at the global scale (at least at the specific time of passing the 2030 agenda) and moved more toward a state of coordination.

One recent study examined the role of the U.N. High Level Political Forum (HLPF), which came about as a result of the 2030 agenda and placed the HLPF as the main coordinating mechanism through 'orchestration' (Abbott and Bernstein 2015). Further, this form of coordination relies on soft, indirect governance of intermediaries to achieve goals and acts a steering agent (Abbott and Bernstein 2015). In addition, the SDGs themselves are based on voluntary agreements and on the hard–soft scale of international law, the SDGs lie at the soft end and complicates the allocation of responsibilities (Bowen et al. 2017). Taking this into account, it could be deduced that the entire system of global governance for sustainable development, and specifically the SDGs, relies on the U.N. as the orchestrator

among the network of member states and serves as the coordinator for collective action. Thus, for this study we seek to examine how the U.N. as an international organization governs its interorganizational network of internal and affiliated units in working toward sustainable development, the SDGs, and FEW resource integration through collective action.

Network Governance. Sustainable development is not a spontaneous event but comes about through goal-directed intervention or steering which involves the whole of society collectively discussing and deciding how to guide actions and policies, and these choices embody the concept of 'governance for sustainable development' (Meadowcroft 2007). One such way to understand the complexity of sustainable development governance is by analyzing the networks of actors or agencies responsible for administering and managing the various resources.

A network is a set of nodes tied together by various types of relationships (Kapucu and Hu 2020). This creates a structure or arrangement that include individuals, groups, or organizations who coordinate their activities and actions to achieve some common goal (Sorensen and Torfing 2007). These actors are tied to each other in a network through various forms of relationships and functions, thus forming different structures and reasons for connecting (Borgatti and Foster 2003). The field of Public Administration has examined networks as a research question for many years and in various policy areas (Milward and Provan 1998; Kapucu and Hu 2020; Popp et al. 2014). Further, public administration scholars add to the definition of networks and view them as new governance structures working toward a goal that could not be effectively addressed in isolation (Hu et al. 2016).

The concept of governance is often used to describe the interdependences and self-organizing of public, private, nonprofit, semiprivate actors or organizations (Klijn and Koppenjan 2000). Here we use the definition of network governance as the use of formal and informal institutions to allocate resources and coordinate actions among organizations in a network (Kapucu and Hu 2020). The actors or components that make up a network are not self-sufficient and rely on other actors for resources and information (Shrestha 2018). In fact, networks have become so prevalent in governing and society, some researchers have claimed that we have become a network society or a society of networks (Provan and Lemaire 2012).

These arrangements have been examined through different contexts and have focused on the policy tools, structural models or forms, and relations amongst the network actors (Koliba et al. 2011). A network consists of three or more legally autonomous organizations that work together to achieve not only their own goals but a collective goal (Provan and Kenis 2008). Further, a network structure consists of the ties between members, patterns, and can depict positions of actors or substructures within the network (Kapucu and Hu 2020). Here we provide a brief explanations of the structural models or forms approach.

The most common network structure is the participant or *self-governed network*. It is characterized as self-governing, dependent upon the exclusive commitment and involvement of all (or a significant subset) organizations that comprise the network, management of internal operations and relationships, as well as managing external relationships (Provan and Kenis 2008). Internal relational ties are predominately horizontal, as opposed to a hierarchical structure, amongst the member organizations (Koliba et al. 2011). The network is the most decentralized form of the three networks as described below.

Conversely, *lead organization networks* are highly centralized structures. A single organization in the network coordinates all major activities and possess key decision-making powers for all other organizations in the network (Provan and Kenis 2008). The lead organization will underwrite the costs of administration, may receive supplemental funding through member organizations, or may control and administer external funding sources (Provan and Kenis 2008). Often, government entities or agencies are the lead organization in regulatory systems or in contracting arrangements (Koliba et al. 2011).

The last structure consists of the *network administrative organization* (NAO). The administrative organization is established to specifically govern the network and its activities (Provan and Kenis 2008). Unlike the lead organization, the administrative organization is established by either a mandate or the network members themselves for the exclusive purpose of network governance or coordination,

while the network itself is externally governed (Provan and Kenis 2008). The organization may be a single actor as a facilitator or a more formal organization consisting of a board of directors and physical location to enhance its legitimacy (Provan and Kenis 2008). Relations amongst the network organizations may vary from horizontal, vertical, or diagonal, and would be dependent upon the actions taken and goals sought by the network itself (Koliba et al. 2011).

4. Method: Data and Network Analysis

An extensive content analysis was completed on the large number of U.N. websites, its online libraries, numerous official UN documents, and insights gained from previous scholarly literature. To gain a better understanding of how the global interorganizational network worked toward the SDGs, focus was placed on the United Nations, its internal funds and programs, and the autonomous specialized agencies whose work is coordinated through the higher-level bodies of the U.N. The U.N. is a large complex multifaceted organization. Thousands of individuals are employed and deployed around the globe with the main offices located in New York City in the U.S. Likewise, an assortment of affiliated organizations work hand-in-hand with the U.N. and are based in locations around the world. To fully analyze the network structure and those units working toward the individual SDGs, content analysis and secondary data collection were conducted in multiple stages.

The first step was to examine the internal structure or governing mechanisms within the U.N. that foster and enable collective action across the organization toward the SDGs. The initial search was to locate the U.N. System Chart (July 2019), or organizational chart, and to review the U.N. Charter. The system chart was the most recent and incorporated the High-Level Political Forum (HLPF) created as a result of the 2030 Agenda. Next, the U.N. Digital Library was accessed. Numerous agendas and reports were gathered and analyzed including the Brundtland Report, the 2030 Agenda, the Addis Ababa Action Agenda (AAAA), and any SDG-related progress and update reports. While these documents were beneficial for understanding the aim, intent, and progress towards the goals, they did not provide the specific units or agencies in which action would be coordinated for each of the goals.

