Cooperatives and Sustainability: An investigation into the relationship

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The Community Research Connections at Royal Roads University is dedicated to the sustainable features of Canadian communities, exploring how to reconcile ecological, social, and economic imperatives through integration of our culture and arts.

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Project commissioned by the International Co-operative Alliance

International Co-operative Alliance

The International Co-operative Alliance unites co-operatives worldwide. It is the custodian of co-operative values and principles and makes the case for their distinctive values-based economic business model which also provides individuals and communities with an instrument of self-help and influence over their development. The ICA advocates the interests and success of co-operatives, disseminates best practices and know-how, strengthens their capacity building and monitors their performance and progress over time.

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October 23, 2013

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Contents


STEEP HILL
FOOD CO-OP

Report Summary

At the end of September 2013, the UN's Intergovernmental Panel on Climate Change (IPCC) issued its latest five year assessment of the science on climate change. The IPCC concluded that it is extremely likely that human influence has been the dominant cause of climate change observed over the past fifty years and that increasing warming in the years to come will result in more frequent and longer heat waves, an increasing rate of sea level rise and more inland flooding.[1] In Europe, the International Federation of Red Cross and Red Crescent Societies found increasing numbers of people depending on food distributions and the spread of 'quiet desperation'.[2]

The United Nations sees hope in the co-operative model, noting that in the face of multiple crisis and natural disasters, co-operatives have maintained high credit ratings, increased assets and turnover and expanded their memberships base. In his statement for the International Day of Co-operatives, Guy Rider, the Director General of the International Labour Organization (ILO) linked co-operatives with sustainable development. "As global attention focuses on the challenge of sustainable development, co-operatives can and must play a key role as creative enterprises expanding into new and innovative areas," Mr. Ryder said, citing such spheres as recycling and renewable energy, providing people with know-how, inputs, finance and markets at fair prices with low-environmental impact.[3] This analysis begins an investigation of the relationship between sustainability and the co-operative model with the question: are co-operatives compatible with notions of sustainability?

We explored this question in two ways; firstly, we used a technical analysis to unearth the key concepts underlying sustainability, followed by co-operatives. We then explored the degree to which the concepts are either compatible or overlap. Secondly, we created a platform to draw on the 'wisdom of the crowd', enabling people from around the world to describe how particular co-operatives promote sustainability.

Findings

The UN is correct to place its hope in the co-operative model and as an engine of sustainability. There is a clear and direct relationship between sustainability and how co-operatives describe themselves. The linkages to social dimensions of sustainability are stronger than the linkages to environmental and economic dimensions, but all three are present. The results of the crowd-sourcing demonstrate that co-operatives embed sustainability into their operating model and values, but further study is required to understand definitively the degree to which co-operatives are 'walking the talk'.

Banca Etica Italy

Ethical Bank offers banking experience different offers all the main banking products and services for individuals and families or organizations and businesses. It is a co-operative bank where the democratic management is ensured by the free participation of members according to the principle of "one person, one vote".

It was started in 1999 through grassroots organizing by the efforts of many people and organizations that were inspired to provide a credit institution inspired by ethical finance. It was developed starting with the founding statues: transparency, participation, equity, efficiency, simplicity, attention to non-economic consequences of economic actions, and credit as a human right. To actualize these, one of the guiding principles is attention to non-economic consequences of economic actions.

Banca Etica has created a Solidarity Fund for Fair Trade. In recent years because of the economic crisis some co-operatives have failed, putting pressure on small investors who had invested in the capital of these companies. Because of the historical link that binds Banca Etica us to the fair trade movement, they decided to establish a solidarity fund to support of these investors.

1 IPCC (2013). The Physical Science Basis: Summary for Policy Makers. Available at: http://www.climatechange2013.org

2 International Federation of Red Cross and Red Crescent Societies (2013). Think differently: Humanitarian impacts of the economic crisis in Europe. Available at: http://www.ifrc.org/PageFiles/134339/1260300-Economic%20crisis%20Report_EN_LR.pdf

3 UN News Centre (2013). Co-operatives can build socio-economic resilience during crises. Available at: http://www.un.org/apps/news/story.asp?NewsID=45353#.UlgFgYaSqSo

Context

The Blueprint for a Co-operative Decade

The Blueprint for a Co-operative Decade is a visionary document prepared for the International Co-operative Alliance that builds on the momentum of the UN's International Year of the Co-operative in 2012. The Blueprint positions co-operatives as builders of sustainability and sustainability is one of five identified priorities for the coming decade. A key part of this effort is to demonstrate convincingly that sustainability is inherent in the nature of co-operatives, and that co-operative enterprises make a positive contribution to sustainability. This analysis represents a first step at identifying the relationship between the co-operative model and sustainability.

> The co-operative sector needs to demonstrate convincingly that sustainability is in the intrinsic nature of co-operatives.
>
> **Blueprint for a co-operative decade**

Research Method

The method consisted of four steps as illustrated in Figure 1. The first step was to identify the key concepts underpinning sustainability. Second, these concepts were compared with the co-operative principles to evaluate whether the co-operative principles could be used as a proxy for sustainability. Third, samples of co-operatives were compiled. Fourth the websites and annual reports were analyzed for the key sustainability concepts. This effort was supplemented by 'crowd-sourcing' examples of co-operatives that are leaders on sustainability.

Methodological Limitations

Selection of papers: A different selection of papers may have influenced the resulting sustainability framework. However, the number of papers provides a high level of confidence that the emergent framework is representative of sustainability. To validate the findings, the results of the analysis were compared against a separate and independent sustainability framework generated out of a series of case studies and the overlap was strong.

Language: While translations from French and Spanish were included, the predominant language of the analysis was English. This means the scan fails to capture other notions or concepts of sustainability in other languages.

Sample: The sample was limited to co-operatives that have an online presence and likely discriminates against small co-operatives and co-operatives in non-English speaking countries. The random sample was evaluated against criteria including geographic representation, sector representation, co-operative type and co-operative size.

Bias: The research team is based in North America and Europe and while the team includes French and Spanish speakers, is limited in our understanding and ability to identify co-operatives globally. An effort was undertaken to identify co-operatives for the leadership sample from ICA's regional offices.

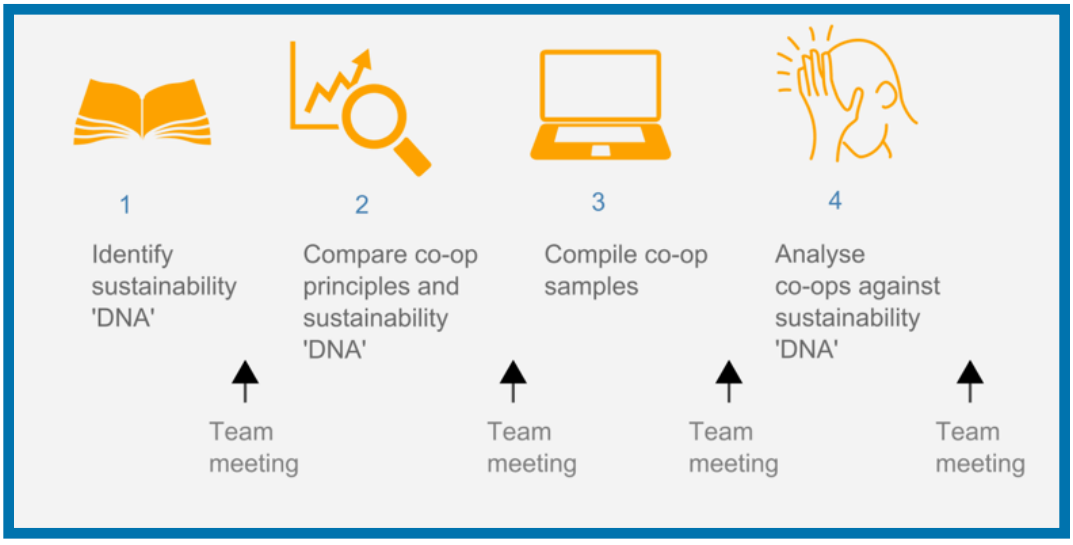


Figure 1: Project method

Defining Sustainability

The World Commission on Environment and Development produced the Brundtland Report in 1987, which defined 'sustainable development' as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs".[4] This definition is ambiguous and has been subject to considerable debate but at its core is the premise that the circumstances of those who are in need can be improved without further degradation of the vitality and resilience of the ecosystem.

At the heart of the debate surrounding sustainability is the issue of substitution - whether or not human capital can be substituted for natural capital. Whether or not there are limits to growth. Many ecologists and a few economists argue that natural capital is not infinitely substitutable - this is sometimes termed strong sustainability. Weak sustainability, on the other hand, is achieved if the aggregate stock of natural and human capital is not decreasing and one is substitutable for the other.

This analysis accepts the idea of absolute biophysical limits. Further, human systems cannot recreate the ecological systems that are required to sustain human life. They are fundamentally dependent upon them for all their resources, and natural capital is non-substitutable, regardless of man's ingenuity. Thus, if the concept of sustainability is divided into its three components or imperatives, the community sustainability can be described as a series of circles or nests (Figure 2), with each senior level transcending but embracing its juniors. In this description, the economy is embedded within a society or cultural sphere, which in turn, is embedded within the ecological or ecosystem sphere, the ultimate limiting factor for all human activities. The ecosystem is the all-encompassing sphere, of which human society is but a subset. In its turn, the economy is a subset of society, a sub-subset, as it were, of the ecosystem.

Sustainability (the colloquial term for sustainable development) is the sweet spot in which social, economic and ecological goals are self-reinforcing. To capture the essence of this term, the research team set aside the theoretical debates around sustainability and elected to derive the key concepts, a metaphorical 'DNA' of sustainability from the best thinking on the subject. Fifty seminal papers were assembled in a database, as a representation of the research community's expertise on sustainability (Appendix 1). Computer-assisted qualitative data analysis software (CAQDAS), specifically NVIVO, was used to identify the underlying and significant concepts in the body of work, deriving the 'DNA' for the concept of sustainability (Figure 3).

We knew, however, that this 'DNA' would not be directly applicable to co-operatives, because the words and concepts employed by co-operatives worldwide are different, in the same way that doctors and lawyers use different professional vernaculars.

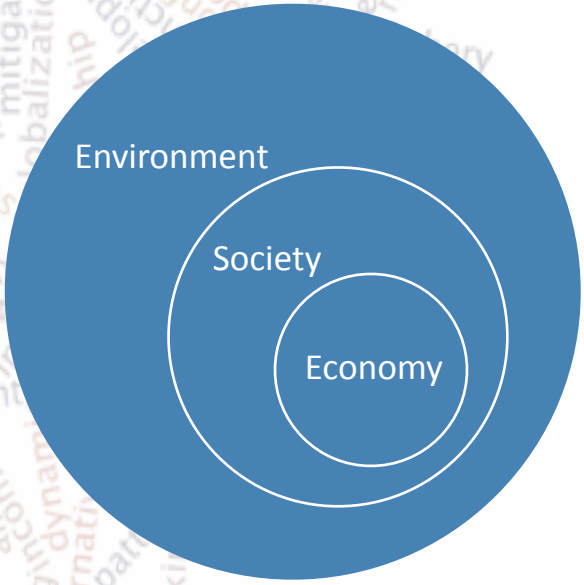


Figure 2: Framework for sustainability

Figure 3: Sustainability genome

4 World Commission on Environment and Development (1987). Our Common Future. Available at: http://conspect.nl/pdf/Our_Common_Future-Brundtland_Report_1987.pdf

Do the co-operative principles represent sustainability?

A co-operative is defined as an "autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly owned and democratically controlled enterprise."[5]

The co-operative principles are a unique charter that cross cultures, politics, languages and religion. We wondered how much these principles would relate over overlap with the essential aspects of sustainability. If there was demonstrated overlap, assuming that co-operatives manifested the principles, we could then conclude that co-operatives by their very definition, also integrated sustainability principles.

We used the CAQDAS software to extract the DNA of the co-operative principles and to compare it with the DNA of sustainability.

1st Principle: Voluntary and Open Membership
2nd Principle: Democratic member Control
3rd Principle: Member Economic Participation
4th Principle: Autonomy and Independence
5th Principle: Education, Training and Informati
6th Principle: Cooperation among Cooperatives
7th Principle: Concern for Community

A sustainability yardstick

We elected to use the co-operatives principles as one measure against which to evaluate co-operatives as the co-operative principles closely mapped the social DNA of sustainability. This approach provides an indication about the degree to which co-operatives represent the social dimensions of sustainability and it also provides the value-added component of indicating the degree to which co-operatives are communicating the co-operative principles. When combined with concepts from the environmental and economic dimensions from the sustainability literature, we arrived at a comprehensive sustainability framework or 'yardstick' against which we could then evaluate the congruence of co-operative and sustainability principles.

Three different types of samples

There are hundreds of millions, if not over a billion, co-operatives in the world. Developing a statistically proportionate sample that could be considered definitive of the degree to which co-operatives manifest sustainability would be impossible. We elected to develop three separate samples, all derived from an internet presence. First, the random sample provides a representation of the co-operative sector as a whole. Second, a snowball sample of recognized

Green Gujarat tree plantation campaign (milk producers co-operatives) India

Milk Producer members of Gujarat Dairy Cooperatives- better known as AMUL have taken up an ambitious plan to save the environment by planting trees, making India green and thereby reducing the effects of global warming. For the last five years, the milk producers of Gujarat Dairy Cooperatives have conducted a mass tree plantation drive every year on Independence Day. Over the years, due to intensive agriculture and dairying various natural resources are consumed at faster pace in Gujarat state of India. The state level apex body of dairy farmers in Gujarat gave a serious thought in this direction and discovered a novel idea for giving back to nature. The idea was "one member one tree" plantation on the 60th Independence day - 15th August 2007. To date they have planted over 300,000 trees. The most striking feature of this programme is that it was initiated by milk producer members of the dairy cooperatives complete with an oath to protect tree saplings till it survives and grows into tree.

5 International Labour Organization (2011). Promoting co-operatives, a guide to ILO recommendation 193. Available at: http://www.ilo.org/empent/Publications/WCMS_160221/lang--en/index.htm

sustainability leaders provides an indication of best practice.[6] Third, a snowball sample of co-operative associations and federations provides a sense of the general commitment of co-operatives to sustainability.

The random sample was generated by identifying all of the associations that are members of ICA. The membership lists for each of the associations were compiled in a database. We used a random number generator to identify which association list to select from and the random number generator was again used to select a co-operative from the membership list. If the selected co-operative did not have a website, it was removed from the sample, a potential bias for which we had no control. A sample of 93 co-operatives was prepared and the text of their websites and annual reports from the past five years were compiled in a database (Appendix 2).

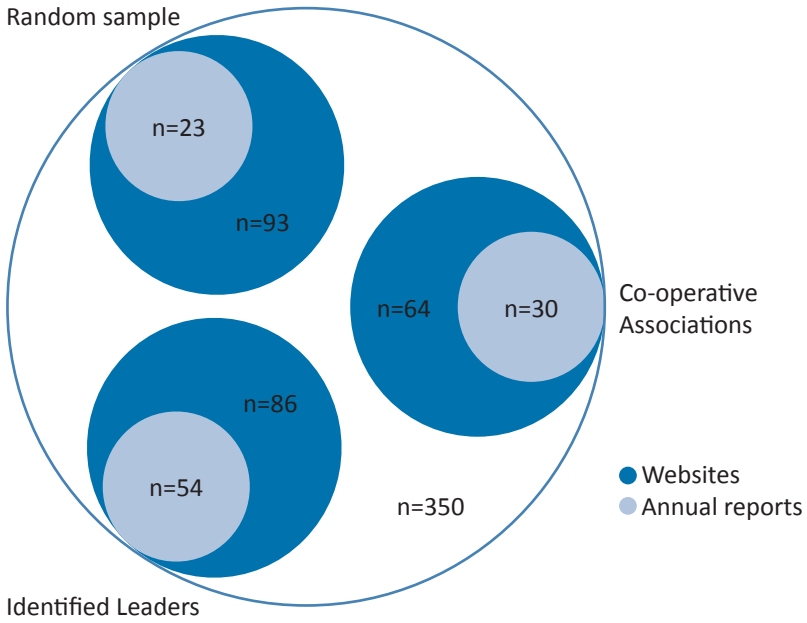


Figure 4: Sample Sizes

A second sample of 86 sustainability leaders was collected by identifying those co-operatives perceived to be leaders by the literature, by indices or lists such as the Global Reporting Initiative and Corporate Knights and by staff of co-operative organizations (Appendix 3).

The final sample consisted of a list of 64 co-operative associations and federations from around the world. The idea behind this was to gauge the messages, commitment and supports at the associative or federation level to sustainability with the assumption there could be a trickle down effect to member co-operatives (Appendix 4).

6 A snowball sample uses a small pool of initial informants to nominate, through their social networks, other participants who meet the eligibility criteria and could potentially contribute to a specific study.

What co-operatives say, not what they do

The data that we analyzed consisted of websites and annual reports. As a co-operative ourselves, we know that the content on our website and in our annual report does not fully capture our commitment to sustainability and there is a potential that disconnect between communications and operations is also the case for the co-operatives and associations in our sample. This is a limitation of our analysis; however, what co-operatives portray does represent the image they want to communicate to their members and their communities and is thus worthy of evaluation.

Analysis by overlap and by association

We then used the sustainability 'yardstick' to evaluate the stories the co-operatives were telling, much like a painter might consider the palette of colours within a painting. If sustainability is represented by yellow, red and blue, how much yellow, red and blue is found in each painting? We also considered the relationship of the concepts; how often is yellow close to red and red close to blue, and so on in each painting.

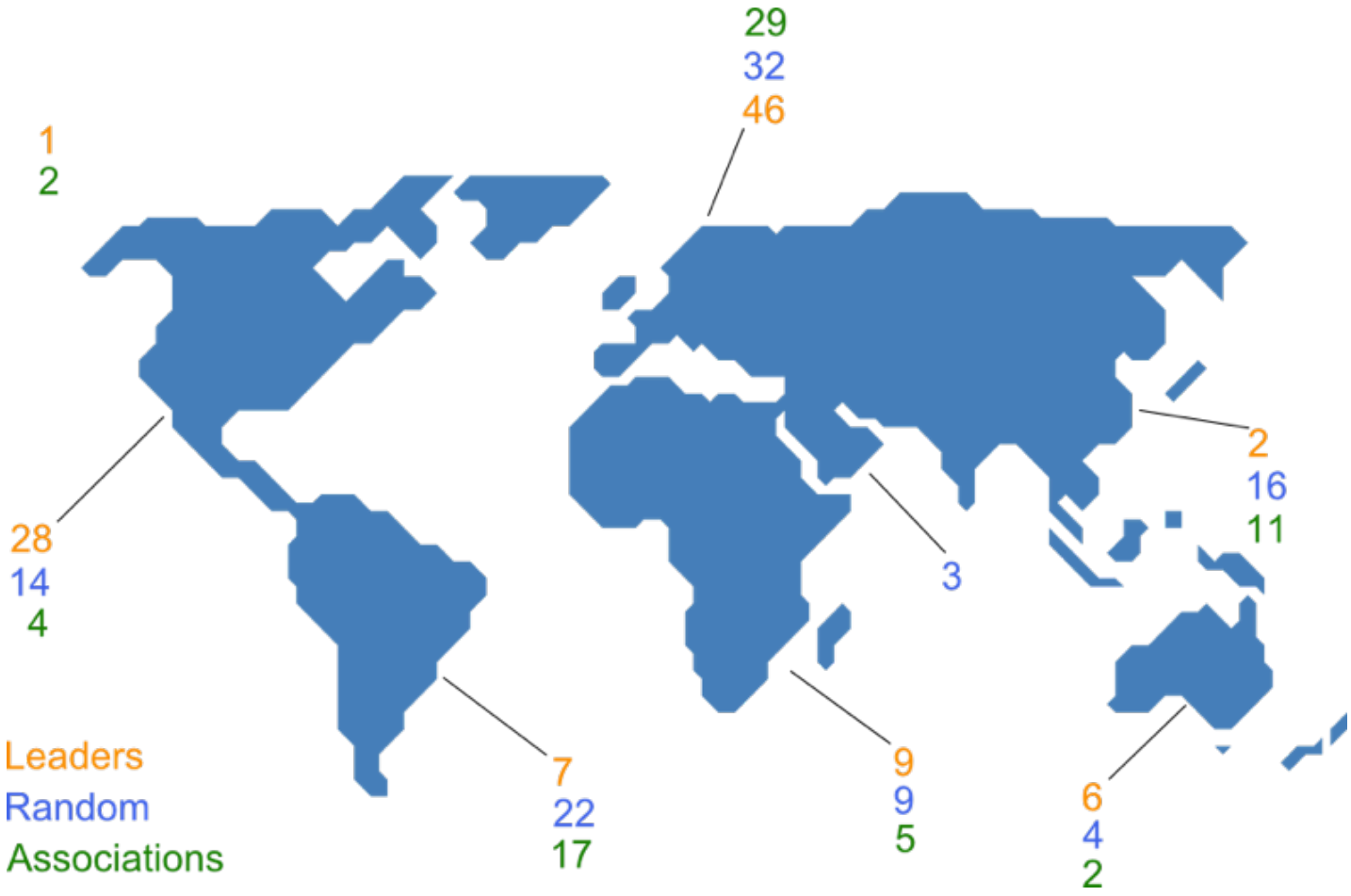


Figure 5: Location of co-operatives in the sample


I ♥ Co-ops

Results

The magic of frequency curves

The NVIVO software tells us how many times terms were used in the sustainability literature and we separated the literature into social, economic and ecological groups. Some concepts are discussed extensively and others are just mentioned once or twice; when these concepts are plotted on a chart the same sort of curve emerges. The concepts which are discussed extensively occur on the steep part of the curve - these are the concepts that define that particular body of literature. In other words these words are the 'DNA of sustainability', as illustrated in Figure 6.

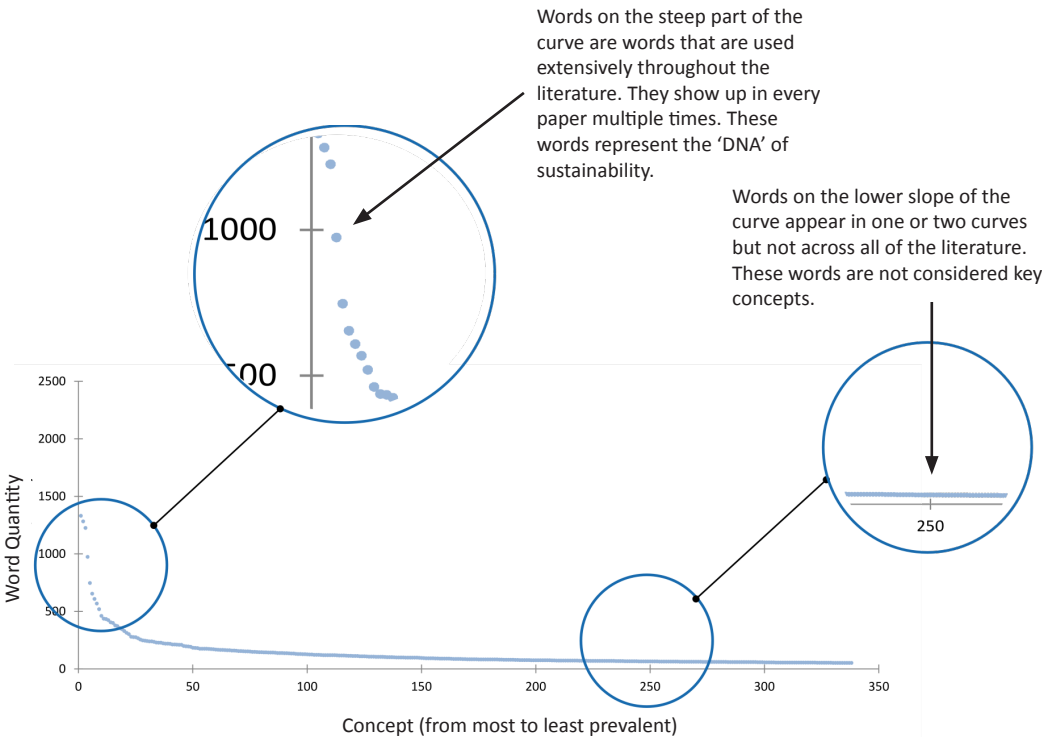


Figure 6: Frequency Curves

What is the DNA of sustainability?

The words on the steep part of the frequency curves were identified and these served as the 'defining' concepts of sustainability (i.e., the DNA of sustainability). These are the terms that are consistently discussed and debated by researchers and academics in a wide range of fields related to sustainability (Appendix 5).

These terms represent the heart of the dialogue around sustainability and could then be employed to identify whether the dialogue in the co-operative encompassed the same set of concepts or not.

The Greenery
The Netherlands

Every day, The Greenery works with its growers, staff, customers and suppliers to provide consumers all over the world with natural, healthy and ultra-fresh vegetables, fruit and mushrooms. 'Success in Fresh Produce' is what The Greenery aims for and what it promises its customers.

Sustainability has become an indispensable part of this sector and continues to play an increasingly important role in the future. The Greenery is responding to this development with a range of initiatives in the field of sustainability. They also work actively with a range of organizations to encourage the growth of sustainable business. For example, one of the world's greatest challenges is making food production more sustainable. The Greenery takes this seriously because they are a major player in the international market. That's why The Greenery has made sustainable cultivation a key focus area of business operations. Good ideas often arise in a practical context, in places where they can be applied. The Greenery supports growers who innovate in a sustainable manner. They can be assured of our help in testing, developing and implementing their ideas. Since early 2010 we have awarded Growers favourably distinguishing themselves in the area of sustainability with the qualification 'Nature Counts'. In addition, the Greenery aims to restrict the use of chemical plant protection agents as much as possible. They encourage growers to use natural alternatives, where possible, by providing information, advice and support.

National Forestry Co-operative Federation Korea

NFCF was first formed in 1962 in order to protect the rights of forest owners and cooperative members and to promote sustainable forestry practices to help Korean economy. Since its inception NFCF has reforested severely denuded mountains in the country within the shortest possible time period. Without 2 million dedicated cooperative members and citizens such feat would not have been possible. Korea's reforestation success story has become acknowledged by world's forestry community. NFCF has many sustainable practices, programs and initiatives. Here are two:

- Integrated Watershed Management: Watershed areas that pose dangers– landslides and other disasters– are specially managed to prevent disasters and to improve forests environment functions. Soil erosion control projects and reforestation in landslide prone areas are major means to prevent those disasters.
- National Forest Inventory: NFCF conducts national forest inventory every 5 years to obtain accurate baseline data for national forest policy. The inventory is carried out through on the ground sampling and by state of the art technology to produce accurate forest statistics acceptable and reliable to international forestry community.

Are the co-operative principles an intrinsic element of sustainability?

The co-operative principles contain a number of key concepts. We were interested in exploring the degree to which the co-operative principles overlapped with the sustainability 'DNA'. We extracted the key terms from the co-operative principles, defining words such as equality, democratic, rights, and others. We then searched for these words in the sustainability literature and found all of them, indicating that the co-operative principles and sustainability literature directly overlap.

However, given that we were searching the cumulative words of 50 key papers, it is not surprising that the terms from the co-operative principles were found. We then considered where the key terms from the co-operative principles fell on the frequency curves from the sustainability literature; in other words, we were interested in whether the terms from the co-operative principles were foci of discussions across all the papers or just one word used in one paragraph of one paper. There was a strong overlap between the important concepts in the social grouping of the literature and the co-operative principles but less overlap between key concepts in the environmental and economic groupings of literature and the co-operative principles.

This is not surprising as the co-operative principles do not discuss environmental issues (with the exception of Principle 7 and, even then, this is implied in the greater context of sustainability), and as we noted, the principles are intended to be applied to a viable business. With this premise, consideration of the economic aspects of a business in the principles would be redundant. We also noted that the economic grouping of the sustainability literature was more focused, but not solely, on the macro-economic scale while co-operatives are more concerned with the micro-economic functions of business. These results are summarized in Figure 7.

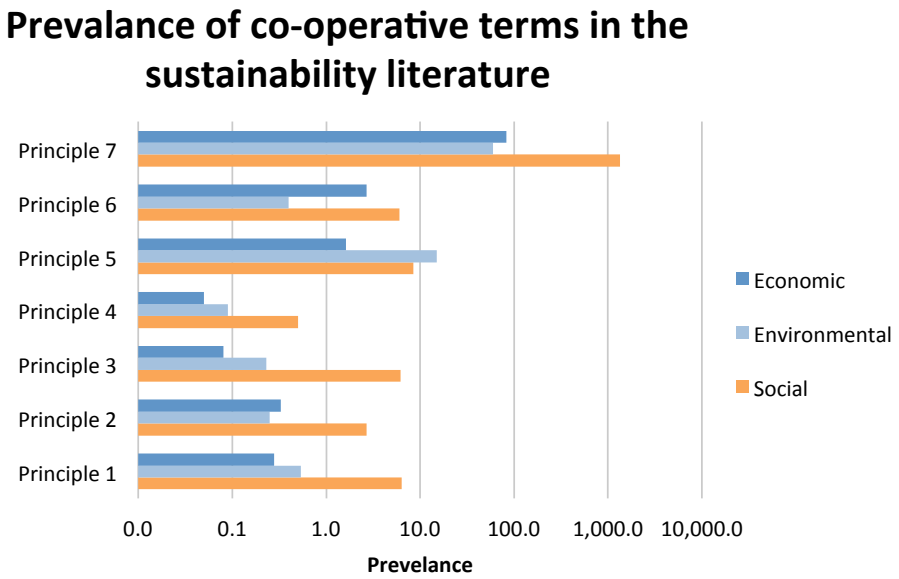


Figure 7: Co-operative terms prevalence in the literature

Figure 7 shows where the co-operative principles concepts lie on the sustainability literature frequency curves. Prevalence values refer to the slopes of the tangent line at a given point of the curve; therefore, the steeper the slope the higher up (i.e., among more prevalent concepts) a term is. Slopes of more than 1 indicate a strong relationship. Principle 7 is particularly high because of the inclusion of the word sustainability in the co-op principle, a concept that unsurprisingly is prevalent in sustainability literature.

We concluded that the co-operative principles were a useful proxy for the social grouping of literature but that additional economic and environmental concepts were required for a comprehensive sustainability analysis (See Appendix 5 for a complete list).

Finding #1
The co-operative principles strongly represent the social dimensions of sustainability 'DNA' but are weak on environmental and economic dimensions.

How are co-operatives discussing sustainability?
Figure 8 shows the top twenty sustainability concepts in order of frequency that they appeared. The samples showed remarkable congruence in terms of the words that appeared most frequently. Many of the terms are likely unique to co-operatives, terms such as local, democratic, community, solidarity and participation.

However, it is not only which terms are being discussed but how often they are being discussed in the context of everything else co-operatives are considering. To represent the relative frequency of the appearance of words, we have developed word clouds.

In Figures 9-11, community emerges as the dominant concept. The leaders' sample illustrates a notable focus on energy and sustainability while the random sample illustrates a lesser focus on energy, education and agriculture, much like the associations sample.

Finding #2
A focus on community is the defining aspect of co-operatives with respect to sustainability.

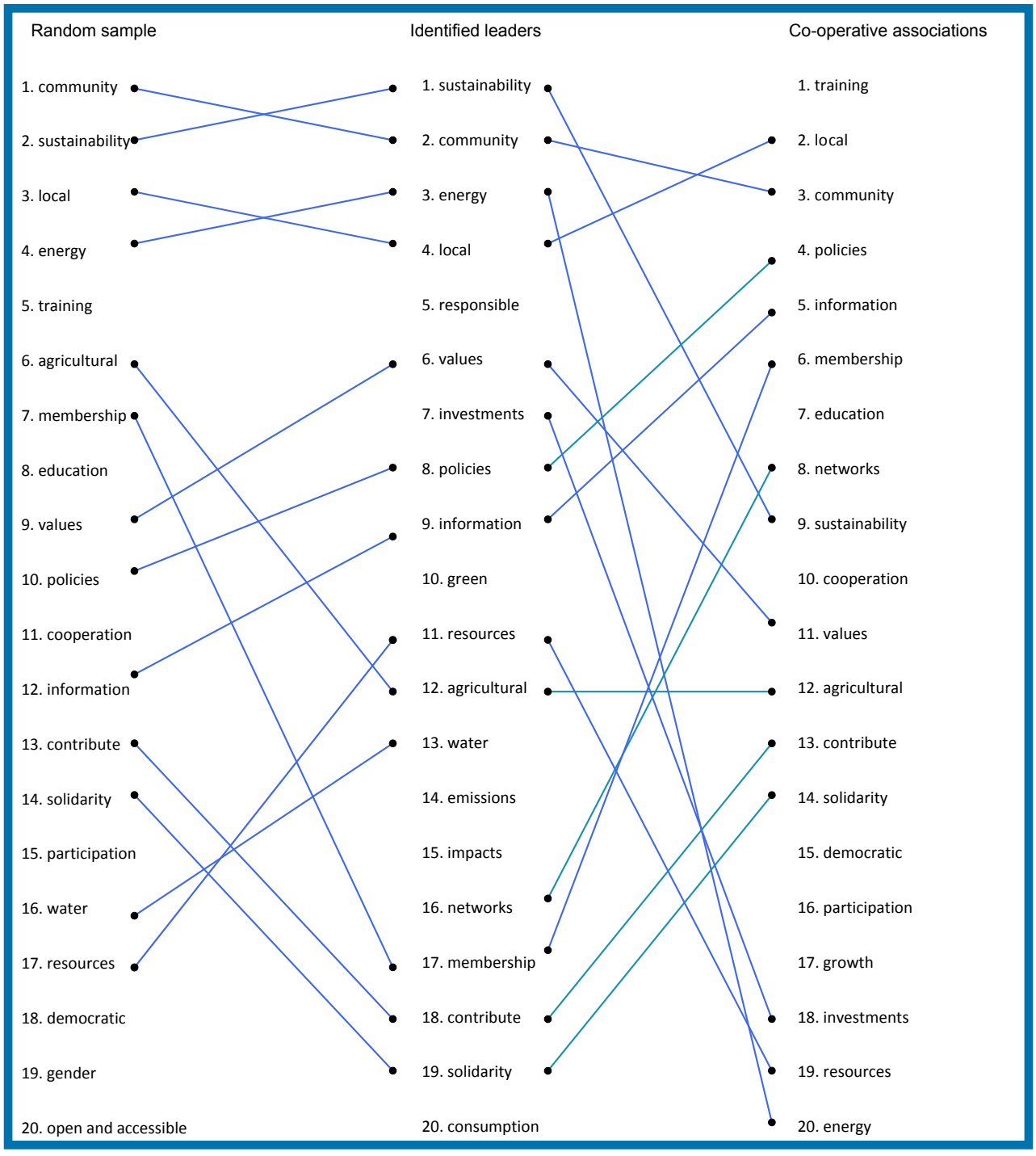


Figure 8: Top twenty sustainability concepts for each sample

Figure 9: Associations Sample

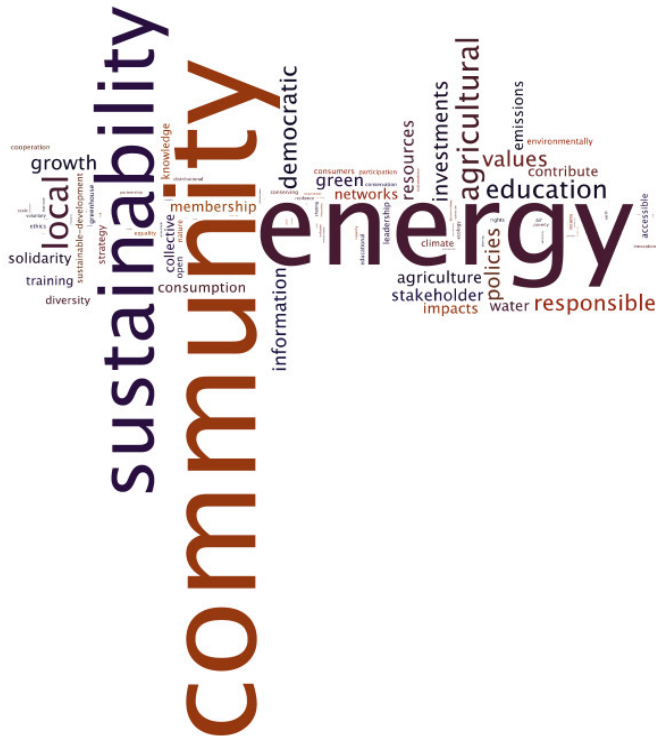


Figure 10: Leaders Sample

Figure 11: Random Sample

Do co-operatives 'walk their talk'?