During the search, information was also located on the steps that the current Secretary General has taken to incorporate and improve coordination within the U.N. system itself. Following this stage, closer inspection was completed on the webpages of the Main Organs identified in the system chart and documents, as well as the two official webpages of the SDGs. This result would lead to the inspection of any reports or documents produced by offices and divisions under the Secretariat that would identify the agencies or mechanisms in which the SDGs are implemented.

During the process, two additional repositories were located throughout the extensive search of the UN website—UN iLibrary and UN University. These were both sources of information for scholars and students; and offered numerous forms of research on various topics. Yet as before, no additional content was located for the specific questions of this research. One last measure taken was to reach out to the Department of Economic and Social Affairs (DESA) via e-mail for any additional documents that could assist in data collection.

The final stage in the process was to locate the numerous agencies and entities across the network working toward specific SDGs. The aforementioned documents were also reviewed for this purpose, which did not identify this arrangement. Rather, the second official SDG website identified the specific specialized agencies or interagency mechanisms working on thematic issues such as UN Water, UN Oceans, and the like under each of the 17 SDGs. Within the website, each entity is listed under the 'links' tab within each SDG page. Some agencies were listed multiple times under one of the SDGs as working toward very specific projects or themes. Here we consolidated or simply notated the agency once for clarity. In addition, a few organizations from outside the U.N. system were also referenced yet we did not include them in the data collection as to isolate the U.N. affiliated organizations for consistency.

Using this information, we built two networks (Borgatti 2002; Borgatti et al. 2002; Borgatti et al. 2018). The first is the 'Organization Network' using an adjacency matrix and the second is the 'SDG Network'

which was created through a two-mode affiliation matrix according to the organizations listed under each of the SDGs from the website. Due to the newness of SDG implementation and limited nature of the secondary data, both matrices relied on binary coding with the assumption the organizations interacted with each other and toward the specific SDG, based on their identification.

5. Results and Analyses

This section highlights the international efforts toward sustainable development-interorganizational coordination, collective action, and network governance. Interorganizational coordination illustrates how the U.N. is taking specific actions to better align with the SDGs. Under collective actions, the networks calculations and visualizations are examined, as are the key actors. Finally, network governance shows the characteristics and mechanisms in which the SDGs are implemented in the global network. We provide additional analysis of FEW nexus as a sub network in this section as it gained some interest among scholars and practitioners.

Interorganizational coordination. During the extensive research of the official websites and documents, it was discovered that the U.N. had taken steps to reform and realign the organization to better coordinate efforts toward the SDGs, both internally and externally. A year after the creation of the SDGs, the General Assembly passed Resolution 70/299 which served several purposes including follow-up and review of progress on the SDGs in the subsequent years (United Nations 2016). More importantly, the resolution requested the Secretary General to "enhance the effectiveness, efficiency, accountability and internal coordination of the Department of Economic and Social Affairs" (United Nations 2016, p. 3). This would involve placing the Department of Economic and Social Affairs (DESA) at the center of the process and creation of the Division for Sustainable Development Goals (DSDG) which serves as the secretariat for the SDGs (Sustainable Development Goals Knowledge Platform n.d.). Further, it was noted elsewhere that, "The UN Department of Economic and Social Affairs works closely with governments and stakeholders to help countries around the world to meet their economic, social and environmental goals. The United Nations Development Programme works with people at all levels of society to help build nations that can withstand crisis and drive and sustain the kind of growth that improves the quality of life for everyone. Many UN agencies work on specific aspects of development, such as the World Health Organization, the Food and Agriculture Organization, UNICEF, UNESCO and the UN Environment Programme." (see Appendix A for organizations full title) (United Nations 2020b).

A second improvement that was initiated and is evolving is in-country development assistance. Since the beginning of his term in January 2017, current U.N. Secretariat General Antonio Guterras has been pursuing a campaign—'United to Reform'—to reform and realign the organization to better deliver on its mandates and has focused on the three general areas of Peace and Security, Management, and Development (United Nations 2020d). The development aspect involves transforming and strengthening the United Nations Sustainable Development Group (UNSDG). The UNSDG relies on Residential Coordinators (RCs) who are the "designated representatives of the Secretary-General for development at the country level. They coordinate the UN Sustainable Development Group (UNSDG) agencies, funds, and programmes working on development, also known as the UN Country Teams" (United Nations Sustainable Development Group 2020). The UNSDG consists of 40 agencies, funds, and programs; works with 131 country teams; and the Development Coordination Office (DCO), which resides under the Secretary General, much like DESA, serving as the secretariat for the group (United Nations Sustainable Development Group 2020). The Core Group is comprised on DESA, FAO, ILO, UNDP, UNESCO, UNFPA, UNHCR, UNICEF, UN Women, WFP, WHO, and the Regional Commissions (United Nations Sustainable Development Group 2020). Combined, these changes are critical steps in increasing the coordination, governance, and resources within the U.N. itself and within countries who are ultimately responsible for meeting the SDGs by 2030.

Collective action. To assess collective action, we utilized the two previously referenced networks to map how the organizations worked with each other and toward the specific SDGs. The first three