In order to evaluate the degree to which co-operatives operationalize what they communicate on their webpages, we also collected annual reports for each of the co-operatives in the sample. Annual reports were not available for every co-operative. The premise of the analysis is that the annual reports provide a more accurate representation of the actual activities of the co-operative, whereas the websites are primarily communication vehicles.

Figures 12 to 14 illustrate the relative strength of the relationship between each of the co-operative principles, the economic and ecological literature and the websites and annual reports for each of the samples. The scale of the charts shows the relative relationship based on the occurrence of the concepts on the frequency curves. In essence, the closer to 1, the stronger the relationship, and any scores beyond 1 indicate a close relationship.
A stronger relationship between sustainability framework with the website text over the annual reports was found in all three samples. This finding may be in part because annual reports tend to be more focused on the business of the co-operative; therefore, de-emphasizing the discussion of the sustainability discourse relative to the websites. In the random sample, primarily the larger co-operatives had annual reports resulting in an increased relationship with the economic literature relative the website sample which also included smaller and medium-sized co-operatives.

One notable observation is what is not being communicated - in all three samples, principles 1, 2, 3 and 4 are not addressed in either the annual reports or on the websites. And the associations are weak on principles except 5 and 6.

Finding #3
Annual reports are not, in general, as focused on sustainability as co-operative websites.

Random sample

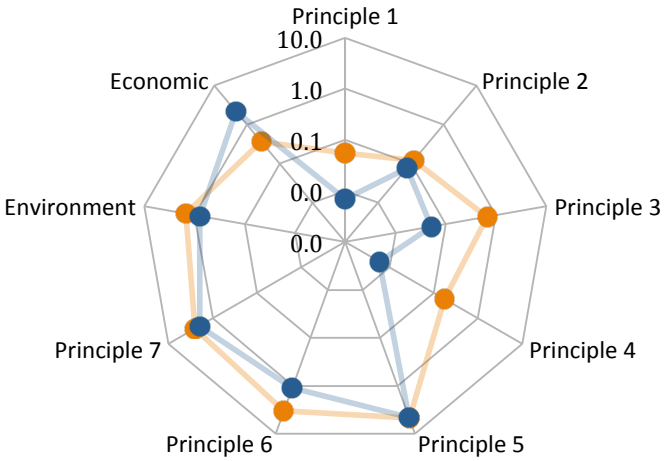


Figure 12: Random Sample

Leaders

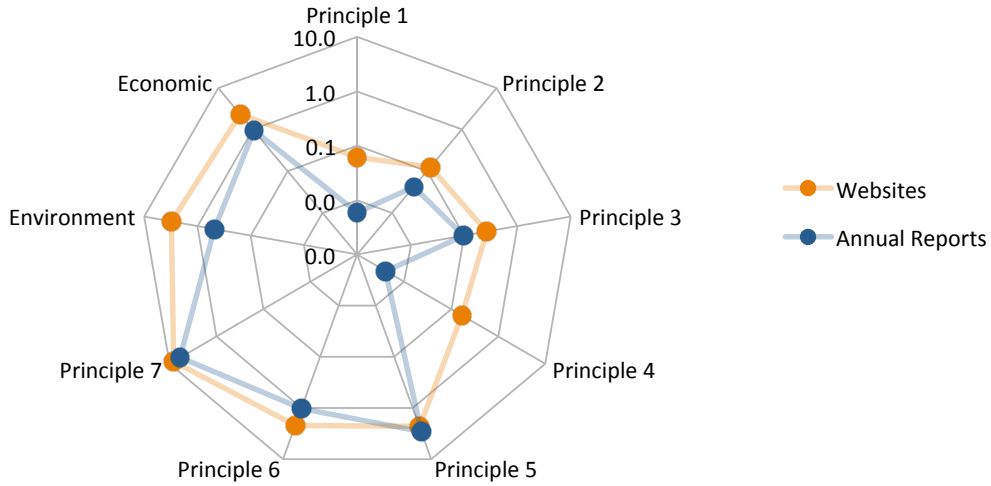


Figure 13: Leaders

Associations

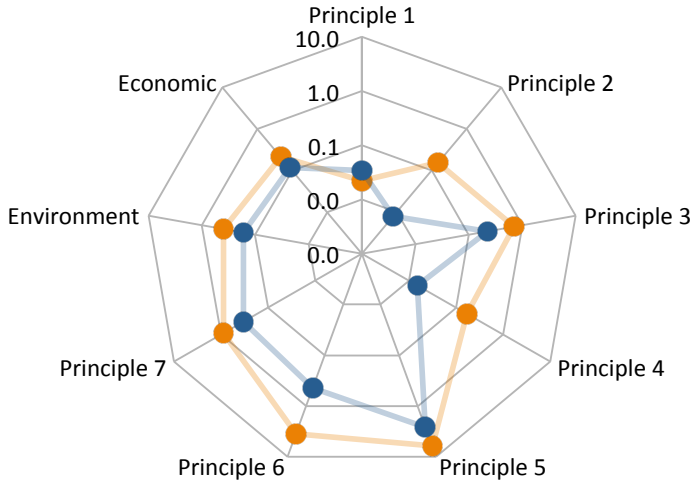


Figure 14: Associations

Seikatsu Club Consumers' Cooperative Japan

The Seikatsu Club Consumers' Cooperative (SCCC) of Japan is unique in its combination of formidable business and professional skills with strict social and ecological principles and a vision of a community- and people-centred economy.

SCCC traces its foundation back to 1965, when a Tokyo housewife organized 200 women to buy 300 bottles of milk. Since then, Seikatsu Club has expanded its buying club activities to include production, distribution, consumption and disposal, the environment, social services and politics. Seikatsu's goal is to create a new lifestyle that protects the environment and overall health of the Earth. By doing this, Seikatsu is dedicated to the environment, the empowerment of women and improvement of workers' conditions.

A catch phrase at Seikatsu is "safe food at reasonable prices". When the Club cannot find products of adequate quality to meet its ecological or social standards, it produces them itself, as it does with milk and soap. Much emphasis is placed on direct contact between producers and consumers to humanize the market, especially in the area of food production. In their campaigns against synthetic detergents, Club members realized the importance of the political process and formed independent networks in different prefectures to run in local elections. In 1979 the first network member was elected to Tokyo city government and in 2008 there were more than 141 Seikatsu Club members serving as local councillors.

Are leaders really leaders?

We answered this question by comparing the importance of concepts from the sustainability literature in the random sample and then in the identified leaders sample.

In the annual reports, the random sample and identified leaders showed similar relationships with Principles 6 and 7 and the economic and environmental literature (Figure 15). On the websites and in the annual reports, associations were significantly weaker than the random sample or identified co-operative leaders.

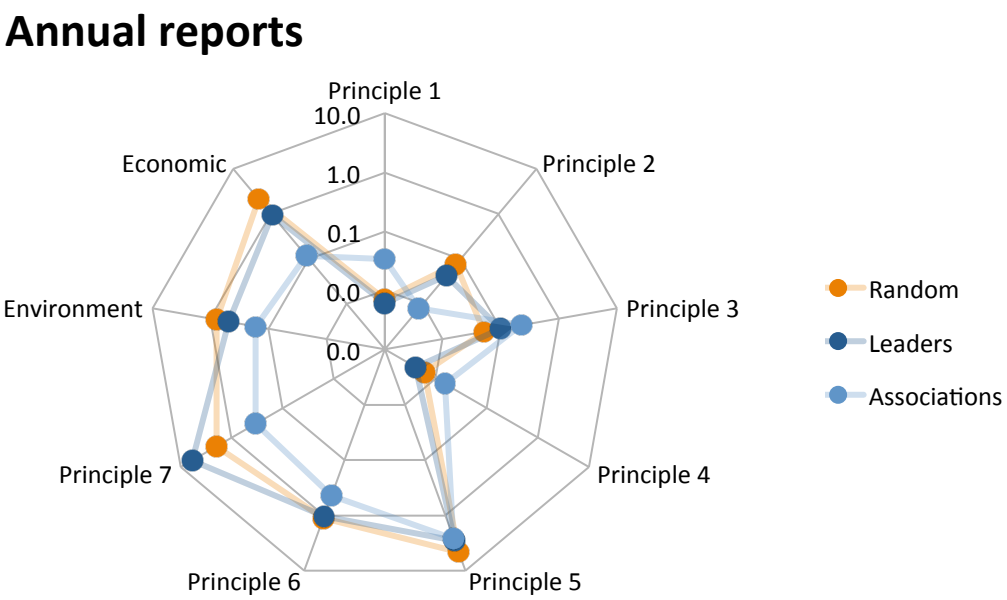


Figure 15: Reports of three samples compared

Finding #4

Co-operatives identified as leaders in sustainability demonstrate a significantly stronger relationship with the sustainability literature.

The identified leaders sample demonstrated a stronger relationship between Principle 7 and the economic and environmental literature than the random sample, as would be expected. Notably, the associations sample demonstrated a stronger relationship with Principles 5 and 6 than the other two samples (Figure 16).

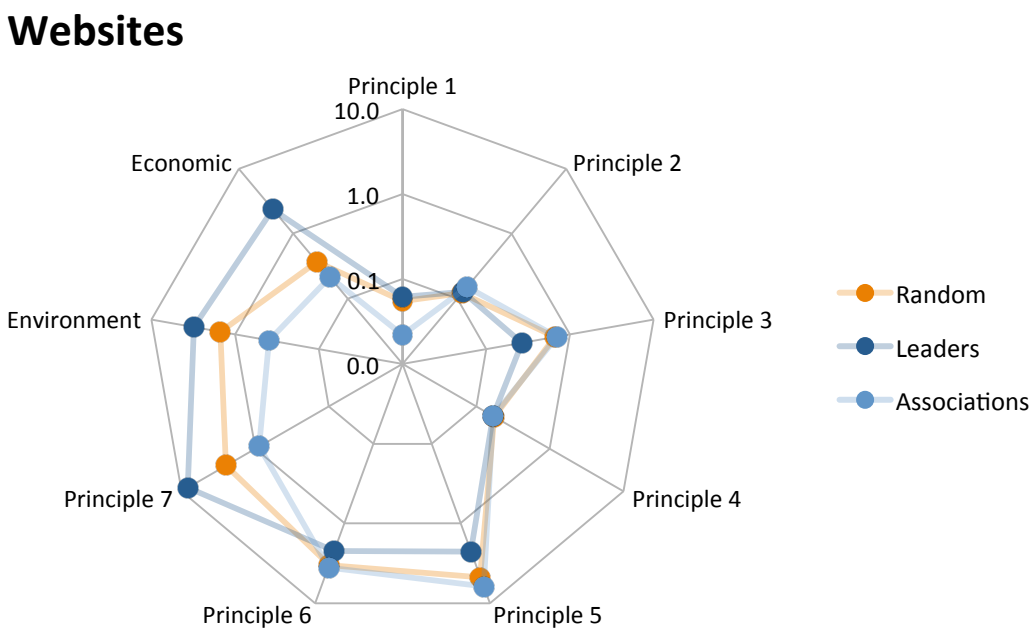


Figure 16: Websites of three samples compared

Finding #5
Co-operatives associations do not communicate a strong focus on sustainability.

Bringing it all together: the co-operative star

We investigated the relationship between co-operatives and nine aspects of sustainability: the seven principles serving as a proxy for the social dimensions of sustainability and the environmental and economic dimensions. When represented as eight equally distributed lines, they represent a star. The thickness of the line represents the strength of the relationship.

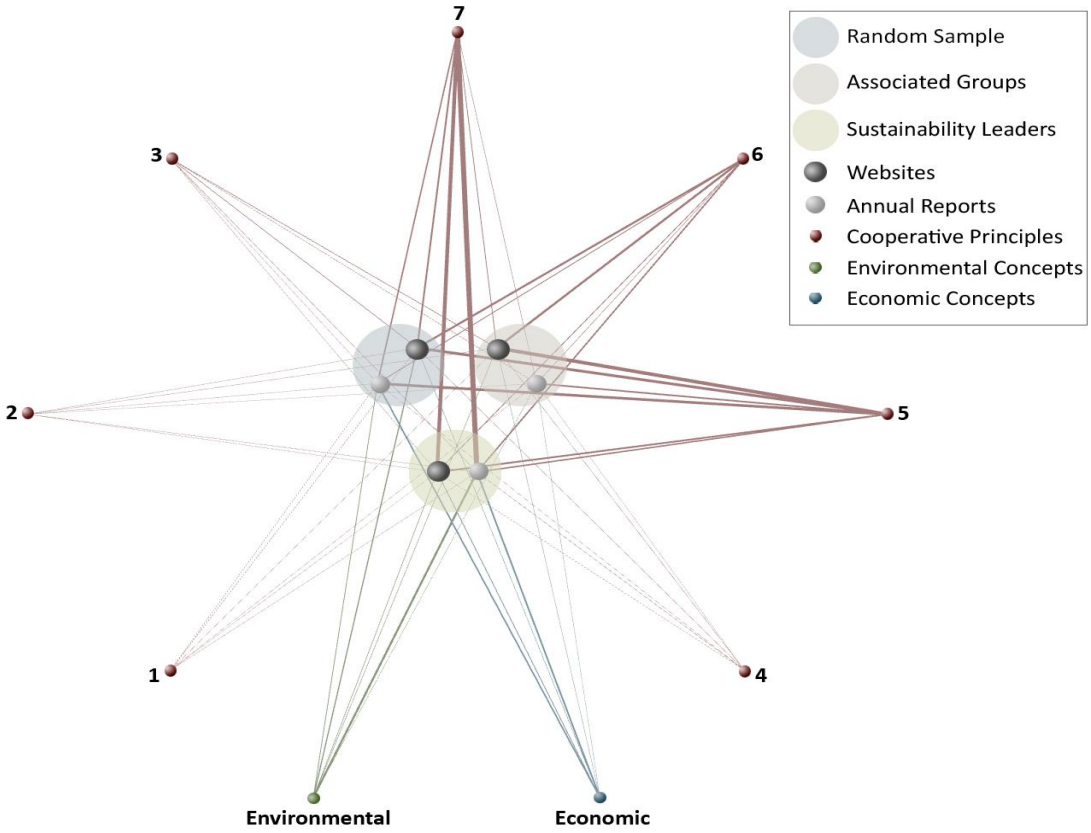


Figure 17: Co-operative star

Union Cab USA

Union Cab is a Worker Cooperative in Madison, USA. Since day one, they have operated as a democratic workplace with one member/one vote. Their mission statement is to create jobs at a living wage or better in a safe, humane, and democratic environment by providing quality transportation services in the greater Madison area.

For fiscal year 2012-13 Union Cab set themselves some sustainability goals. After conducting an environment audit they found out that their carbon footprint is 80% fleet, 12% people impact (training etc.) and 8% facilities. They set about to reduce those numbers through the development of a strategic plan design by the Green Team. Some highlights from their Sustainability Report include:

- Overall Fleet mpg improved 7.59 mpg - from 18.44 to 26.03 mpg - 29.4%;
- Madison Metro Commuter Choice Program - bus ridership increased 56%;
- MGE Green Power Tomorrow Program - 50% renewable energy purchase;
- MGE gas Therms improved 37% & electric KWH improved 2.5% over 2011; and
- Attained Green Master Status with Wisconsin Sustainable Business Council.

Looking to improve on these, Union Cab continues to implement the Natural Step strategies: to reduce reliance on fossil fuels and mineral resources, minimize chemical and unnatural substance use, and reduce encroachment on nature.

Crowdsourcing

Our analysis is relatively technical and academic; in order to ground this analysis in what co-operatives are actually doing on the ground, we drew on the "wisdom of the crowd" using an internet platform at www.sustainability.coop. The platform is a global map that allows any co-operative to submit a description outlining how their co-operative or co-operative project is contributing to sustainability. At time of writing this report, there were 67 examples posted from around the world, with more being added every day. This site will become a living and breathing evidence of the commitment of co-operatives to sustainability.

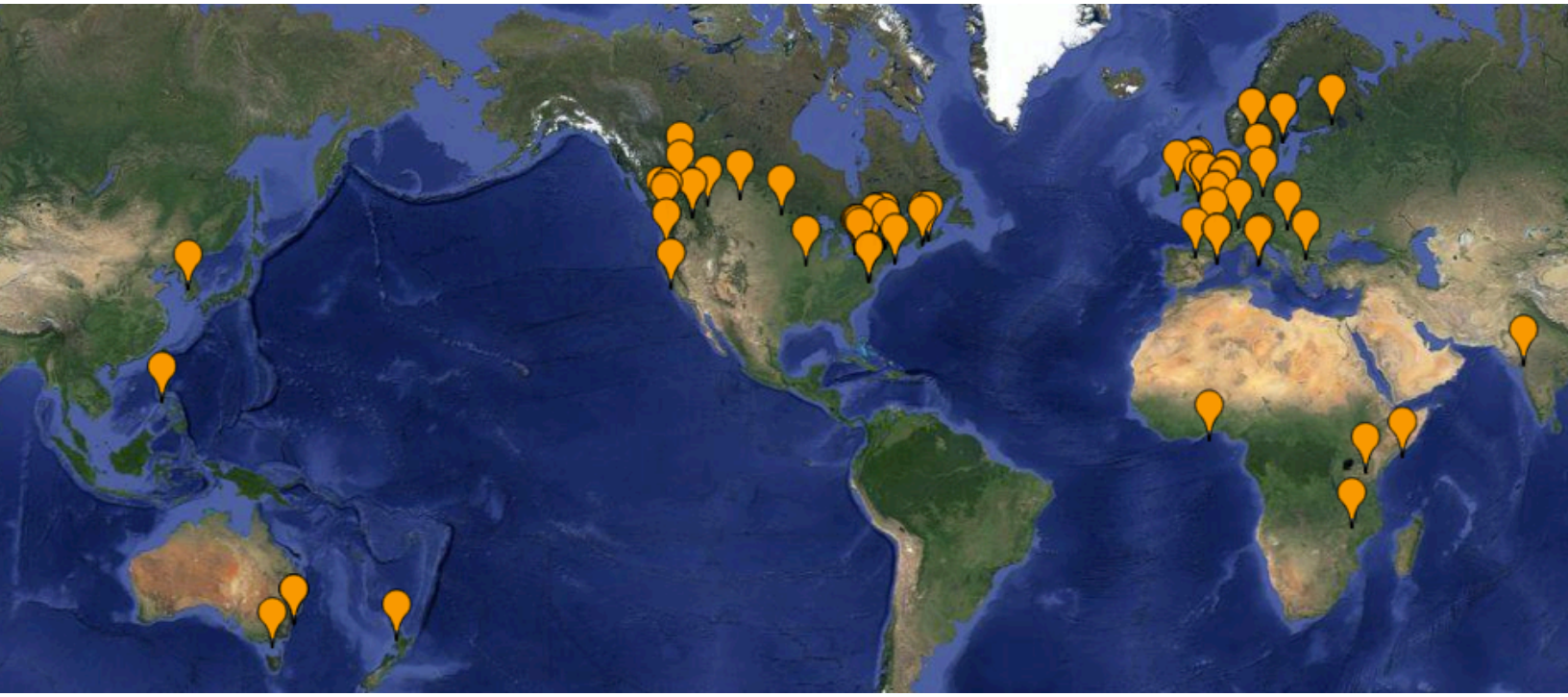


Figure 18: Crowdsourcing map

Observations

1. Co-operatives are involved in the social, economic and environmental dimensions of sustainability.
2. The co-operative principles are more closely aligned with the social dimensions of sustainability.
3. Similarly, co-operatives websites and annual reports (overall) most strongly related to social aspects of sustainability.
4. In communicating their efforts on sustainability, co-operatives understate their efforts on Principles 1, 2 and 3.
5. A co-operative is sustainable when it is an economically viable business that fully implements the seven co-operative principles, and maintains or regenerates the ecosystem in which they are embedded.
6. Co-operative associations lag behind co-operatives in advancing a comprehensive sustainability agenda.
7. Of the cooperative principles, concepts related to principle 5 (education, training, knowledge sharing), principle 6 (cooperation among cooperatives), and principle 7 (sustainable community development) were strongly communicated.
8. Cooperatives websites highlighted sustainability concepts, whereas in the annual reports, sustainability concepts were discussed in context with items (e.g., items relating business operations).

Figure 19: The definition of a sustainable co-operative

New Internationalist UK

New Internationalist (NI) is a not-for-profit worker co-operative that exists to report on the issues of world poverty and inequality; to focus attention on the unjust relationship between the powerful and powerless worldwide; to debate and campaign for the radical changes necessary to meet the basic needs of all; and to bring to life the people, the ideas and the action in the fight for global justice. Their principal activity is the production of a monthly magazine, books and other publications.

NI recognises that its operations have an effect on the local, regional and global environment; because of this, they aim to reduce the environmental impact of their business and to operate in a responsible manner. In the publishing business, paper is a heavily used resource. NI has reduced environmental impact by both reducing the volume of paper used and by printing publications on recycled paper. The volume of paper used in traditional marketing strategies involves the heavy use of catalogues, direct mail and leaflets. NI has switched from these methods and moved to methods such as meeting customers face-to-face and using telephone and electronic marketing. In addition, they strive to maximise the post-consumer content of recycled paper used, wherever possible. They have a policy to work with printing companies that hold an environmental management system certified to the internationally recognised ISO14001 standard.

Going forward

In the process of developing this analysis, we have identified opportunities for further investigation and strategic development.

1. How do co-operatives compare with investor-owned corporations? It would be possible to employ the same method to develop similar samples of investor-owned corporations and assess their relationship to sustainability, comparing the results with the co-operatives samples.
2. How do co-operatives actualize what they communicate? Detailed interviews of the co-operatives in the samples would enable us to compare what happens on the ground against what is described in the annual reports and in the websites.

> **As global attention focuses on the challenge of sustainable development, cooperatives can and must play a key role as creative enterprises expanding into new and innovative areas.**
>
> **Guy Ryder, Director General of the ILO.**
> **2013 statement on the International Day of Co-operatives titled: *Cooperatives can build socio-economic resilience during crises.***

The Project Team

Ann Dale is a professor at Royal Roads University and holds a Canada Research Chair in sustainable development at Royal Roads University. Her community research is both place-based and virtual, and she is recognized as a leader in on-line real-time dialogue and innovative research dissemination techniques. She chairs the Canadian Consortium for Sustainable Development Research (CCSDR), is a Fellow of the World Academy of Art and Science, a recipient of the 2009 Bissett Alumni Award for Distinctive Contributions to the Public Sector and received the 2001 Policy Initiative Award for Outstanding Research Contribution to Public Policy, and a Trudeau Alumna (2004). She recently won the 2013 Canada Council of the Arts Molson Prize for the Social Sciences. She has written extensively on governance for sustainable development, social capital, agency, integrated community planning, and has led over 50 deliberative e-Dialogues.

Chris Strashok is a sustainability expert focusing on local governance structures, social capital, sustainable community development, and modelling of complex systems. Chris has nine years of experience modelling complex and dynamic processes. In addition to this he has a strong background in client relations and has assisted clients of various levels of expertise in achieving effective use of modelling applications. Chris is also an expert in the role local monetary systems are playing as a tool for fostering community resilience and vitality by bringing the decisions that affect our communities back to the community level.

Fiona Duguid's thesis considered member involvement and learning through sustainable energy development using co-operatives. She worked for five years for the Co-operatives Secretariat for the Government of Canada where she was a Senior Policy and Research Analyst. Following this she worked at the Canadian Co-operative Association as a Research Officer. She has been a researcher on funded university/community projects. Currently she is the coordinator and researcher for the National Study on the Impact of Co-operatives (Canada). She is on the board of the Canadian Association for the Study of Co-operation and has been the program chair for the last two years. She has also volunteered with the Toronto Renewable Energy Co-operative on the Education Committee and is a founding member of Windshare Co-operative.

Melissa Garcia Lamarca has worked, researched and taught in issues related to organizational sustainability, urban politics and development and urban transformation for over a decade in Canada and internationally. In addition to being a founder and an associate of SSG, Melissa is currently a doctoral student in Human Geography at the University of Manchester's School of Environment and Development. She is a regular contributor to Polis, a collaborative blog on cities, with a team of over a dozen people around the world. Melissa is based in Barcelona.

Rob Newell has a keen interest in the communication of environmental trends and sustainability ideas. He works in the design, development and delivery of environmental education programs and is completing a graduate thesis on approaches to effective environmental communications. Rob's work includes developing environmental education programs for settlement agencies and project leading in Asia, Africa, and the South Pacific. Rob is involved in developing creative and interactive ways of disseminating Canada Research Chair on Sustainable Community Development research ideas including HEADTalks, the data and media aspects of the Community Vitality Project, exploring alternatives to constant economic growth, organizing and supporting e-Dialogues, and developing case studies.

Vancity Canada

Vancity Credit Union in Vancouver, Canada is leader in terms of sustainability. While the traditional banking model focuses on increasing profits for the benefit of shareholders, they have a vision to redefine wealth, which aims to make a positive impact in their members' lives and their communities. They are certified as a Living Wage Employer and a member of the Global Alliance for Banking on Values—a network of the world's leading sustainable financial institutions sharing the commitment to achieving triple-bottom-line impact through responsible banking practices.

An example of Vancity's ecological sustainability actions, in December 2012, Vancity purchased 5,253 tonnes of CO2 offsets. These offsets were purchased from Offsetters Clean Technology Inc. They included: 3,766 from biomass boiler installation in Chilliwack, BC, and 1,487 tonnes from the Great Bear Forest Carbon Project in BC, which generates emission reductions by protecting forest areas. Thus for the year 2011, the Vancity Group is claiming Carbon Neutrality. While there is no universally accepted definition of carbon neutrality, for Vancity, carbon neutrality is the result of an organization offsetting their greenhouse gas (GHG) emissions such that their net impact on the climate is neutral.

Peter Hough has been a developer of worker co-operatives in Canada for more than 30 years. Peter has been involved in major co-operative initiatives in Canada such as the development of a national co-operative investment fund, managing an investment fund for worker co-operatives and research projects such as Measuring the Co-operative Difference. Peter Hough also led the development of the Co-op Index, a tool that allows you to consider your co-op against the ideal co-op on a range of variables including operations and governance. Peter serves on the Board of Directors of SSG.

Petronella Tyson is currently building a model that evaluates the impacts of land-use decisions on health outcomes. Petronella has worked with a number of consultancies in the UK with clients that included a number of co-operatives. Petronella recently completed a Masters program in sustainability in Sweden.

Rebecca Foon is a versatile urban planner who is dedicated to integrating a holistic understanding of sustainability in growing healthy communities. She is an accomplished organizer and facilitator, survey and sustainability management systems creator, sustainability assessment leader, and green building consultant. Rebecca was the project manager on a broad-based sustainability strategy for Algonquin College, Western and McGill University and developed provincial surveys on sustainability in higher education (targeting students, faculty, administration and staff). Rebecca led the development of two case studies on adaptation in BC and was the LEED coordinator for Proment Development's new residential development, Le Vistal, achieving LEED gold in Montreal, Canada. Other major clients include Halton Hills, Discovery Channel, West Hants and BC Government.

Yuill Herbert has worked on sustainability consulting projects in the spheres of community planning, sustainability assessments and green buildings. Major projects include the development of an open source model to evaluate the climate change impacts of municipal plans, the development of a carbon neutral course for Cascadia Green Building Council and a sustainability assessment for Concordia University. Yuill has advised municipal, provincial and federal governments on policies related to sustainability and is active in sustainable development research. Major clients include the Co-operators Insurance Group, Canada Mortgage and Housing Corporation, Discovery Channel and Capital Regional District. Yuill serves as a director of the boards of the Canada Research Chair on Sustainable Community Development, the Canadian Worker Co-operative Federation, Tatamagouche Community Land Trust and the Canadian Co-operative Association.

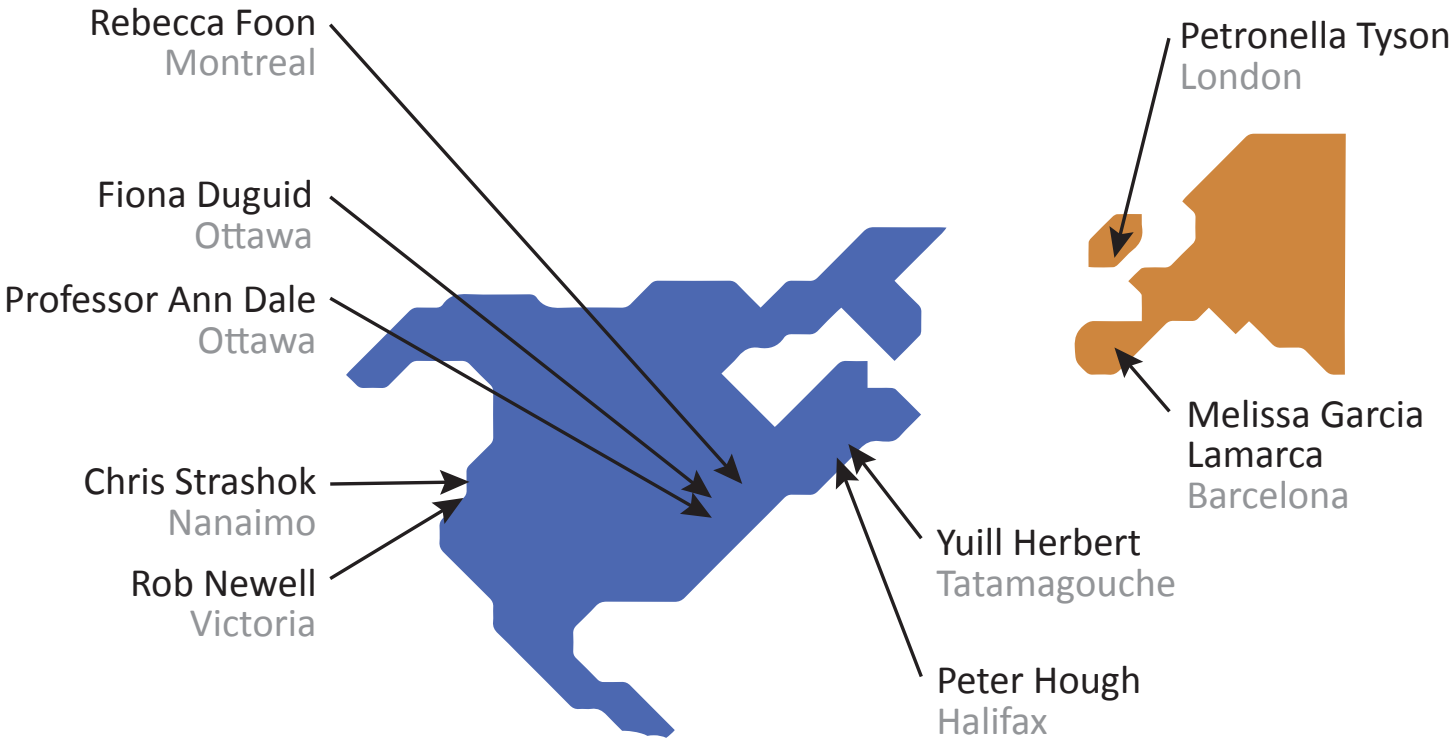
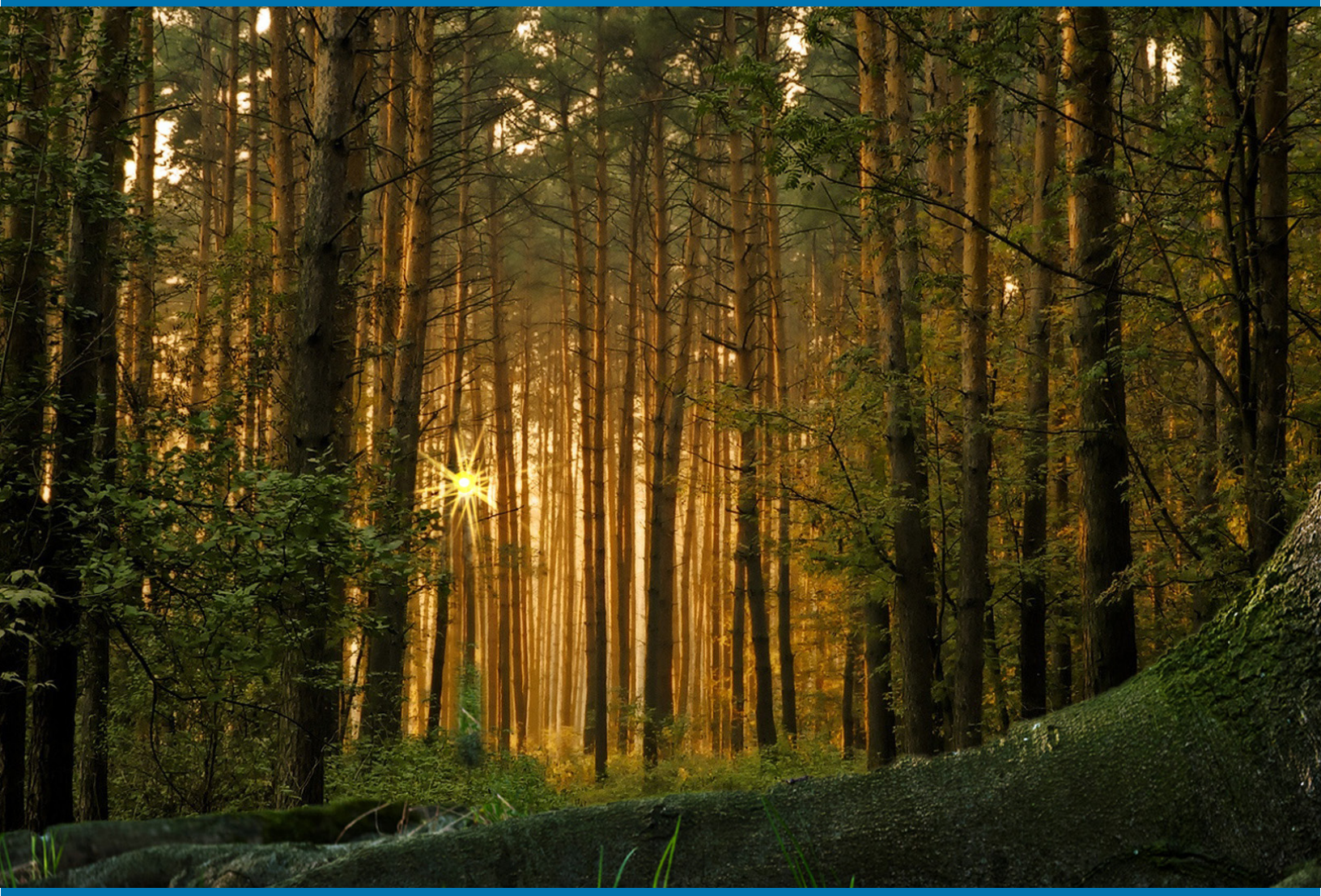