Figures 1–3 provide diagrams of the 'Organization Network' and the following three Figures 4–6 are diagrams of the 'SDG Network'. Figures 1 and 3 are the whole networks of each, which contains all nodes and their ties to each other. With the other Figures, we utilized node filtering. Node filtering is completed to remove nodes that are peripheral to specific research interests or questions (Borgatti et al. 2018). Thus, Figures 2 and 4 present only those organizations or mechanisms that work together based on the FEW resources and partnerships, whereas Figures 3 and 6 reduces the nodes even further to visualize just those associated with the FEW resources; or SDGs 2, 6, and 7, respectively. To maintain consistency, similar colored nodes were used throughout the graphs. A blue node signifies an organization, fund, or specialized agency. A red node indicates the 17 SDGs. A line, or edge, between nodes illustrates a connection or tie between them or in working towards those specific goals.
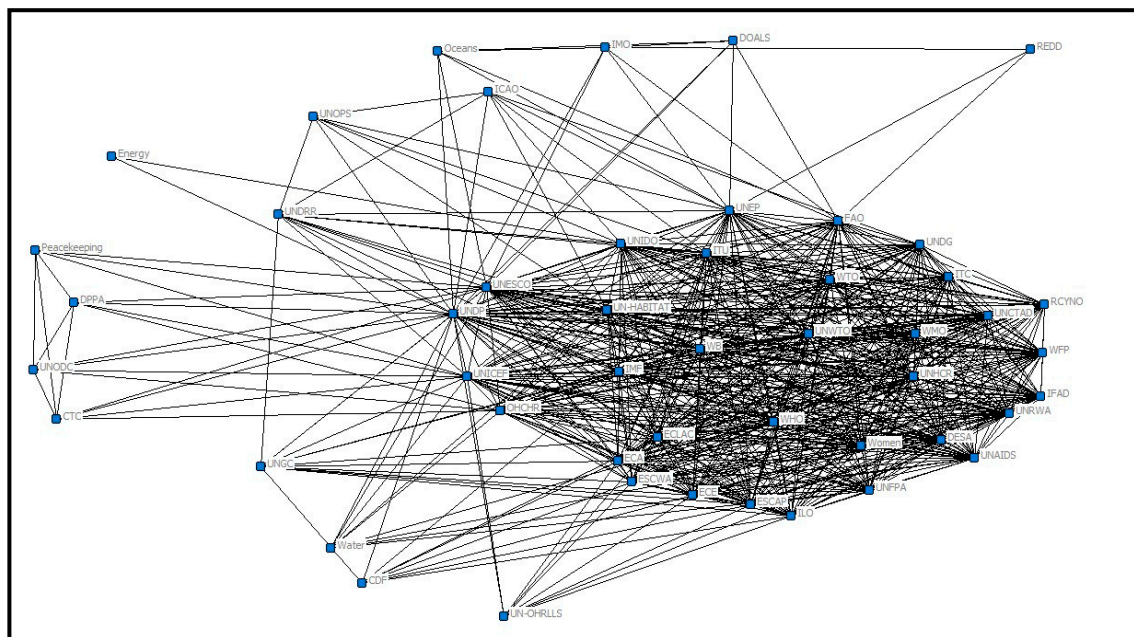

Figure 1. Organizations—whole network.

The Organization Whole Network graph (Figure 1) illustrates a couple of interesting items. The first is that there is a large cluster of nodes on the right side, a smaller cluster on the left side, and a few nodes on the periphery. In addition, it can be seen that every node is connected to at least two others. To further explore the cohesion or connectedness of the network, we calculated the density and compactness. Density provides the actual number of ties or connections within the network as a proportion of all possible ties (Borgatti et al. 2018). The result was a score of 0.537. In other words, roughly 54% of all possible ties are present. Going further, the network scores even higher on its compactness at 0.767. Compactness can be interpreted as the ability of things, such as information or resources, to travel quickly through the network (Borgatti et al. 2018). Thus, the density of the network appears to be lower than expected, yet it is fairly connected. Lastly, we calculated the degrees for each node and the results can be found in Appendix B.

In Figure 2, we removed all nodes that did not interact with the others on FEW resources or through partnerships. As can be seen, a majority of the nodes are still present, and most are clustered together. Going one step further, we removed the nodes based on partnerships to isolate just those associated with the FEW resources (Figure 3). The other calculations we inspected were degrees and n-degrees, which simply measures the connection of nodes to other nodes and the overall connection as a percentage.

UN Energy and UN Water measured very low and can be visualized to the left side in Figure 2. It must be noted that these are actually programs that consist of many of these same organizations. Others that scored fairly high included IFAD, WFP, and FAO, whose primary focus is on food and agriculture. Yet, surprisingly some organizations scored higher than expected such as UN-HABITAT, UNIDO, UNICEF, and UNESCO. The organization with the highest scores was UNDP (United Nations Development Program) and this relates back to the statement in the first portion of our findings which explained the program's role. All of these actors are at the center of this network and can clearly be seen in Figure 3.

Figure 2. Organizations—Food–Energy–Water (FEW) and partnership network.

Figure 3. Organizations—FEW network.

The next objective was to analyze the SDG network to better understand the structure of the network and which organizations worked toward each of the individual goals. The initial, visual

observation of the network (Figure 4) appears less dense or compact when compared to the Organization network. There are also quite a few nodes, or pendants, that are tied to only one SDG rather than multiple SDGs. As evidenced, density measured at 0.101. Surprisingly though, compactness was calculated at 0.610.

To further examine these results, multiple centrality measures were calculated which can be located in Appendix C. Here we looked at the degree figures of each SDG. Degrees in two-mode networks simply measures the number of incidents, or ties, to each node as a percentage (Borgatti et al. 2018). The degree percentage for the SDGs 1 through 16 ranged from 0.061 to 0.204. This would help to explain the low density of the network. SDG 17, however, measured at 0.673 and this could help to explain the higher level of compactness found in the network.

Figure 4. Sustainable Development Goals (SDGs)—whole network.

Figure 5. SDGs—FEW and partnership network.

As before, we removed all other SDG nodes besides FEW and partnerships (Figure 5). A majority of the organizations are still present and clustered predominately around SDG 17 as was also found in the Organization network. This helps to visualize the previously found high degree percentage of this node.

Following, we removed this Partnership node to isolate the FEW nodes (Figure 6). A couple of interesting observations appear as a result. First, the same organizations identified in the Organization network subgroup also appear in this subgroup. Almost exclusively the organizations or collaboratives are tied to a single SDG such as FAO working toward Zero Hunger, UN Water to Clean Water and Sanitation, and so forth. Yet, UNDP is the only entity tied to all three SDGs. In fact, it ranks the highest throughout this network at 0.765 degrees for all SDGs. Thus, based on these results, one could argue that UNDP is the most important actor in the SDG network and for the FEW nexus.
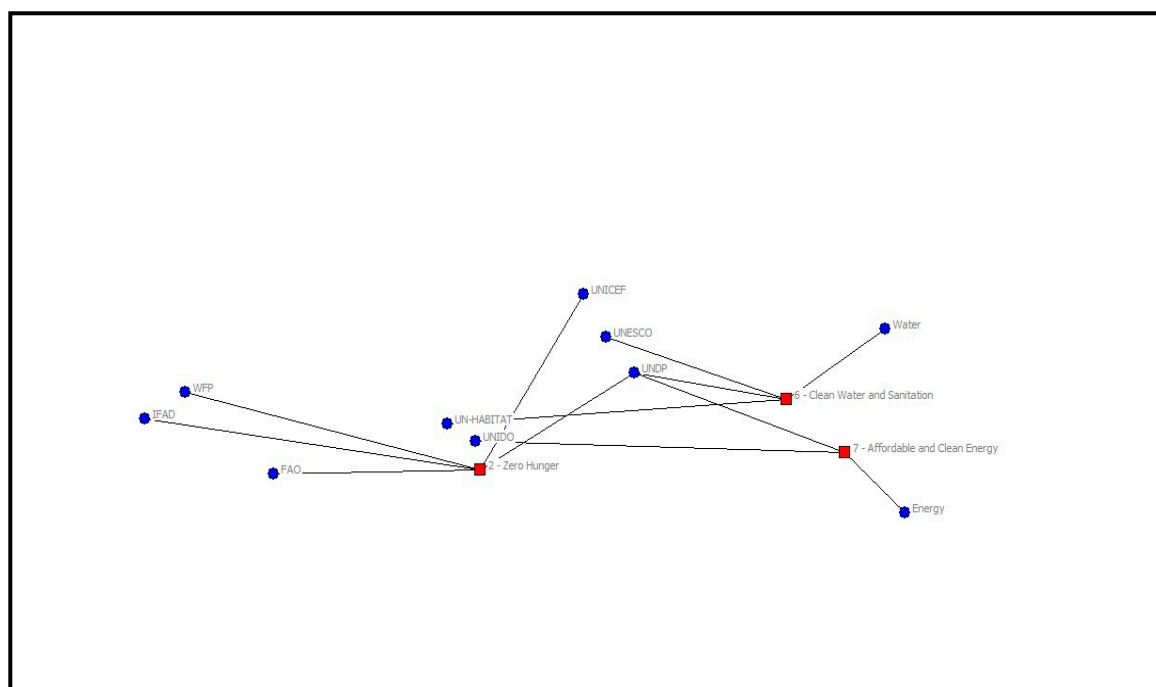

Figure 6. SDGs—FEW network.

Network governance. The member states requested the Secretary General reform the system to better equip DESA, and more specifically the DSDG, to be the secretariat for the SDGs. A total of three additional documents were located which identified the mechanisms in which DESA supports SDG implementation—Toward Sustainable Development for All (2019), Highlights 2018–2019 (2019), and the DESA Organizational Structure (2019). Below are the committees, forums, or bodies, their main parent unit, and the type of unit or mechanisms in which DESA is a part of or in which staff provides extensive administrative support (Table 2).

As can be seen, DESA works across the spectrum of the U.N. network. In referring back to the different types of network structures postulated by Provan and Kenis (2008), we observe some interesting characteristics. The entire U.N. system exhibits characteristics of a self-organized network as the specialized agencies (under the Chief Executives Board for Coordination) and member states ultimately retain their sovereignty apart from the U.N. Similarly, DESA also exhibits characteristics of a Network Administrative Organization (NAO) with the member states passing the resolution to redefine the department's role to govern the SDG follow up and coordination process. Yet, DESA also exhibits characteristics of a lead agency with its centralized and orchestrating role within the context of the SDGs.

Table 2. Department of Economic and Social Affairs (DESA) committees, forums, or bodies, their main parent units.

Committee/Forum/Body	Acronym (If Applicable)	Main Parent Unit	Type
Secretariat		Secretariat	Principal UN Organ; DESA is under the Secretariat
General Assembly—Economic and Financial Committee		General Assembly	Main General Assembly Committee (Second Committee)
General Assembly—Social, Humanitarian, and Cultural Issues		General Assembly	Main General Assembly Committee (Third Committee)
Economic and Social Council	ECOSOC	Economic and Social Council	Principal UN Organ
High-Level Political Forum on Sustainable Development	HLPF	General Assembly & Economic and Social Council	Highest level forum for sustainable development; at General Assembly level
Statistical Commission		Economic and Social Council	Functional Commission (under ECOSOC)
Commission on Population and Development		Economic and Social Council	Functional Commission (under ECOSOC)
Commission on Social Development	CSocD	Economic and Social Council	Functional Commission (under ECOSOC)
United Nations Forum on Forests	UNFF	Economic and Social Council	Functional Commission (under ECOSOC)
Conference of States Parties to the Convention on the Rights of Persons with Disabilities		Secretariat	Forum
Intergovernmental follow-up on Financing for Sustainable Development		Secretariat	Division within DESA (Financing for Sustainable Development Office)
United Nations Committee on Global Geospatial Information Management	UN-GGIM	Economic and Social Council	Committee
Committee for Development Policy	CDP	Economic and Social Council	Expert Body (composed of members serving in their personal capacity)
Committee of Experts on Public Administration	CEPA	Economic and Social Council	Expert Body (composed of members serving in their personal capacity)
Committee on Non-Governmental Organizations		Economic and Social Council	Standing Committee
Permanent Forum on Indigenous Issues	PFII	Economic and Social Council	Expert Body (composed of members serving in their personal capacity)
UN Water		Chief Executives Board for Coordination (CEB)	Interagency Coordinating Mechanism/Created by Chief Board for Coordination
UN Energy		Chief Executives Board for Coordination (CEB)	Interagency Coordinating Mechanism/Created by Chief Board for Coordination
Development Cooperation Forum	DCF	Economic and Social Council	Forum
Financing for Development Forum	FfD	Economic and Social Council	Forum
Internet Governance Forum	IGF	Secretariat	Forum
Multi-stakeholder Forum on Science, Technology, and Innovation for the SDGs	STI	Secretariat	Forum