Figure 20: SSG's team



Appendix 1: Seminal Papers on Sustainability

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Appendix 2: Random Sample

African Confederation of Cooperative Savings & Credit	http://www.accosca.org/
Alpha Cooperative	http://www.alpha.coop/
Ankara Sugar Beet Co-operative	http://www.ankarapancar.com.tr/
Arbejdernes Landsbank	https://www.al-bank.dk/default.asp?id=13
Arctic Co-op	http://www.arcticco-op.com/index.htm
Asia Pro	http://asiapro.coop/
Austhorpe Primary School	http://www.austhorpe.leeds.sch.uk/homepage/index.php
Baltimore Bicycle Works	http://www.baltimorebicycleworks.com/
Beersheva Food Cooperative	http://advocacy.org.il/content/view/125/188/
Bellylove Catering Co-operative	http://www.bellylove.co.uk/
Berkeley Student Co-operative	http://www.bsc.coop/
BPCE	http://www.bpce.fr/en
Bukidnon Government Employees Multi Purpose Cooperative	http://www.sunstar.com.ph/cagayan-de-oro/business/2011/10/11/bukidnon-government-employees-multi-purpose-cooperative-184480
CABAL	http://www.cabal.com.uy/
Caisse Populaire Acadiennes	http://www.acadie.com/en/nous.cfm#.UhZaGpLVAb0
Caja Popular Mexicana	http://www.cpm.coop/
Capricorn	http://www.capricorn.coop/
CCOTTAJ	http://www.coottaj.noronet.com.ar/
Central Co-operative Bank	http://www.ccbank.bg/
Centrepoint Counselling Services Co-oeprative	http://centerpoint.coop/blog/index.php/about-us/our-story/
Channel Islands Co-operative	http://www.channelislands.coop/the-society/
Confiamos Cooperativa de la Guajira	http://www.confiamos.com.co/
Coopava	http://www.coopava.com.co/index.php/beneficiosservicios
Coopeacosta	http://www.coopeacosta.fi.cr/
COOPEBIS	http://www.coopebis.com/quienes_somos.htm
Coopegrecia RL	http://www.coopegrecia.fi.cr/gobierno_corporativo2.htm
Coopemedicos RI	http://www.coopemedicos.com/
Cooperativa de Ahorro y Credito Cajo Rural Nacional	http://www.caruna.com.ni/resena.html
Cooperativa Multiactiva de Detallistas de Bogota D.C. LTDA	http://www.cooratiendas.com/
Cooperativa Sagrada Familia	http://www.sagradafamilia.hn/quienes-somos/historia-de-la-cooperativa-sagrada-familia/
Co-operative Central Bank Ltd	https://www.op.fi/op/op-pohjola-gruppen?id=80000&srcpl=1&kielikoodi=sv
Cooperative Education and Rehabilitation of Maladjusted Children and Social Solidarity of the municipalities of Castro Verde and Ourique Almodovar	http://www.cercicoa.blogspot.ca/
COSAP Cooperamos contigo	http://www.cosap.com.uy/quienes_somos.html

CRECER	http://www.crecer.org.bo/index.php?mc=64#crecer
Crinabel Theatre	http://www.crinabelteatro.blogspot.ca/
DAI Consulting Architecture and Engineering	http://www.dai.dk/
Dorkambo Co-operative	http://www.dorkambo.com/index.php
Dumbier v.d.	http://www.dumbier.sk/
El Mirallet	http://www.elmirallet.cat/?page_id=2
Equidad Seguros	http://www.laequidadseguros.coop/
Farmlands	http://www.farmlands.co.nz/about-us.html
Federación Argentina de Cooperativas de Electricidad y Otros Servicios Públicos Limitada (FACE)	http://www.face.coop/es/asociados/cooperativas-asociadas-a-face/
Federacion de cooperativas de production del Uruguay	http://www.fcpu.coop/
Federation of Alberta Gas Co-operatives	http://www.fedgas.com/
Ferrograf	http://www.ferrograf-ctl.com.ar/
Financiar	http://www.financiar.com.co/
Frie Bornehoaver og Fritidsheim	http://www.frie.dk/
FUCAC	http://www.fucac.com.uy/index_1.html
Gaia Host Collective	http://www.gaiahost.coop/
Galeati Industrie Grafiche	http://www.galeati.it/storia.html
Granoften Hotel	http://www.hotel-grantoften.dk/
Handmade Bakery	http://www.thehandmadebakery.coop/about
Henderson Community Co-op	http://www.hendersonville.coop/Home
Hobest	http://www.hobest.es/
Design Action Co-operative	http://designaction.org/
Incipe	https://incipe.ca/
Indian Farmers Fertilizers Co-operative	http://www.iffco.nic.in/ifc/web.nsf/vwleftlinks/About
Juratri	http://www.juratri.fr/
Kagera Co-operative Union	http://www.kcutz.org/
Karagwe Coffee	http://www.kdcucoffee.com/index.htm
Karnataka Co-operative Milk Producers' Federation	http://kmfnandini.coop/
Kastamonu Pancar Kooperatifi	http://www.kastamonupancar.com/index.php?option=com_content&task=view&id=30&Itemid=56
Kilimanjaro Native Cooperative Union	http://www.kncutanzania.com/
Korean Agricultural Trading Co-operative	http://www.nonghyup.com/Eng/NACF/Current/Commitment/Index.aspx
Le Theatre	http://www.theatre-macon.com/2013-2014/
Mediatrans	http://www.mediatrans.es/EN/empresa.htm
Medicopp	http://www.medicoop.com.do/site/
Murray Goulburn Co-operative	http://www.mgc.com.au/index.php/about-us/about-murray-goulburn-co-operative
National Cooperative Consumers' Federation on India	http://nccf-india.com/aboutus.asp

National Cooperative Housing Federation of India	http://www.nchfindia.net/aboutus.html
National Cooperative Housing Union (Kenya)	http://nachu.or.ke/about-us/
National Cooperative Insurance Society of Nigeria	http://www.coopinsuranceng.com/nciswebportal/default.asp
National University of Singapore Bookstore	http://coop.nus.edu.sg/about_us/index.htm
Ngāti Pāhauwera	http://ngatipahauwera.co.nz/
Okrasa	http://www.okrasa.sk/sk/cl/2/historia-spolocnosti-okrasa.html
Oneota COmmunity Food Coop	http://www.oneotacoop.com/about-the-coop/
Oromia Coffee Farmers Co-operative Union	http://www.oromiacoffeeunion.org/aboutUs.php
People Tree	http://www.peopletree.co.uk/about-us
People's Food Co-op	http://www.pfc.coop/
Peri-Urban Agriculture Co-op	http://www.puac.info/index.php?option=com_content&view=article&id=100&Itemid=103
Pishgaman group	http://www.pishgaman.com/?l=EN
Pompes Japy	http://www.pompes-japy.com/
Primary Wool Co-operative	http://primarywool.co.nz/
RESEAU	http://www.reseau.coop/publications/
Scotsburn Dairy Co-operative	http://www.scotsburn.com/
Sekem	http://www.sekem.com/
Social Talent Work Centre	http://www.socialtalentworkcenter.org/
Socorro Empowered People's Co-operative	http://www.soemco.coop/soemco-history
Sorosoro Ibaba Development Cooperative (SIDC)	http://www.sidc-coop.com/about-sidc
Tanda Dairy Co-operative Union	http://www.agro-info.net/?menu=organisations&view=organisation&organisation_id=15821&tab=organisational%20data
Tanzania Tobacco Co-operative Apex	http://ttcapex.coop/
Tele - Taxi Cooperative Taxi Driver and American Region	http://www.cooperativateletaxi.com.br/home.
The Energy Saving Co-operative	https://www.energysaving.coop/
The Hotel in Pipinas	http://www.pipinas.com/pagesen/inicio.htm
The Norinchukin Bank	http://www.nochubank.or.jp/en/
The Plumber Company	http://www.blikkenslagerne.dk/
Travolcas	http://www.travolcas.com/entrada11.htm
TRC Multi-Purpose Co-operative Society	http://www.trccoop.org.sg/index.asp
Woodcraft Folk	http://woodcraft.org.uk/
Woodland Burial Trust	http://www.woodlandburialtrust.org.uk/
Zdruzena	http://www.zdruzena.sk/
Zenkyoren (National Mutual Insurance Federation of Agricultural Cooperatives)	http://www.ja-kyosai.or.jp/about/annual/index_e.html
ZENROSAI	http://www.zenrosai.coop/english/

Appendix 3: Leaders Sample

Affinity Credit Union	http://www.affinitycu.ca/
Al Tekio	http://www.altekio.es/
Alfalfa House	http://www.alfalfatest.org/
Altromercato	http://www.altromercato.it/
Alvardo St Bakery	http://www.alvaradostreetbakery.com/
Assiniboine Credit Union	http://www.assiniboine.mb.ca/
Banca Etica	http://www.bancaetica.it/
bankmecu	http://www.bankmecu.com.au/
Baywa Group	http://www.baywa.com/
Baywind	http://www.baywind.co.uk/
Biomass Energy Coop	http://www.biomassenergy.coop/
BPCE	http://www.bpce.fr/
Brasserie	http://www.brasseriedelalesse.be/
CACPECO	http://www.cacpeco.com/
Caisse d'Economie Solidaire	http://www.caissesolidaire.coop/
Chickenshack	http://www.chickenshack.co.uk/
CIC Insurance Group	http://cic.co.ke/
CONO Cheesemakers	http://www.cono.nl/
Consum	http://www.consum.es/
Consum	http://www.consum.es/
Coomeva	http://www.coomeva.com.co/
Coop	http://www.coop.ch/
Coop	https://www.coop.se/
Cooperatif Terrana	http://www.terrena.fr/
Cooperativa Manduvira	http://manduvira.com/
Cooperativa Obrera	http://www.cooperativaobrera.coop/
Cooperative Bank of Kenya	http://www.co-opbank.co.ke/
Cooperators	http://cooperators.ca/
Coopkracht	http://www.coopkracht.org/
COOTRAMED	http://www.cootramed.com.co/
Credal	http://www.credal.be/
Credit cooperatif	http://www.credit-cooperatif.coop/
Cultura bank	https://www.cultura.no/
De Windvogel	http://www.windvogel.nl/
Desjardins	http://www.desjardins.com/
Dulas	http://www.dulas.org.uk/
DZ Bank	http://www.sustainability.dzbank.com/en
Earthworker Cooperative	http://earthworkercooperative.com/
Ecology building society	http://www.ecology.co.uk/
Ecopower cvba	http://www.ecopower.be/
Ekobanken	http://www.ekobanken.se
Enercoop	http://www.enercoop.fr/
Equal Exchange	http://equalexchange.coop/
Evergreen coop	http://evergreencooperatives.com/

Fintea Growers Cooperative	http://fintea.co.ke/
First Alternative Natural Foods Coop	http://firstalt.coop/
Footprint workers cooperative	http://www.footprinters.co.uk/
Friesland Campina	http://www.frieslandcampina.com/
Frigot Verte	http://www.lefrigovert.com/
FUCAC	http://www.fucac.com.uy/
Githunguri Dairy Farmers	http://www.fresha.co.ke/about-us/githunguri-dairy-farmers-cooperative/
GLS Bank	https://www.gls.de/privatkunden/english-portrait/
Hamrothaili	http://hamrothaili.com.np/
Hashøj Biogas	http://www.hashoejbiogas.dk/
iCoop Korea	http://www.icoopkorea.coop/
IFFCO	http://www.iffco.nic.in/IFC/web.nsf
Kalamazoo	http://www.kalamazoo.coop/
Kauai Island Utility Cooperative	http://website.kiuc.coop/
Kootney Coop	http://www.kootenay.coop/
La Mauve	http://www.lamauve.com/
Lantmännen	http://lantmannen.se/
Maison Verte	http://www.cooplamaisonverte.com/
Malawi Union of Savings and Credit Cooperatives	http://www.muscco.org/
Merkur Cooperative Bank	https://www.merkur.dk/Default.aspx?alias=www.merkur.dk/uk
Migros	http://www.migros.ch/
Mountain Equipment Cooperative	http://www.mec.ca/
Murray Goulburn Cooperative	http://www.mgc.com.au/
New Internationalist	http://newint.org/
Nutrinor	http://www.nutrinor.com/
Oekogeno	http://www.oekogeno.de/
Oiko Credit	http://www.oikocredit.coop/
Organic meadow	http://organicmeadow.com/
Organic valley	http://www.organicvalley.coop/
Oromia Coffee Farmers Cooperative Union	http://www.oromiacoffeeunion.org/
Planet X Housing Cooperative	http://planetxnsw.wordpress.com/
PRODECOOP	http://www.prodecoop.com/
Rabobank Group	https://www.rabobank.com
REI	http://www.rei.com/
Reverse Garbage	http://reversegarbage.org.au/
Rewe Group	http://www.rewe-group.com/
Royal Cosun	http://www.cosun.com/
RZB	http://www.rzb.at/
Sanford Housing Co-op	http://www.sanfordcoop.org/
SEAS NVE	http://www.seas-nve.dk/
Seikatsu Club Consumers' Cooperative	http://www.seikatsuclub.coop/
Shirika Sacco Society	http://shirikasacco.co.ke/

Som energia	http://www.somenergia.coop/
SUMA	http://www.suma.coop/
Sustainable South Osborne Community Cooperatives	http://sustainablesouthosborne.com/
Tapiola	http://www.lahitapiola.fi/
The Cheese Board Collective	http://cheeseboardcollective.coop/
The Cooperative Group	http://www.co-operative.coop/
The Greenery	http://en.thegreenery.com/
The Wedge Natural Foods Coop	http://www.wedge.coop/
Thrivent Financial	https://www.thrivent.com
Unimed	http://www.unimed.coop.br/
Union Cab	http://www.unioncab.com/
URBED	http://www.urbed.coop/
Vancity	https://www.vancity.com/

Appendix 4: Associations

ACCOSCA	http://www.woccu.org/
ACDI/VOCA	http://www.nasco.coop/about
AGCI (Italy)	http://www.uniontpk.com/index.php?MhObg5KvQxG7QBWbUFezUFSXQ9Wzg5SPE9eTQlK-MdmPg5mH
ASCOOP	http://www.ascoop.coop/
Asociacion Colombiana de Cooperativas	http://www.confecoop.coop/
Baniyas Co-operative (UAE)	http://www.ccsmyanmar.com/ccs.htm#background
Brasil Cooperativo	http://www.brasilcooperativo.coop.br/
BVR	http://www.bvr.de/
Canadian Cooperative Association	http://www.coopscanada.coop/
Canadian Worker Cooperative Federation	http://www.canadianworker.coop/
CECODHAS Housing Europe	http://www.housingeurope.eu/
Central Co-operative Society (Mynamar)	http://www.ncfnepal.com.np/about%20NCF.html
CFI	http://www.cfi.it/
CICOPA	http://www.cicopa.coop/
Coceta	http://coceta.coop/
Confecoop	http://www.confecoop.coop/
Confederación de Cooperativas de Colombia (CONFECOOP)	http://www.face.coop/es/
Confederación Uruguaya de Entidades Cooperativas (CUDECOOP)	http://www.fecoopse.com/
Co-op	http://jccu.coop/
Coop Product Slovenso	http://www.uk.coop/
Co-operative party (UK)	http://www.legacoop.it/
Co-operatives Australia	http://www.creditunion.ie/
Cooperatives de Treball de Catalunya	http://www.fevecta.coop/
Cooperatives UK	http://www.uk.coop/
Coops UK	http://www.cooperativestreball.coop/
CUNA	http://www.cuna.org/
Dot Coop Directory	http://www.organiclife.co.il/
DRV	http://www.raiffeisen.de/
European Association of Co-operative Banks	http://www.eacb.coop/
Federación Argentina de Cooperativas de Electricidad y Otros Servicios Públicos Limitada (FACE)	http://www.kooperationen.dk/
Federacion de Asociaciones Cooperativas de Ahorro y Crédito R.L., (FECOOPSE R.L.)	http://www.ascoop.coop/
Fédération Belge des Coopératives (FEBECOOP)	http://www.usworker.coop/about
FEECOOTRA	http://www.fecootra.org.ar/
GDW	http://web.gdw.de/