Table 2. *Cont.*

Committee/Forum/Body	Acronym (If Applicable)	Main Parent Unit	Type
Partnership Forum		Economic and Social Council	Forum
World Data Forum		Secretariat	Forum
Youth Forum		Economic and Social Council	Forum
Collaborative Partnership on Forests	CPF	Economic and Social Council	Collaborative Mechanism
Executive Committee of Economic and Social Affairs	ECESA	Secretariat	Collaborative Mechanism
High-level Group for Partnership, Coordination and Capacity-building for the 2030 Agenda	HLG-PCCB	Economic and Social Council	Collaborative Mechanism
Inter-agency and Expert Group on SDG Indicators	IAEG-SDGs	Economic and Social Council	Collaborative Mechanism
Inter-agency Consultative Group on SIDS	IAGG	Secretariat	Collaborative Mechanism
Inter-agency Support Group for the Convention on the Rights of Persons with Disabilities	IASG	Chief Executives Board for Coordination (CEB)	Collaborative Mechanism
Inter-agency Task Force on Financing for Development	IATF	Secretariat	Collaborative Mechanism
Inter-agency Task Team for the Technology Facilitation Mechanism	IAWG	Secretariat	Collaborative Mechanism
UN Inter-agency Support Group on Indigenous People's Issues	IASG	Economic and Social Council	Collaborative Mechanism
United Nations Inter-agency Network on Youth Development	IANYD	Secretariat	Collaborative Mechanism
United Nations Global Working Group on Big Data for Official Statistics	GWG	Secretariat	Collaborative Mechanism
Committee of Experts on International Cooperation in Tax Matters		Economic and Social Council	Committee/Advisory Body
United Nations Group of Experts on Geographical Names	UNGEGN	Economic and Social Council	Committee/Advisory Body

6. Conclusions

This article reviewed where we are in terms of coordination of UN agencies in implementing the agreed upon SDGs after 5 years. Still a substantial effort is needed in examining SDGs and how they are reported and evaluated. Action taken by the U.N., Secretary General, and member states since the adoption of the SDGs has included reforming and realigning the internal organization coordination and external, in-country support mechanisms for the SDGs. This research also showed how the numerous programs, funds, and specialized agencies are working together through collective action partnerships and illustrates the structure and governance of the networks. Yet, 5 years after the passage of the SDGs, global actors acknowledge that more must be done to reach the goals by the year 2030. In September 2019 and as part of the 2020 priorities, the Secretary General called on all members and sectors of society to mobilize and accelerate solutions for the 'Decade of Action' (United Nations 2020a).

Such collective action relies extensively on partnerships due to the complex, transnational problems addressed by the SDGs. Further, innovative solutions that consider the integrated nature of resources and specific goals, such as the FEW nexus, can help to reduce tradeoffs and decision making in silos.

As was introduced at the beginning of this paper and evidenced throughout, sustainable development has been elevated on the global stage as arguably the most critical modern challenge facing humanity and the planet. The SDGs are the latest and most comprehensive guidelines to eliminate previous decades of undesirable and inequitable patterns of economic, social, and environmental treatment and development. This study contributes to the literature on sustainability by understanding and reinforcing the critical role of partnerships for the SDGs, network governance in implementing the SDGs, collective action at the global level, and the key actors in the global network. Of course, there are some limitations with this research, primarily due to the availability of data for the networks and partnerships. While the reports and documents for DESA were consistent, there was some question on the validity of the SDG data. The only document or website that could be located to gather data on the specific organizations working toward the individual goals was from the Sustainable Development Goals website. While some organizations may be more involved or central to the networks (such as the World Trade Organization and U.N. Environmental Programme), we believe overall the results captured many of the core interorganizational players and actors for the SDGs and helped to provide a visual representation of them and the key role of partnerships for the goals.

Appendix A. Organization Titles and Acronyms

Organization	Acronym
Counter-Terrorism Committee	CTC
Regional Commissions New York Office	RCNYO
Economic and Social Commission for Asia and the Pacific	ESCAP
Economic and Social Commission for Western Asia	ESCWA
Economic Commission for Africa	ECA
Economic Commission for Europe	ECE
Economic Commission for Latin America and the Caribbean	ECLAC
Food and Agriculture Organization	FAO
International Civil Aviation Organization	ICAO
International Fund for Agricultural Development	IFAD
International Labour Organization	ILO
International Maritime Organization	IMO
International Monetary Fund	IMF
International Telecommunication Union	ITU
International Trade Centre	ITC
Joint United Nations Programme on HIV/AIDS	UNAIDS
UN Capital Development Fund	CDF
UN Department of Economic and Social Affairs	DESA
UN Department of Political and Peacebuilding Affairs	DPPA
UN Division for Ocean Affairs and Law of the Sea	DOALS

Organization	Acronym
UN Energy	Energy
UN Enviroment Programme	UNEP
UN Global Compact	UNGC
UN High Commissioner for Refugees	UNHCR
UN Human Settlements Programme	UN-HABITAT
UN Industrial Development Organization	UNIDO
UN Oceans	Oceans
UN Office for Disaster Risk Reduction	UNDRR
UN Office of Project Services	UNOPS
UN Office of the High Commissioner for Human Rights	OHCHR
UN Population Fund	UNFPA
UN REDD Programme	REDD
UN Relief and Works Agency for Palestine Refugees in the Near East	UNRWA
UN Peacekeeping	Peacekeeping
UN Water	Water
UN Women	Women
United Nations Children's Fund	UNICEF
United Nations Conference on Trade and Development	UNCTAD
United Nations Development Group	UNDG
United Nations Development Programme	UNDP
United Nations Educational, Scientific and Cultural Organization	UNESCO
United Nations Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States	UN-OHRLLS
United Nations Office on Drugs and Crime	UNODC
World Bank	WB
World Food Programme	WFP
World Health Organization	WHO
World Meteorological Organization	WMO
World Tourism Organization	UNWTO
World Trade Organization	WTO

Appendix B. Organization Network—Degree Measures

	Degree	nDegree
Counter-Terrorism Committ	7.000	0.146
Regional Commissions New	32.000	0.667
Economic and Social Commi	35.000	0.729
Economic and Social Commi	35.000	0.729
Economic Commission for A	35.000	0.729
Economic Commission for E	35.000	0.729
Economic Commission for L	35.000	0.729
Food and Agriculture Orga	36.000	0.750
International Civil Aviat	8.000	0.167
International Fund for Ag	32.000	0.667
International Labour Orga	35.000	0.729
International Maritime Or	7.000	0.146
International Monetary Fu	35.000	0.729
International Telecommuni	35.000	0.729
International Trade Centr	32.000	0.667
Joint United Nations Prog	33.000	0.688