Ghana Cooperative Credit Unions association	http://baniyascoop.ae/site/index.php
Global Communities	http://www.acdivoca.org/site/ID/Vision
Irish League of Credit Unions	http://www.party.coop/
Japan Labour Bank	http://all.rokin.or.jp/
Japan Workers Cooperative Union	http://english.roukyou.gr.jp/
Kooperationen	http://www.uniontpk.com/
La Faîtière des Caisses d'Epargne et de Crédit Agricole Mutuel du Bénin (FECECAM- BENIN)	http://www.australia.coop/ca/
Lega Coop	http://www.agci.it/
Legacoop	http://www.ancpl.legacoop.it/
Les Scop	http://www.les-scop-bfc.coop/
Maltese Coops	http://www.fenacerci.pt/
MG Community Credit Cooperatives	https://www.kfcc.co.kr/
NASCO	http://www.accosca.org/
National Confederation of Co-operatives (NATCCO)	http://www.nz.coop/
National Co-operative Federation of Nepal	http://www.fececam.org/
National Cooperative Grocers Association (NCGA)	http://www.cudecoop.coop/index2.php?controlador=noticia&accion=verSeccion&seccion=184
National Federation of Coops of Social Solidarity	http://www.cpscoop.sk/
National Mutual Federation of Agricultural Cooperatives	http://www.ja-kyosai.or.jp/
National Union of Worker Producer Co-operatives (Bulgaria)	http://www.febecoop.be/
NCBA	http://www.eacb.coop/
New Zealand Cooperatives Association Inc.	
Organic life	http://www.zinahco.co.zw/
Rescoop	http://www.rescoop.eu/rescoop-map
Tanzania Federation of Co-operatives Ltd. (TFC)	http://www.ushirika.coop/
Trabajo cooperativo	http://www.fcpu.coop/
Union of Sugar Beet Growers' Production Co-operative (Pankobirlik)	https://www.ncga.coop/
Union TPK	http://cooperatives-malta.coop/
US Federation of Worker Cooperatives	http://www.usworker.coop/
US WOrker Co-operative Federation	http://www.globalcommunities.org/aboutus
WOCCU	http://www.natcco.coop/
Zenrossi	http://www.zenrosai.coop/
ZGV	http://www.mittelstandsverbund.de/
Zimbabwe National Association of Housing Co-operatives (ZINAHCO)	http://www.ncba.coop/

Appendix 5: Sustainability Terms

Co-operatives Principle 1	Co-operatives Principle 2	Co-operatives Principle 3	Co-operatives Principle 4	Co-operatives Principle 5	Co-operatives Principle 6	Co-operatives Principle 7
voluntary	democratic	equitable	independence	education	cooperation	sustainable development
open (accessible)	decision making	participation	democratic	training	working together	community
discrimination	accountable	membership	autonomy	information	coordination	policies
gender	equality	contribute	self-governance	public (informing and outreach)	partnership	sustainability (with sustainable)
accessibility	rights	inclusive	sovereignty	youth	levels (of government)	values
inclusive	self-governance	sharing		leader (and leadership)	networks	
social diversity	social justice	stakeholder		knowledge	collaboration	
transparent	empowerment	engagement			connection	

Ecological	
resources (renewable)	agriculture
adapts	privatization
environmentally	pollution
energy	challenging
ecology	patterns
nature	collective
commons	capital
community	feedback
conserving	equilibrium
environments	biodiversity
complex	vulnerable
scale	indigenous
ecosystems	severity
resilient	green
waters	air
growth	risks
cycle	extinction
forests	distributional
fishery	credibility
dynamics	trajectories
limits	collapse
diversity	conflicts
capacity	earth
lands (use, resource)	planning
species	local
evolution	science

Economic	
growth	alternatives
climate	agricultural
globalization	entrepreneurs
corporations	poverty
resources	stakeholders
managing	educational
responsible	renewal
investors	transition
income	consumption
impacts	degraded
diversity	mitigation
scale	rights (human)
emissions	soil
complex	qualitative
energy	uncertainty
measuring	atmospheric
consumers	eco-labelling
transforming	greenhouse
goods (public)	optimality
investments	eco-effeciency
ethics	socio-economic
conservation	innovation
limits	strategy
knowledge	
resilience	
efficiency	

Appendix 6: Preliminary analysis

SUSTAINABLE COMMUNITY DEVELOPMENT AND THE SEVEN PRINCIPLES OF COOPERATIVES

A Preliminary Analysis

Prepared by

Robert Newell
Research Associate
Community Research Connections
August 15, 2013

Background and Context

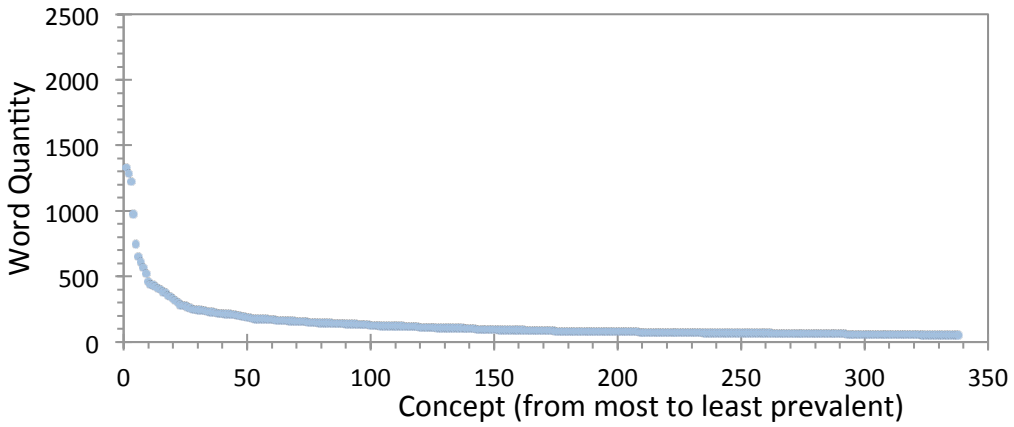
The following document details the results of an analysis that compares the seven cooperatives principles, **as defined by the International Cooperatives Alliance (ICA)**, to a comprehensive collection of academic literature on sustainable development. The purpose of the analysis is to see how closely the cooperatives principles relate to ideas and research on sustainability and sustainable development. The outcome of this analysis will guide research that will be conducted through a partnership between the **Sustainability Solutions Group** and the **Community Research Connections** program, involving an investigation into whether the cooperative model inherently lends to sustainable development.

Methodology used in this analysis was developed by Community Research Connections specifically for this research; however, both the methodology and results from analysis have potential applications to other research efforts. The purpose of this document is to describe how the analysis was conducted and to provide results of the analysis.

Methods

The initial step in the analysis consisted of distilling a list of terms from the compiled sustainability literature by conducting queries using NVivo software to determine which terms and ideas characterize (i.e., are emphasized in) the research literature. The compiled sustainability literature was categorized into three groups, dependant on the dimension of sustainability to which they specifically pertained, i.e., social, economic, and ecological; therefore, four lists of terms were generated – one for the whole set of literature and one for each of the three groups of literature. Terms searches were quality-controlled and manually filtered to ensure that lists of only terms that are meaningful as concepts or ideas remained. To clarify, certain terms were removed such as numbers, proper names (used for in-text citations), prepositions, verbs that have only grammatical purpose, etc. In addition, related words and derivations of words (i.e., 'sustainable' and 'sustainability') were grouped together as under a singular term, as they express the same concept.

Numbers of times terms appeared in the text were plotted on a Cartesian plane as a scatterplot. Each term was designated a number and arranged along the x-axis according to the number of times they appeared in the text, from highest to lowest. The specific number of times a term appeared in the text (i.e., term count) was plotted on the y-axis. The resultant plots appear as follows.

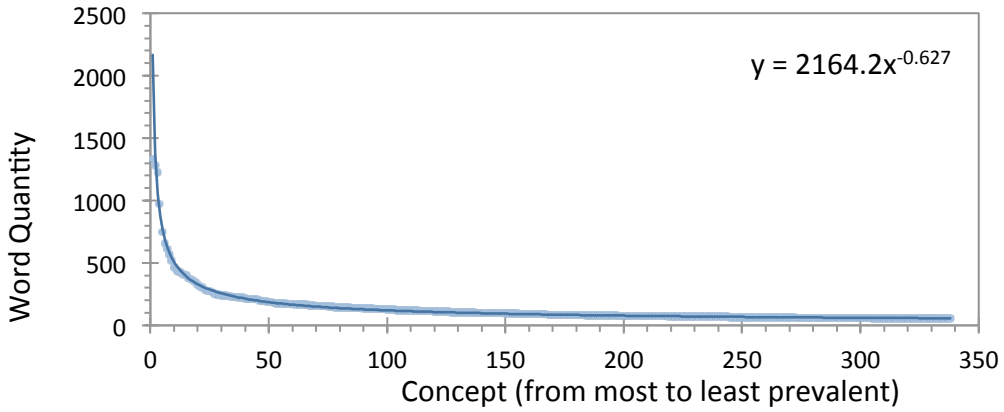


Once the terms were plotted, a curve was fitted to the plot to determine trends in term frequency. The resultant 'term frequency curve' typically took the form of a negative power curve, i.e., $y=ax^{-b}$, because prevalent and emphasized terms in text are used disproportionately more than infrequently used terms. When doing an analysis using this methodology, the analyst can expect to 'best-fit' the term frequency curves with negative power curves.

Term frequency curves display the most prevalent terms, i.e., those that are highlighted and focused in the text, to the left of the curve. A steep drop in term frequency initially occurs as the curve travels from the most frequent term to the less frequent terms, and then the curve gradually levels as it reaches the terms that appear

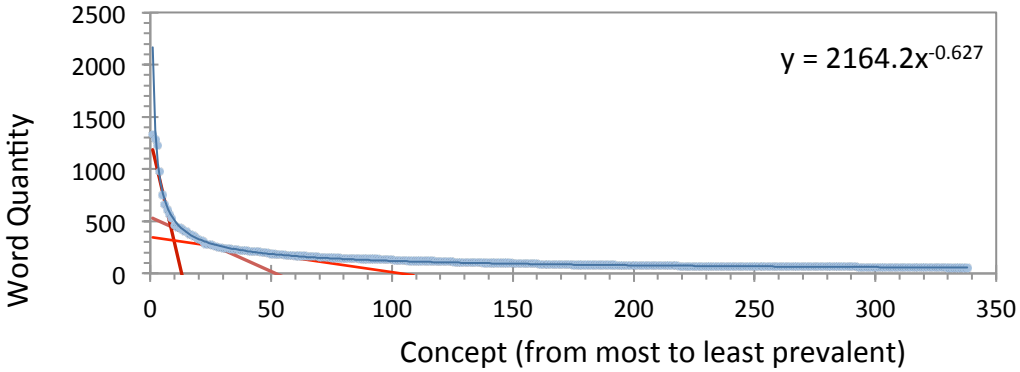
infrequently in the text. The level portion of the curve represents words that are not particularly emphasized or highlighted in the text. This portion of the curve is level as these words hold the same or similar word count to many other words found in the text.

The figure below displays a word frequency plot fitted with a negative power curve. The equation of the best-fit curve is displayed in the top right of the figure.



As mentioned above, terms to the left of the curve represent concepts that are more prevalent and highlighted in the literature. Therefore, terms on the steeper portion of a term frequency curve are the terms of interest in this analysis. Determining where a term lies on the frequency curve, thus, is best calculated by looking at where the term is relative to the curve's steepness. This was done by calculating rates of change for the curve by obtaining the derivative of the curve's equation. With the derivative equation, tangential slopes (represented by the red lines in figure below) can be calculated for any given point of the curve, allowing an analyst to determine where term would lie on a curve relative to the curve's steepness. Through this approach, terms can be analyzed in a *comparative* context, i.e., seeing how prevalent and highlighted they in a body of text rather than simply how many times they appear in the text.

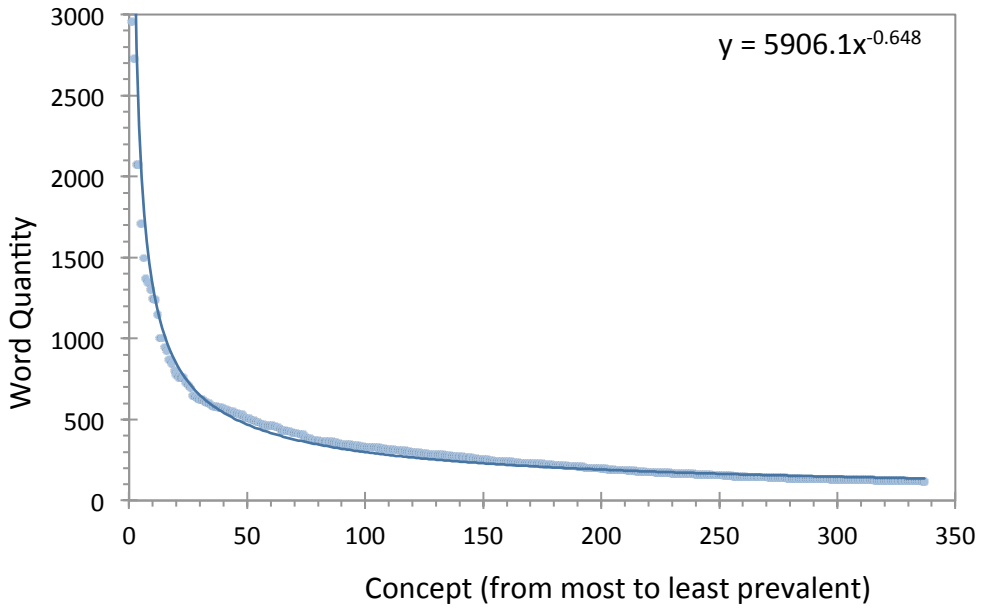
Slope values were used in this analysis as a measure for examining how prevalent terms and ideas from the cooperatives principles are in the sustainability literature. This was done by distilling terms and ideas from the cooperatives principles, using NVivo to search these terms in the sustainability literature, and then calculating the corresponding slope value from the search results. Since the word frequency trends follow negative power curve, calculated tangential slopes were all negative; however, absolute values were used when displaying the results in the table below as positive integers make for clearer analysis. Any term with a corresponding slope of 1 and above can be considered a term of interest because, below a rate of change of one-for-one (i.e., where tangential slope = 1), terms can no longer be considered to have (on average) a unique word count. Concisely stated, the higher the slope, the more emphasis a term has received in the text.



Term Frequency Curves

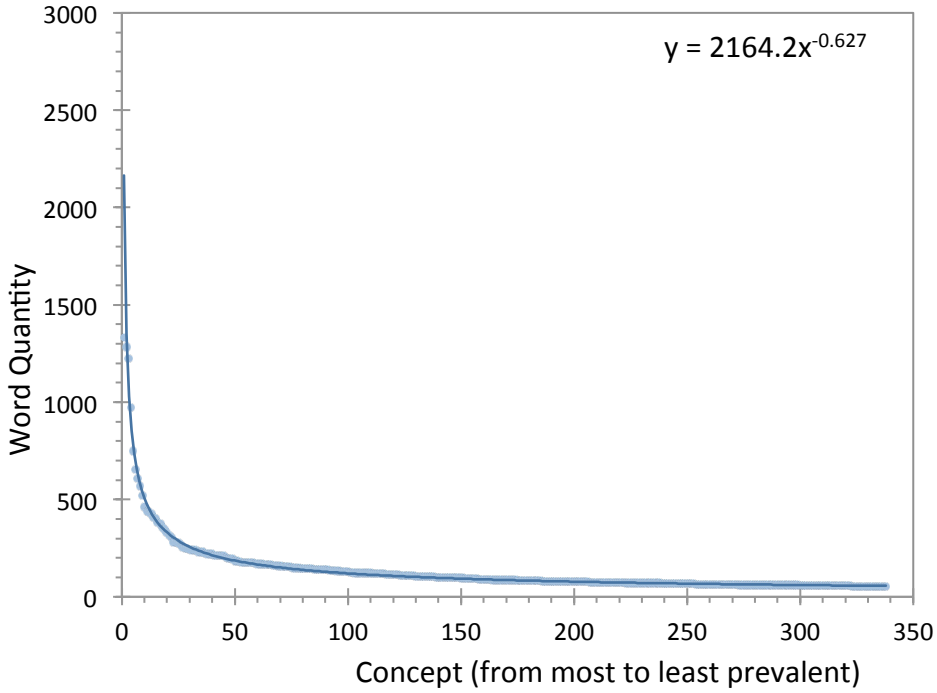
The following four graphs display term frequency curves calculated for this analysis – one for all the compiled literature, and one for each of the groupings of the literature pertaining to a respective dimension of sustainability, i.e., social, ecological, and economic. Equations for the best-fit curves are displaying in the top-right of each of the graphs.

Sustainability (i.e., all papers) Literature Term Frequency Curve



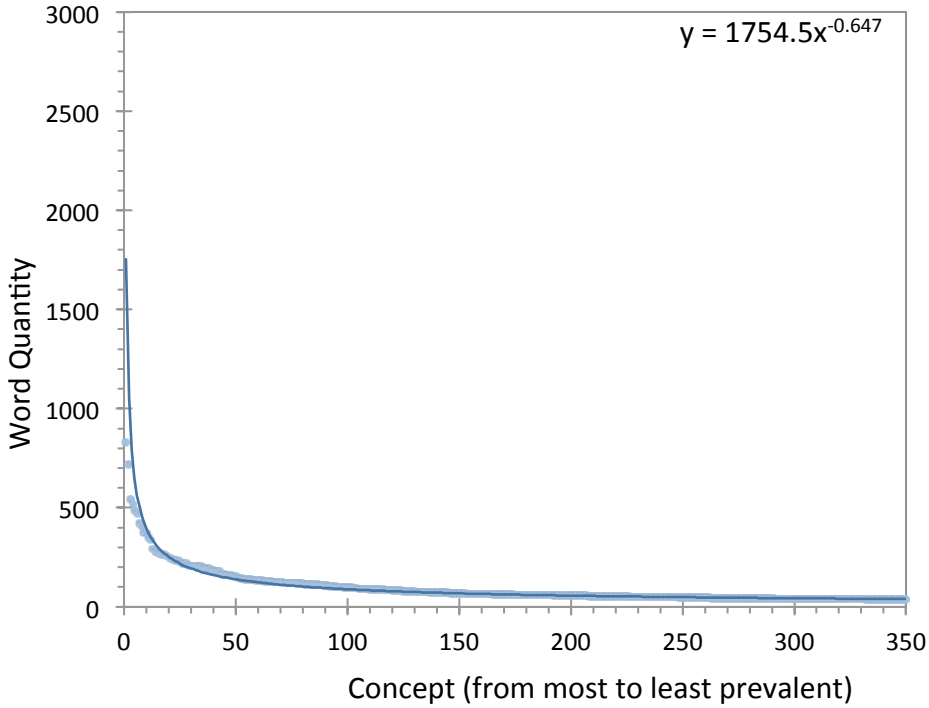
Social Sustainability Literature Term Frequency Curve

Generated using 26 academic articles.