	Degree	nDegree
UN Capital Development Fu	9.000	0.188
UN Department of Economic	33.000	0.688
UN Department of Politica	7.000	0.146
UN Division for Ocean Aff	6.000	0.125
UN Energy	2.000	0.042
UN Enviroment Programme	39.000	0.813
UN Global Compact	13.000	0.271
UN High Commissioner for	32.000	0.667
UN Human Settlements Prog	36.000	0.750
UN Industrial Development	36.000	0.750
UN Oceans	6.000	0.125
UN Office for Disaster Ri	12.000	0.250
UN Office of Project Serv	7.000	0.146
UN Office of the High Com	36.000	0.750
UN Peacekeeping	6.000	0.125
UN Population Fund	33.000	0.688
UN REDD Programme	3.000	0.063
UN Relief and Works Agenc	32.000	0.667
UN Water	9.000	0.188
UN Women	33.000	0.688
United Nations Children's	40.000	0.833
United Nations Conference	32.000	0.667
United Nations Developmen	33.000	0.688
United Nations Developmen	47.000	0.979
United Nations Educationa	42.000	0.875
United Nations Office of	9.000	0.188
United Nations Office on	7.000	0.146
World Bank	34.000	0.708
World Food Programme	32.000	0.667
World Health Organization	33.000	0.688
World Meteorological Orga	32.000	0.667
World Tourism Organizatio	32.000	0.667
World Trade Organization	32.000	0.667

Appendix C. SDG Network Centrality Measures

	Degree	2-Local	Eigenvect	Closeness	Betweennes
Counter-Terrorism Committee	0.059	0.01	0.025	0.481	0.000
Regional Commissions New York Offices	0.059	0.04	0.111	0.638	0.000
Economic and Social Commission for Asia and the Pacific	0.118	0.052	0.142	0.661	0.004
Economic and Social Commission for Western Asia	0.118	0.052	0.142	0.661	0.004
Economic Commission for Africa	0.118	0.052	0.142	0.661	0.004
Economic Commission for Europe	0.118	0.052	0.142	0.661	0.004
Economic Commission for Latin America and the Caribbean	0.118	0.052	0.142	0.661	0.004
Food and Agriculture Organization	0.353	0.068	0.204	0.711	0.057
International Civil Aviation Organization	0.059	0.01	0.024	0.493	0.000
International Fund for Agricultural Development	0.118	0.046	0.135	0.646	0.002
International Labour Organization	0.118	0.052	0.142	0.661	0.004
International Maritime Organization	0.118	0.013	0.034	0.502	0.003
International Monetary Fund	0.176	0.06	0.17	0.677	0.010
International Telecommunication Union	0.176	0.054	0.155	0.677	0.012
International Trade Centre	0.059	0.04	0.111	0.638	0.000
Joint United Nations Programme on HIV/AIDS	0.118	0.048	0.141	0.653	0.003
UN Capital Development Fund	0.059	0.012	0.031	0.485	0.000
UN Department of Economic and Social Affairs	0.176	0.054	0.162	0.661	0.011

	Degree	2-Local	Eigenvect	Closeness	Betweennes
UN Department of Political and Peacebuilding Affairs	0.059	0.01	0.025	0.481	0.000
UN Division for Ocean Affairs and Law of the Sea	0.059	0.008	0.024	0.493	0.000
UN Energy	0.059	0.004	0.011	0.457	0.000
UN Environment Programme	0.412	0.076	0.217	0.748	0.084
UN Global Compact	0.118	0.02	0.059	0.511	0.001
UN High Commissioner for Refugees	0.118	0.049	0.144	0.646	0.002
UN Human Settlements Programme	0.235	0.058	0.166	0.693	0.024
UN Industrial Development Organization	0.176	0.053	0.146	0.685	0.023
UN Oceans	0.059	0.008	0.024	0.493	0.000
UN Office for Disaster Risk Reduction	0.118	0.018	0.053	0.526	0.002
UN Office of Project Services	0.059	0.010	0.024	0.493	
UN Office of the High Commissioner for Human Rights	0.176	0.059	0.169	0.685	0.019
UN Peacekeeping	0.059	0.01	0.025	0.481	0.000
UN Population Fund	0.353	0.071	0.227	0.685	0.030
UN REDD Programme	0.059	0.005	0.01	0.417	0.000
UN Relief and Works Agency for Palestine Refugees	0.059	0.04	0.111	0.638	0.000
UN Water	0.118	0.013	0.048	0.498	0.001
UN Women	0.176	0.058	0.174	0.661	0.006
UN Children's Fund	0.471	0.091	0.293	0.769	0.070
UN Conference on Trade and Development	0.059	0.04	0.111	0.638	0.000
UN Development Group	0.059	0.04	0.111	0.638	0.000
UN Development Programme	0.765	0.125	0.389	0.919	0.264
UN Educational, Scientific, Cultural Organization	0.412	0.085	0.264	0.779	0.073
UN Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States	0.059	0.005	0.018	0.465	0.000
UN Office on Drugs and Crime	0.059	0.010	0.025	0.481	0.000
World Bank	0.118	0.048	0.139	0.661	0.004
World Food Programme	0.118	0.046	0.135	0.646	0.002
World Health Organization	0.176	0.058	0.174	0.661	0.006
World Meteorological Organization	0.118	0.044	0.127	0.646	0.004
World Tourism Organization	0.059	0.040	0.111	0.638	0.000
World Trade Organization	0.059	0.040	0.111	0.638	0.000

	Degree	2-Local	Eigenvect	Closeness	Betweennes
1 - No Poverty	0.143	0.02	0.197	0.468	0.042
2 - Zero Hunger	0.102	0.01	0.166	0.474	0.015
3 - Good Health and Well-Being	0.143	0.02	0.208	0.479	0.034
4 - Quality Education	0.082	0.007	0.169	0.463	0.006
5 - Gender Equality	0.163	0.027	0.231	0.443	0.019
6 - Clean Water and Sanitation	0.082	0.007	0.125	0.458	0.016
7 - Affordable and Clean Energy	0.061	0.004	0.079	0.443	0.033
8 - Decent Work and Economic Growth	0.204	0.042	0.216	0.479	0.069
9 - Industry, Innovation, and Infrastructure	0.163	0.027	0.169	0.491	0.089
10 - Reduced Inequalities	0.082	0.007	0.124	0.453	0.035
11 - Sustainable Cities and Communities	0.061	0.004	0.088	0.403	0.003
12 - Responsible Production and Consumption	0.082	0.007	0.139	0.468	0.009
13 - Climate Action	0.082	0.007	0.112	0.407	0.005
14 - Life Below Water	0.143	0.020	0.166	0.491	0.096
15 - Life On Land	0.082	0.007	0.067	0.391	0.038
16 - Peace, Justice, and Strong Institutions	0.163	0.027	0.175	0.474	0.126
17 - Partnerships for the Goals	0.673	0.454	0.771	0.717	0.581

References

Abbott, Kenneth W., and Steven Bernstein. 2015. The High-Level Political Forum on Sustainable Development: Orchestration by Default and Design. *Global Policy* 6: 222–33. [CrossRef]

Auriacombe, Christelle, and Shikha Vyas-Doorgapersad. 2019. Critical Considerations for the Role of Governments in the Interface between Good Governance and Sustainable Development in Developing Countries. *International Journal of eBusiness and eGovernment Studies* 11: 1–16. [CrossRef]

Bexell, Magdalena, and Kristina Jonsson. 2017. Reasonability and the Sustainable Development Goals. *Forum for Development Studies* 44: 13–29. [CrossRef]

Biermann, Frank, Norichika Kanie, and Rakhyun E. Kim. 2017. Global governance by goal-setting: The novel approach of the UN Sustainable Development Goals. *Current Opinion in Environmental Sustainability* 26–31. [CrossRef]

Bodin, Orjan. 2017. Collaborative Environmental Governance: Achieving Collective Action in Social-Ecological Systems. *Science* 357. [CrossRef] [PubMed]

Borgatti, Steven P. 2002. *NetDraw Network Visualization*. Harvard: Analytic Technologies.

Borgatti, Steven P., and Pacey C. Foster. 2003. The Network Paradigm in Organizational Research: A Review and Typology. *Journal of Management* 29: 991–1013. [CrossRef]

Borgatti, Steven P., Martin G. Everett, and Linton C. Freeman. 2002. *UCINET 6 for Windows: Software for Social Network Analysis*. Harvard: Analytic Technologies.

Borgatti, Steven P., Martin G. Everett, and Jeffrey C. Johnson. 2018. *Analyzing Social Networks*, 2nd ed. Thousand Oaks: Sage.

Bowen, Kathryn J., Nicholas A. Cradock-Henry, Florian Koch, James Patterson, Tiina Hayha, Jess Vogt, and Fabiana Barbi. 2017. Implementing the "Sustainable Development Goals": Towards addressing three key governance challenges—Collective action, trade-offs, and accountability. *Current Opinion in Environmental Sustainability* 26–27: 90–96. [CrossRef]

Bringezu, Stefan, Janez Potočnik, Heinz Schandl, Yonglong Lu, Anu Ramaswami, Mark Swilling, and Sangwon Suh. 2016. Multi-Scale Governance of Sustainable Natural Resource Use—Challenges and Opportunities for Monitoring and Institutional Development at the National and Global Level. *Sustainability* 8: 778. [CrossRef]

Bryson, John M., Barbara C. Crosby, and Melissa M. Stone. 2006. The Design and Implementation of Cross-Sector Collaborations: Propositions from the Literature. *Public Administration Review* 66: 44–55. [CrossRef]

Chidozie, Felix, and O. Aje Oluwatobi. 2017. International Organizations and Global Governance Agenda: SDGs as a Paragon. *Acta Universitatis Danubius: Relationes Internationales* 10: 43–60. Available online: http://journals.univ-danubius.ro/index.php/internationalis/article/view/2379/4114 (accessed on 23 May 2020).

Daher, Bassel, Bryce Hannibal, Kent Portney, and Rabi H. Mohtar. 2019. Toward creating an environment of cooperation between water, energy, and food stakeholders in San Antonio. *Science of Total Environment* 651: 2913–26. [CrossRef]

Emerson, Kirk, Tina Nabatchi, and Stephen Balogh. 2011. An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory* 22: 1–29. [CrossRef]

Hu, Qian, Sana Khosa, and Naim Kapucu. 2016. The Intellectual Structure of Empirical Network Research in Public Administration. *Journal of Public Administration Research and Theory* 26: 593–612. [CrossRef]

Ingram, Paul, and Magnus Thor Torfason. 2010. Organizing the In-between: The Population Dynamics of Network-weaving Organizations in the Global Interstate Network. *Administrative Science Quarterly* 55: 577–605. [CrossRef]

Kapucu, Naim, and Qian Hu. 2020. *Network Governance: Concepts, Theories, and Applications*. New York: Routledge.

Klijn, Erik-Hans, and Joop F. M. Koppenjan. 2000. Public Management and Policy Networks. *Public Management: An International Journal of Research and Theory* 2: 135–58. [CrossRef]

Koliba, Christopher J., Jack W. Meek, Asim Zia, and Russell W. Mills. 2011. *Governance Networks in Public Administration and Public Policy*. New York: CRC Press.