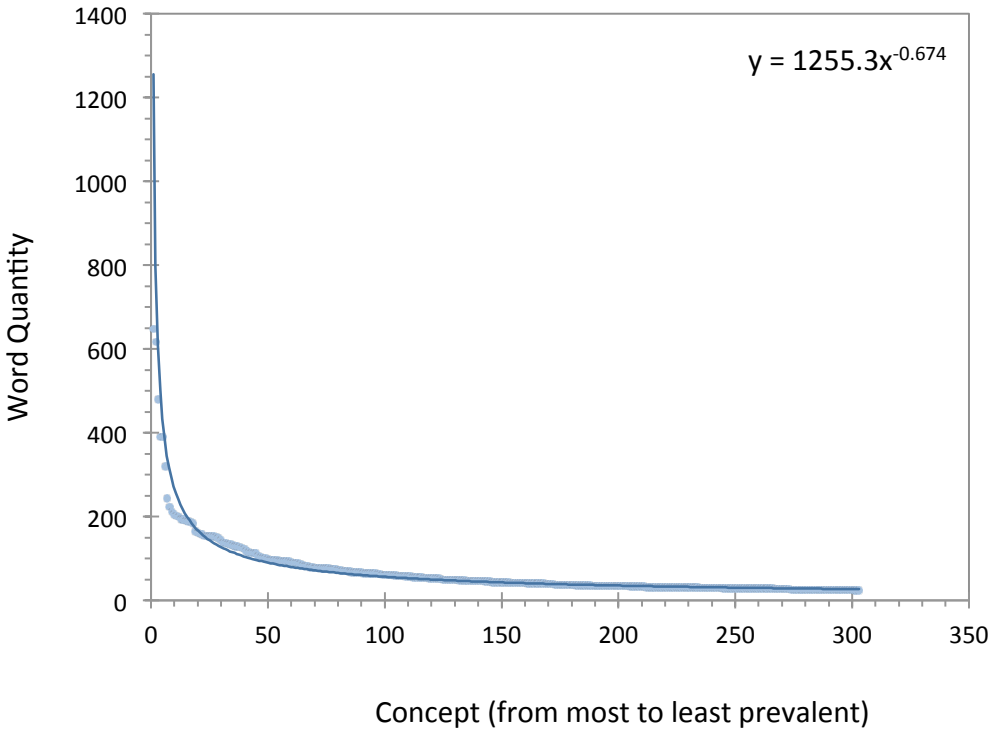
Ecological Sustainability Literature Term Frequency Curve

Generated using 14 academic articles.



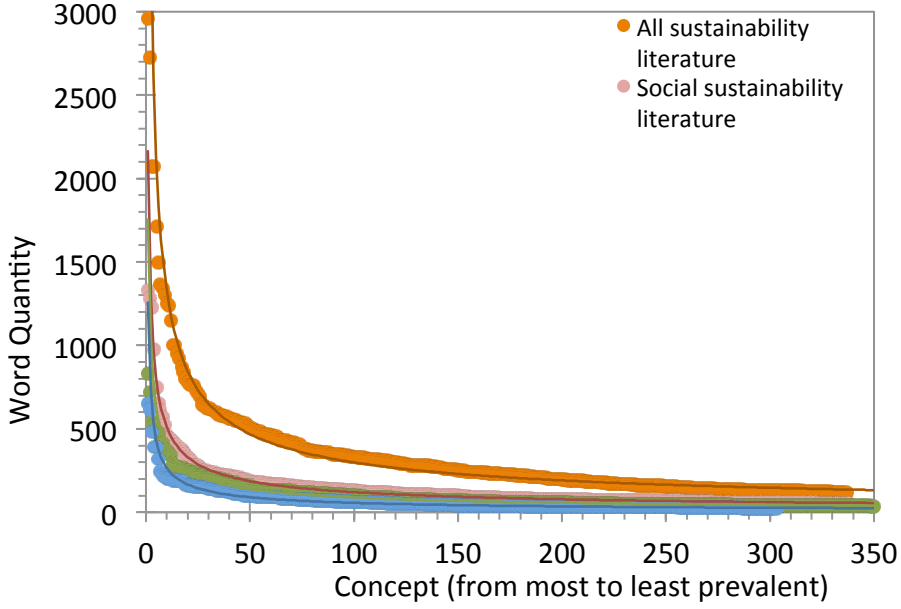
Economic Sustainability Articles Term Frequency Curve

Generated using 10 academic articles.



Sustainability Literature Frequency Curves

Comparison plot of all four term frequency curves.



Cooperatives Principles Comparison with Sustainability Literature

A total of 50 articles on sustainable development were used for this analysis – 26 on social sustainability, 14 on ecological sustainability, and 10 on economic sustainability. Terms distilled and derived from each of cooperatives principles were searched for in the sustainable literature using NVivo. Search results were compared to the term frequency curves (see above) and slopes were obtained as a measure of how closely cooperative principles terms relate to literature. Search results were scanned and manually checked when necessary to ensure correct meaning and context were captured.

The following tables display the results of the analysis. Tables are organized as follows.

Table columns

- *Count* refers to the word count of a term in the sustainability literature.
- *Slope* (in absolute, i.e., positive, values) displays the term prevalence by comparing the term to the appropriate term frequency curve.
- *Sources* refer to the percentage of sources, or articles, a given term appears in.

Table rows

- Light grey rows contain main subjects and descriptive terms found in the cooperatives principles text (i.e., distilled terms).
    - Distillation for these terms were guided by word 'generalizations' and term search analyses of the cooperative principles (done using NVivo)
    - Distilled terms from a principle's description text were selected for their relevance to their respective principle and for their 'searchability'

- Mid-grey rows contain terms related to the principles selected through thesaurus searches and through relevant research / literature.
    - Related terms are used in this analysis to reconcile language differences between academic and non-academic writing.

- Dark grey rows contain ontology terms, which combine like terms and treat them as a singular term.
    - Ontologies are created because terms distilled from the literature also encompass word groupings and derivations.

Cooperatives Principle #	Sustainability			Social			Ecological			Economic		
Term	**Count**	**Slope**	**Sources**	**Count**	**Slope**	**Sources**	**Count**	**Slope**	**Sources**	Count	Slope	Sources
Derived term												
Derived term												
Derived term												
Related term												
Related term												
Ontology												

Cooperative Principle 1*. Voluntary and Open Membership*

ICA Description: Co-operatives are voluntary organisations, open to all persons able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.

Notes:

- This analysis focused on the main terms of the principle - 'voluntary' and 'openness'.
- Term searches on 'open' have been manually checked to capture the meaning of 'open to all people' (i.e., rather than the verb or other meanings).
- 'Accessible' and 'inclusion' were also searched as terms that relate to 'open to all people'.
- The ontology encompasses the idea of cooperatives being open to all. An ontology was not created for the term of 'voluntary' as this term represents straightforward concept, represented well by the one word.
- 'Gender' was searched to test for references in the literature to specific types of diversity. The other diversity terms noted (social, racial, political or religious) produced mostly results that did not specifically refer to social diversity; however, diversity was searched and filtered for the social context (including cultural, perspectives, political, etc.) to capture the social diversity aspect of cooperative principle description.

Cooperatives Principle 3	Sustainability			Social			Ecological			Economic		
Term	**Count**	**Slope**	**Sources**	**Count**	**Slope**	**Sources**	**Count**	**Slope**	**Sources**	**Count**	Slope	Sources
equitable	57	< 0.05	40%	46	0.06	50%	8	< 0.05	36%	3	< 0.05	20%
participation	216	0.69	68%	158	1.36	73%	41	0.09	64%	17	< 0.05	60%
membership	98	0.11	64%	65	0.16	69%	20	< 0.05	64%	13	< 0.05	50%
contribute	7	< 0.05	10%	5	< 0.05	12%	2	< 0.05	14%	0	N/A	0%
inclusive	34	< 0.05	28%	34	< 0.05	54%	0	N/A	0%	0	N/A	0%
sharing	85	0.79	48%	56	0.12	62%	26	< 0.05	43%	3	< 0.05	20%
mutuality	48	< 0.05	42%	14	< 0.05	42%	29	< 0.05	0.50	34		60%
stakeholder	43	< 0.05	36%	18	< 0.05	27%	6	< 0.05	100%	11	< 0.05	50%
ontology (merge participation, inclusive, membership, mutuality)	388		88%	266		96%	61		93%	29		60%

Cooperative Principle 2. *Democratic Member Control*

ICA Description: Co-operatives are democratic organisations controlled by their members, who actively participate in setting their policies and making decisions. Men and women serving as elected representatives are accountable to the membership. In primary co-operatives members have equal voting rights (one member, one vote) and co-operatives at other levels are also organised in a democratic manner.

Notes:

- Distilled terms selected relate to 'democratic control' and system of governance. Conducting a search on 'democratic member control' on the sustainability literature did not produce results.
- 'Equailty' and 'rights' were manually checked to ensure for correct meaning and context.
- Two ontologies were created – one to capture the elements of governance and democratic system, and one to capture the overarching concept of fostering equality and rights among members of a group, community or organization.

Cooperatives Principle 2	Sustainability			Social			Ecological			Economic		
Term	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources
democratic	88	0.09	58%	71	0.20	69%	28	< 0.05	71%	45	0.21	90%
decision making	103	0.13	58%	67	0.17	65%	29	< 0.05	64%	7	< 0.05	30%
accountable	148	0.40	72%	75	0.23	65%	11	< 0.05	43%	6	< 0.05	50%
equality	57	< 0.05	40%	46	0.06	50%	8	< 0.05	36%	3	< 0.05	20%
rights	172	0.51	60%	86	0.31	65%	78	0.40	57%	8	< 0.05	50%
self-governance	6	< 0.05	6%	0	N/A	0%	6	< 0.05	21%	0	N/A	0%
social justice	39	< 0.05	24%	33	< 0.05	35%	4	< 0.05	14%	2	< 0.05	10%
ontology (merge democratic, decision making, accountable)	323	1.74	94%	202	2.68	96%	63	0.25	86%	58	0.33	100%
ontology (merge equality, rights, social justice)	262	1.06	76%	161	1.41	85%	88	0.47	64%	13	< 0.05	70%

Cooperative Principle 3. *Member Economic Participation*

ICA Description: Members contribute equitably to, and democratically control, the capital of their co-operative. At least part of that capital is usually the common property of the co-operative. Members usually receive limited compensation, if any, on capital subscribed as a condition of membership. Members allocate surpluses for any or all of the following purposes: developing their co-operative, possibly by setting up reserves, part of which at least would be indivisible; benefiting members in proportion to their transactions with the co-operative; and supporting other activities approved by the membership.

Notes:

- 'Member participation' was the main focus of this search, and terms relating participatory action were searched.
- Searches included terms relating to people / members / individuals (in a public sense) participating in organizations, communities, etc.
- Terms in the principle's description that were not searched were those referring to examples or methods of economic participation, and thus would not serve as search terms that would appropriately or accurately represent the overall principle.
- 'Economic' was only searched when relating to participation, sharing, or member contribution. The majority of economy references in the sustainability literature do not relate to this principle.
- Searched terms were manually checked to ensure context and meaning were correct

Cooperatives Principle 3	Sustainability			Social			Ecological			Economic		
Term	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources
equitable	57	< 0.05	40%	46	0.06	50%	8	< 0.05	36%	3	< 0.05	20%
participation	216	0.69	68%	158	1.36	73%	41	0.09	64%	17	< 0.05	60%
membership	98	0.11	64%	65	0.16	69%	20	< 0.05	64%	13	< 0.05	50%
contribute	7	< 0.05	10%	5	< 0.05	12%	2	< 0.05	14%	0	N/A	0%
inclusive	34	< 0.05	28%	34	< 0.05	54%	0	N/A	0%	0	N/A	0%
sharing	85	0.79	48%	56	0.12	62%	26	< 0.05	43%	3	< 0.05	20%
stakeholder	43	< 0.05	36%	18	< 0.05	27%	6	< 0.05	100%	11	< 0.05	50%
ontology (merge participation, inclusive, membership)	342	2.12	86%	252	6.20	92%	61	0.23	93%	29	0.08	60%

Cooperative Principle 4. *Autonomy and Independence*

ICA Description: Co-operatives are autonomous, self-help organisations controlled by their members. If they enter into agreements with other organisations, including governments, or raise capital from external sources, they do so on terms that ensure democratic control by their members and maintain their co-operative autonomy.

Notes:

- Terms searched refer to the main items of 'autonomy' and 'independence'.
- 'Democratic' was a substantive term in the description for this principle (and an effective search term), and thus 'democratic' was included in the term searches.
- 'Sovereignty' was the best thesaurus-produced term for this cooperative principle. The 'sovereignty' term search was manually checked for proper meaning and context
- The ontology merged all listed terms to capture a comprehensive impression of the principle, i.e., a cooperative system should operate as an independent and democratic entity.

Cooperatives Principle 4	Sustainability			Social			Ecological			Economic		
Term	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources
independence	26	< 0.05	32%	9	< 0.05	27%	13	< 0.05	43%	4	< 0.05	30%
democratic	88	0.09	58%	71	0.20	69%	28	< 0.05	71%	45	0.21	90%
autonomy	26	< 0.05	26%	8	< 0.05	19%	18	< 0.05	57%	0	< 0.05	0%
self-governance	6	< 0.05	6%	0	N/A	0%	6	< 0.05	21%	0	N/A	0%
sovereignty	20	< 0.05	10%	19	< 0.05	15%	0	< 0.05	0%	1	< 0.05	10%
ontology (merge all)	159	0.44	76%	107	0.50	73%	41	0.09	79%	11	< 0.05	80%

Cooperative Principle 5. ***Education, Training and Information***

ICA Description: Co-operatives provide education and training for their members, elected representatives, managers, and employees so they can contribute effectively to the development of their co-operatives. They inform the general public - particularly young people and opinion leaders - about the nature and benefits of co-operation.

Notes:

- 'Education', 'training', and 'information' were the key terms in this principle.
- 'Knowledge' was also searched as a related term.
- 'Youth' and 'leaders' are noted in the coop principle text as particularly important, thus were searched.
- 'Public' was searched and filtered to for the context of 'informing the public'.
- The ontology included education, training, and information-sharing related ideas

Cooperatives Principle 6	Sustainability			Social			Environmental			Economic		
Term	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources
cooperation	87	< 0.05	48%	29	< 0.05	50%	55	0.17	57%	3	< 0.05	30%
working together	5	< 0.05	6%	4	< 0.05	8%	1	< 0.05	7%	0	N/A	0%
coordination	28	< 0.05	32%	17	< 0.05	31%	8	< 0.05	36%	3	< 0.05	30%
partnership	88	0.09	42%	59	0.12	38%	15	< 0.05	43%	14	< 0.05	50%
levels (of government)	8	< 0.05	12%	6	< 0.05	15%	2	< 0.05	14%	0	N/A	0%
networks	270	1.10	60%	136	0.85	65%	17	< 0.05	57%	117	1.69	50%
solidarity	3	< 0.05	4%	1	< 0.05	4%	0	< 0.05	0%	2	< 0.05	10%
interdependence	19	< 0.05	24%	6	< 0.05	23%	12	< 0.05	86%	1	< 0.05	10%
collective	136		70%	68	0.18	69%	50	0.14	79%	18	< 0.05	60%
collaboration	40	< 0.05	34%	24	< 0.05	23%	11	< 0.05	50%	5	< 0.05	40%
ontology (merge all except levels of government)	645	16.80	100%	332	10.40	100%	158	1.90	100%	155	4.50	100%

Cooperative Principle 6. *Co-operation among Co-operatives*

ICA Description: Co-operatives serve their members most effectively and strengthen the co-operative movement by working together through local, national, regional and international structures.

Notes:

- 'Working together' is specific language included in the cooperative principle description, and thus was searched.
- The term, 'levels', was specifically searched in terms of its reference to government and organizational hierarchies.
- 'Networks' were manually checked to ensure this term referred to social and organization networks.
- The ontology specifically looked at the concept of cooperation, collaboration, and
- partnership.

Cooperatives Principle 6	Sustainability			Social			Environmental			Economic		
Term	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources
cooperation	87	< 0.05	48%	29	< 0.05	50%	55	0.17	57%	3	< 0.05	30%
working together	5	< 0.05	6%	4	< 0.05	8%	1	< 0.05	7%	0	N/A	0%
coordination	28	< 0.05	32%	17	< 0.05	31%	8	< 0.05	36%	3	< 0.05	30%
partnership	88	0.09	42%	59	0.12	38%	15	< 0.05	43%	14	< 0.05	50%
levels (of government)	8	< 0.05	12%	6	< 0.05	15%	2	< 0.05	14%	0	N/A	0%
networks	270	1.10	60%	136	0.85	65%	17	< 0.05	57%	117	1.69	50%
collaboration	40	< 0.05	34%	24	< 0.05	23%	11	< 0.05	50%	5	< 0.05	40%
ontology (merge all except levels of government)	504	5.87	92%	264	6.00	92%	99	0.40	100%	141	2.70	80%

Cooperative Principle 7. *Concern for Community*

ICA Description: Co-operatives work for the sustainable development of their communities through policies approved by their members.

Notes:

- No ontology was created for this principle as the terms, 'sustainable development' and 'sustainability', are encompassing concepts that are abundant in the sustainability literature.
- The term 'policies' was searched because it is referred to in the principle's description as method or avenue for acting in accordance with the principle, i.e., for contributing to sustainable community development.
- Analysis of this principle displayed a strong relationship between the principle and the sustainability literature because the principle's description uses the terms, 'sustainable development' and 'community'.