Le Blanc, D. 2015. Towards Integration at Last? The Sustainable Development Goals as a Network of Targets. *Sustainable Development* 23: 176–87. [CrossRef]

Lim, Michelle L., Peter Sogaard Jorgenson, and Carina A. Wyborn. 2018. Reframing the sustainable development goals to achieve sustainable development in the Anthropecene—A systems approach. *Ecology and Society* 23: 22. [CrossRef]

Lubell, Mark. 2015. Collaborative partnerships in complex institutional systems. *Current Opinion in Environmental Sustainability* 12: 41–47. [CrossRef]

Marker, Carolin, Sandra Venghaus, and Jurgen-Friedrich Hake. 2018. Integrated governance for the food-energy-water-nexus—The scope of action for institutional change. *Renewable and Sustainable Energy Reviews* 97: 290–30. [CrossRef]

Meadowcroft, James. 2007. Who is in Charge here? Governance for Sustainable Development in a Complex World. *Journal of Environmental Policy & Planning* 9: 299–314. [CrossRef]

Milward, H. Brinton, and Keith. G. Provan. 1998. Measuring Network Structure. *Public Administration* 76: 387–407. [CrossRef]

Newell, Joshua, Goldstein Benjamin, and Alec Foster. 2018. A 40-year-review of food-energy-water nexus literature and its application to the urban scale. *Environmental Research Letters* 14: 073003. [CrossRef]

Nowell, Branda, Mary C. Hano, and Zheng Yang. 2019. *Networks of Networks?* Toward and External Perspective of Whole Networks. *Perspectives of Public Management and Governance* 1–21. [CrossRef]

Ostrom, Elinor. 2009. Polycentric Systems as One Approach to Solving Collective-Action Problems. In *Climate Change and Sustainable Development: New Challenges for Poverty Reduction*. Edited by Mohamed A. Salih. Northampton: Elgar, pp. 17–35.

Pahl-Wostl, Claudia. 2017. Governance of the water-energy-food security nexus: A multi-level coordination challenge. *Environmental Science and Policy* 92: 356–67. [CrossRef]

Popp, Janice K., Brinton H. Milward, Gail MAcKean, Ann Casebeer, and Ronald Lindstorm. 2014. *Interorganizational Networks: A Review of The Literature to Inform Practice*. Washington, DC: IBM Center for The Business of Government, Available online: http://www.businessofgovernment.org/sites/default/files/Inter-Organizational%20Networks.pdf (accessed on 13 June 2020).

Provan, Keith, and Patrick Kenis. 2008. Modes of Network Governance: Structure, Management, and Effectiveness. *Journal of Public Administration Research and Theory: J-PART* 18: 229–25. [CrossRef]

Provan, Keith G., and Robin H. Lemaire. 2012. Core Concepts and Key Ideas for Understanding Public Sector Organizational Networks: Using Research to Inform Scholarship and Practice. *Public Administration Review* 72: 638–48. [CrossRef]

Shah, Mohamed M. 2008. Sustainable Development. *Encyclopedia of Ecology*. Available online: https://www.sciencedirect.com/topics/earth-and-planetary-sciences/sustainable-development (accessed on 23 May 2020).

Shrestha, Manoj K. 2018. Network Structure, Strength of Relationships, and Communities' Success in Project Implementation. *Public Administration Review* 78: 284–94. [CrossRef]

Siegel, David A. 2009. Social networks and collective action. *American Journal of Political Science* 53: 122–38. [CrossRef]

Sorensen, Eva, and Jacob Torfing. 2007. *Theories of Democratic Network Governance*. New York: Palgrave Macmillan.

Sovacool, Benjamin K., and Thijs Van de Graaf. 2018. Building or stumbling blocks: Assessing the performance of polycentric energy and climate governance networks. *Energy Policy* 118: 317–24. [CrossRef]

Stafford-Smith, Mark, David Griggs, Owen Gaffney, F. Ullah, Belinda Reyers, Norichika Kanie, Bjorn Stigson, Paul Shrivastava, Melissa Leach, and O'D. Connell. 2017. Integration: The key to implementing the Sustainable Development Goals. *Sustainability Science* 12: 911–19. [CrossRef]

Sustainable Development Goals Knowledge Platform. n.d. Division for Sustainable Development Goals. Available online: https://sustainabledevelopment.un.org/about (accessed on 23 May 2020).

United Nations. 1987. *Report to the World Commission on Environment and Development (Report A/42/427)*. New York: United Nations.

United Nations. 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development (Report A/Res/70/1)*. New York: United Nations.

United Nations. 2016. *Follow-up and Review of the 2030 Agenda for Sustainable Development at the Global Level (Resolution 70/299)*. New York: United Nations.

United Nations. 2019. *History*. Available online: https://www.un.org/en/sections/history/history-united-nations/index.html (accessed on 10 June 2020).

United Nations. 2020a. Decade of Action. Available online: https://www.un.org/sustainabledevelopment/decade-of-action/ (accessed on 10 June 2020).

United Nations. 2020b. Promote Sustainable Development. Available online: https://www.un.org/en/sections/what-we-do/promote-sustainable-development/index.html (accessed on 13 June 2020).

United Nations. 2020c. Sustainable Development Goals. Available online: https://www.un.org/sustainabledevelopment/sustainable-development-goals/ (accessed on 13 June 2020).

United Nations. 2020d. United to Reform. Available online: https://reform.un.org/ (accessed on 10 June 2020).

United Nations. n.d. Charter of the United Nations. Available online: https://www.un.org/en/sections/un-charter/chapter-i/index.html (accessed on 10 June 2020).

United Nations Sustainable Development Group. 2020. UNSDG on the Agenda. Available online: https://unsdg.un.org/2030-agenda (accessed on 10 June 2020).

Weiss, Thomas G. 2015. The United Nations: Before, during and after 1945. *International Affairs* 91: 1221–35. [CrossRef]

Wilkinson, Rorden. 2005. The Commission on Global Governance: A New Word. In *The Global Governance: A Reader*. Edited by R. Wilkinson. New York: Routledge.

Wong, Ryn. 2019. What makes a good coordinator for implementing the Sustainable Development Goals? *Journal of Cleaner Production* 238: 117928. [CrossRef]

Yung, Laurie, Elena Louder, Louise A. Gallagher, Kristal Jones, and Carina Wyborn. 2019. How Methods for Navigating Uncertainty Connect Science and Policy at the Water-Energy-Food Nexus. *Frontiers in Environmental Science* 7. [CrossRef]

Publisher's Note: MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.