Cooperatives Principle 7	Sustainability			Social			Ecological			Economic		
Term	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources	Count	Slope	Sources
sustainable development	934	42.00	82%	620	58.00	81%	77	0.37	79%	237	30.00	90%
community	1132	63.00	92%	895	137.00	96%	201	3.20	93%	36	0.13	80%
policies	898	37.00	92%	484	35.00	96%	189	265.00	86%	225	26.00	90%
sustainability (with sustainable)	2280	340.00	96%	1324	1350.00	92%	463	60.00	100%	493	83.00	100%

Initial Overall Impressions of Analysis Results

The results of the analysis can be examined to determine how closely and in what ways the cooperatives principles relate to sustainability literature. Through a cursory examination, three observations are apparent.

1. Of the three groups of literature compiled (i.e., social, ecological, economic), the majority of the principles relate most strongly to the social sustainability literature.
2. Cooperative principle number 7 relates very strongly to the literature due its inclusion of the terms 'sustainable development' and 'community'; however, the principle description does not detail elements of sustainable development, and thus it relates to the literature on a very general level.
3. The results above can be used to gain insight on the compiled sustainability literature to see how the literature examines the different aspects of sustainability. For example, most of the cooperatives principles terms did not relate strongly to economy, even though many cooperatives are businesses, and this could be because the literature focuses on macro-scale rather than community-scale economics.

Coding Similarities between Cooperatives Principles

To determine how the language of and concepts behind the cooperative terms relate to each other, the cooperatives principles terms (listed in the tables above) were merged into codes in a manner that a single code encompasses all terms pertaining to a single principle. Codes were arranged into the matrix table below, displaying how many times the sets of terms for each principle overlap with one another in the sustainability literature.

Principles	1	2	3	4	5	6	7
Coop Principle 1	2147	160	141	28	157	231	764
Coop Principle 2	160	577	113	91	41	83	195
Coop Principle 3	141	113	509	16	40	107	188
Coop Principle 4	28	91	16	159	10	77	41
Coop Principle 5	157	41	40	10	870	144	209
Coop Principle 6	196	48	72	42	109	551	167
Coop Principle 7	764	195	188	41	209	202	3997

The raw values displayed in the table above are difficult to use for comparative analysis as they read as arbitrary values; thus, to create more meaning from this analysis, another, more comparative matrix was created (below). Cooperative principle codes were arranged in this matrix from the code containing the highest number of references in the sustainability literature to that containing the lowest. Percentages were then calculated using the codes with LESS references as denominators to see if 100% overlap exists for any of the codes.

Principles	7	1	5	2	3	6
Coop Principle 1	35.6%					
Coop Principle 5	24.0%	18.0%				
Coop Principle 2	33.8%	27.7%	7.1%			
Coop Principle 3	36.9%	27.7%	7.9%	22.2%		
Coop Principle 6	40.7%	10.0%	15.0%	8.7%	22.7%	
Coop Principle 4	25.8%	17.6%	6.3%	57.2%	10.1%	127.0%

Of particular interest is the amount of overlap codes experience with cooperative principle number 7. Since the code for cooperative principle 7 contains terms like 'sustainable development', 'community' and 'sustainability', overlap with this code provides insight on how much terms contained within other codes relate to sustainability and sustainable community development.

Prominent and Meaningful Concepts Pertaining to Sustainability

Below are lists of terms found within the sustainability literature (from most prevalent in the text to least prevalent). The lists has been distilled from the term frequency

searches and organized into the literature group they pertain to - social, ecological, economic, or sustainability (i.e., all). In addition to using frequency curves and corresponding slopes to analyze text for its relevance to research and ideas on sustainability (as was done above), and simpler, quicker analysis can be conducted using the following lists of terms as bases for search protocols. The lists are extensive and contain meaningful terms, thus, would be viable indicators for determining a document's or piece of text's level of reference to sustainability.

Sustainability	Social	Ecological	Economic
sustains	social	systems	sustaining
develops	development	resources	develops
socially	environmental	sustaining	economics
environmental	sustainable	changing	changing
changing	environment	managing	socially
systems	sustainability	adapts	environmentally
economics	change	environmentally	policy
community	community	energy	new
resources	economic	ecology	growth
environment	local	develops	humans
new	people	nature	climate
adapts	planning	commons	nature
policy	public	community	globalization
nature	policy	economics	corporations
ecology	global	social	systems
managing	communities	science	issues
globally	world	institutions	worlds
plans	research	level	resources
humans	urban	property	ecology
local	human	climatic	managing
worlds	university	conserving	ones
climatic	climate	local	responsible
press	ecological	populations	investors
researching	adaptation	global	years
needs	resilience	humans	value
activity	physical	increase	network
university	political	technology	relations
governments	health	policy	capital
people	issues	world	environments
institutions	society	process	university
sciences	system	effects	science
model	nature	environments	hdi
politics	behavior	knowledge	research
problem	systems	problems	income
energy	land	models	businesses

relations	activity	complex	impacts
public	time	governments	innovative
effects	concept	researchers	increase
society	justice	impact	need
commons	resources	nations	nations
impacts	design	bases	adaptive
growth	future	university	countries
groups	work	scale	problem
responsive	groups	conditions	society
nations	natural	renewable	institutions
resilient	built	products	politics
timing	management	rules	approach
scale	plans	states	focus
values	needs	ecosystems	sd
approach	housing	imports	processes
concepts	international	resilient	timing
population	principles	relatively	different
internationally	travel	timing	level
urbanization	state	needs	making
capital	problems	people	theory
futurity	model	waters	future
behaviors	growth	international	provide
designs	capital	growth	rate
imports	living	understanding	concept
technology	used	users	works
diversity	economy	provide	community
products	journal	builds	result
culture	values	cycle	studying
action	changes	interactive	evolutionary
individuals	support	years	costs
organizations	capacity	behaviors	concern
areas	resource	potential	effect
markets	equity	forests	diversity
principles	important	rights	scale
corporations	life	practices	industry
complexity	factors	society	models
conserving	governance	politics	products
focusing	policies	evolutionary	analysis
builds	market	approach	assessments
knowledge	action	responsive	activity
networks	diversity	assessments	populations
costs	place	reducing	case
requiring	scale	fishery	emissions
interest	studies	controls	group
supports	personal	individuals	csr
concerns	process	decision	integration

participation	neighbourhood	regional	programs
income	building	leads	responding
units	csr	values	earth
large	ecology	emissions	goods
ability	approaches	initiatives	investments
ideas	areas	sharing	public
successive	conditions	depends	scientific
interactive	knowledge	experiments	governments
generators	states	field	people
green	activities	united	evolution
link	decision	ability	local
accessing	population	evolution	ethics
table	role	agriculture	risk
emerging	report	privatization	conservation
less	issue	tragedy	improvement
services	ties	consumption	limits
leads	context	supports	knowledge
housing	impact	boundary	generations
justice	institutions	downloaded	position
standards	concerns	efforts	supported
challenging	given	council	direct
possible	income	evolving	debates
evolutionary	costs	perspectives	depends
forests	energy	regimes	leads
renewal	problem	benefits	maintain
quality	sd	biology	traditionally
vulnerable	politics	function	resilience
following	existing	links	ability
rules	control	operate	informing
built	countries	panarchy	regions
consumption	decisions	pollution	dimensions
transforms	environments	protection	bank
waters	responsibility	existing	index
programs	levels	concept	argues
consuming	dimensions	solutions	discourse
improving	earth	businesses	calculations
ranging	idea	challenging	efficiency
indicators	literature	standardisation	undp
cycling	mental	consumers	alternatives
traditional	understanding	fuel	ipcc
critics	critical	address	patterns
privatization	erp	available	agency
risks	demand	factors	agricultural
demands	regional	defining	hdrs
dimensions	access	goods	perspective
goals	effects	stable	plans

sharing	space	events	sri
equity	density	order	entrepreneurs
experiments	potential	predators	fund
contexts	association	projects	attention
space	found	ranges	choice
promotional	household	achieve	function
continuously	ideas	domain	literature
contribute	interests	contribute	living
protections	elements	maintain	poverty
organising	large	scientific	progress
elements	liberal	focusing	regard
stability	united	continuously	stability
relationships	concern	framework	standards
emissions	culture	patterns	stocks
csr	present	collective	design
dynamics	initiatives	efficiency	tends
efforts	strategy	density	benefit
choice	creating	capital	objectives
regulators	dependent	concerns	separation
residents	developing	stocks	services
transportation	interest	loop	skills
perspectives	law	objects	stakeholders
agency	poverty	enhance	analysts
pollution	risk	feedback	power
earth	scales	specialized	capacity
function	vehicle	lake	educational
objects	agenda	transformations	financial
framework	concepts	efficiency	growing
materials	neighborhood	equilibrium	operations
accounts	strategies	gas	path
discourse	commission	island	personal
investors	complex	biodiversity	trading
debates	individuals	vulnerable	agenda
mentally	norms	academy	criteria
operative	trade	establish	critics
learning	diverse	opportunities	exploring
opportunities	practices	heating	fuels
actors	projects	predict	links
similarly	question	quality	quality
agriculture	stability	rate	achieving
density	transit	relevant	aspects
neighbourhood	around	competitive	conference
expects	multiple	evaluation	period
evaluative	neighborhoods	indigenous	renewal
implementing	questions	programs	transition
solutions	assessment	severity	war

domination	experience	specification	areas
benefits	factor	appropriation	basic
biology	framework	green	builds
collectively	value	participation	decision
neighborhoods	evidence	influence	hdr
agenda	forest	multiple	involves
distributive	governments	air	origins
constructs	network	behaviour	principle
trading	sector	deal	shifts
company	agency	economy	sources
ends	coastal	shape	contribute
investments	members	shift	ranging
evolution	discourse	discussion	consumption
hdi	efforts	accumulation	degraded
household	infrastructure	features	mitigation
patterns	limits	innovative	producing
ties	opportunities	materials	weak
sector	planners	situations	mental
streets	pollution	cooperative	rights
transit	poor	associations	soil
applying	challenges	greenhouse	visions
growing	cost	implementation	challenges
species	ecosystems	risks	oae
alternatives	effective	considered	qualitative
laws	increase	degradation	uncertainty
connects	institutional	difficult	accepted
fishing	adaptations	incentives	consideration
available	programs	expressed	engaging
educational	recreation	adoption	physics
aspects	brundtland	cross	price
attentive	history	forces	atmospheric
closing	institute	identifying	eco-labelling
council	places	might	commission
efficiently	socially	necessary	described
shape	societies	stakeholders	early
shifts	vision	extinction	elements
engaging	walking	extreme	erp
movement	act	indicators	greenhouse
evolving	benefits	mental	programme
forces	goals	represent	reflect
history	goods	combined	technical
modernizing	lead	constructive	century
encourage	major	distributional	force
field	person	modernization	optimality
identifying	spaces	characteristics	consequences
influence	win	credibility	employs

stakeholders	attention	hence	eco-effeciency
accepted	measures	key	socio-economic
consequently	water	sci	socio-effectiveness
externally	success	trajectories	
characteristics	achieve	collapse	
act	century	components	
norms	council	conflicts	
progressively	protection	consequently	
centers	standards	elements	
enhancing	address	history	
noting	characteristics	plants	
combined	education	lower	
balancing	organization	prices	
established	property	life	
fishery	technology	section	
subjects	aspects	services	
features	choice	labels	
real	pedestrian	report	
	production	moving	
	sustain	rationality	
	sustainability	agents	
	central	goals	
	effectiveness	harvesting	
	higher	places	
	reduce	pool	
	single	affect	
	challenge	attention	
	changing	experts	
	choices	closing	
	debate	earth	
	european	persons	
	industry	planning	
	material		

Appendix 7: Comparative Analysis

Sustainability and the Cooperative Model

A Comparative Analysis

This analysis employs similar techniques to what was done with the preliminary work, i.e., comparing the sustainability literature to the cooperative principles. As was done in the preliminary analysis, concept frequency curves were generated for each of the following groups: random sample websites, random sample annual reports, identified leaders websites, identified leaders annual reports, coop associations websites and coop associations annual reports. Websites and annual reports were treated as separate sample groups because,

a. every website did not have an annual report analog,
b. the level of verbiage for a website was much lower than an annual report, thus certain organizations with reports would be weighted much more heavily than others if consolidating samples,
c. and part of this analysis was aimed at illuminating differences between website communications and what is communicated through reports.

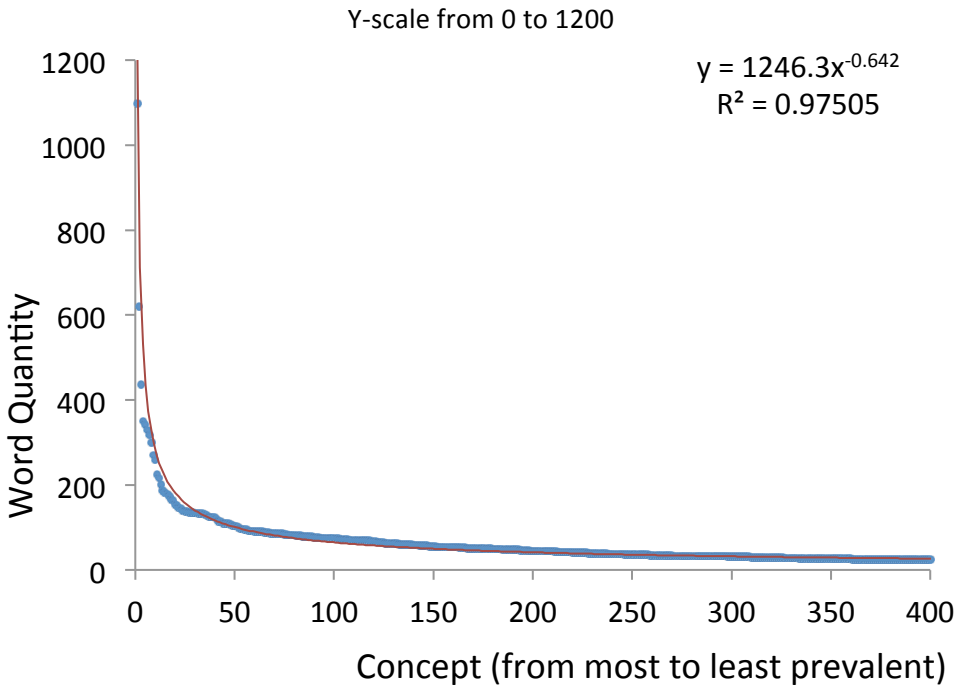
Below are frequency curves for each of the six samples. The y-axis (word quantity) has a much larger scale for the annual reports because verbiage is much higher for these samples. The x-axis is scaled to 400 concepts as, in most cases, the top words were filtered from a list of the top 500 terms found in the samples; filtering was done so that only words with conceptual value are considered, i.e., excluding words such as grammatical terms. Creating the frequency curves through a filtered selection of 500 words ensures enough words have been considered for the analysis, as this number creates reliable trend curves with R^2 values above 0.97.

Prevalent concepts from the frequency curves have been compiled and placed in the spreadsheet in sheet number 3 ("3 - Concepts from Coop Samples"). These concepts represent terms that lie on the frequency curve right of where the tangential slope is equal to -1, meaning that their frequencies in the text assume unique values (or at least, are estimated to do so). In the spreadsheet, the most prevalent of these terms can be found at the top of the list, and prevalence decreases going down the list (but these words can still be considered distinct within the text).

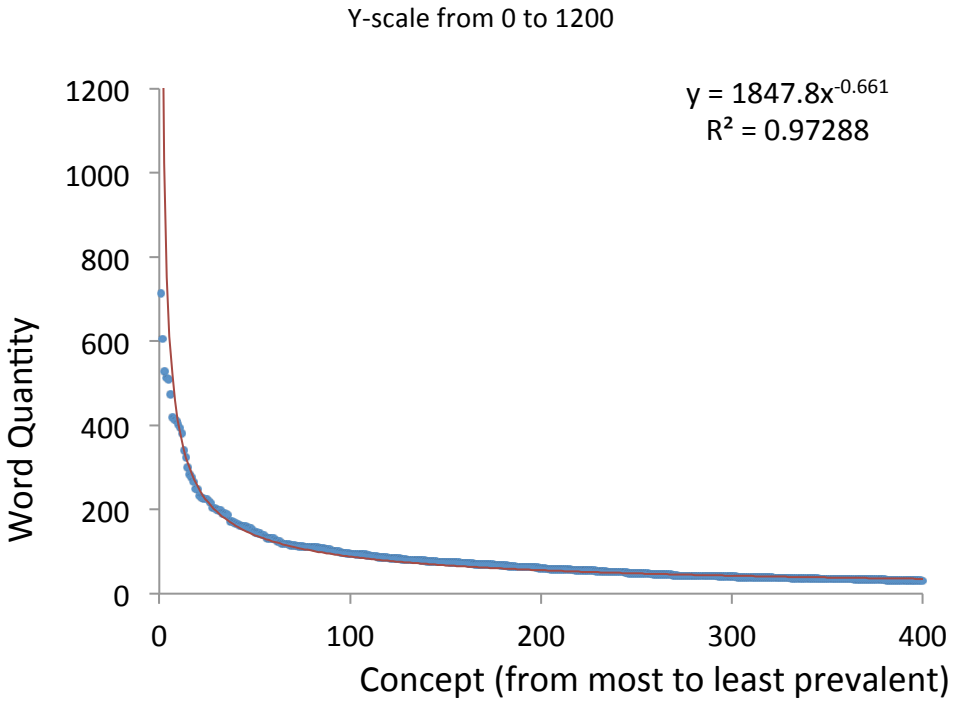
It should be noted that frequency curves for the websites were generated through English translations of the website material, where frequency curves for the annual reports were generated through consolidating translations of Spanish and French lists of most frequent terms with English lists of most frequent terms.

Robert Newell September 25, 2013

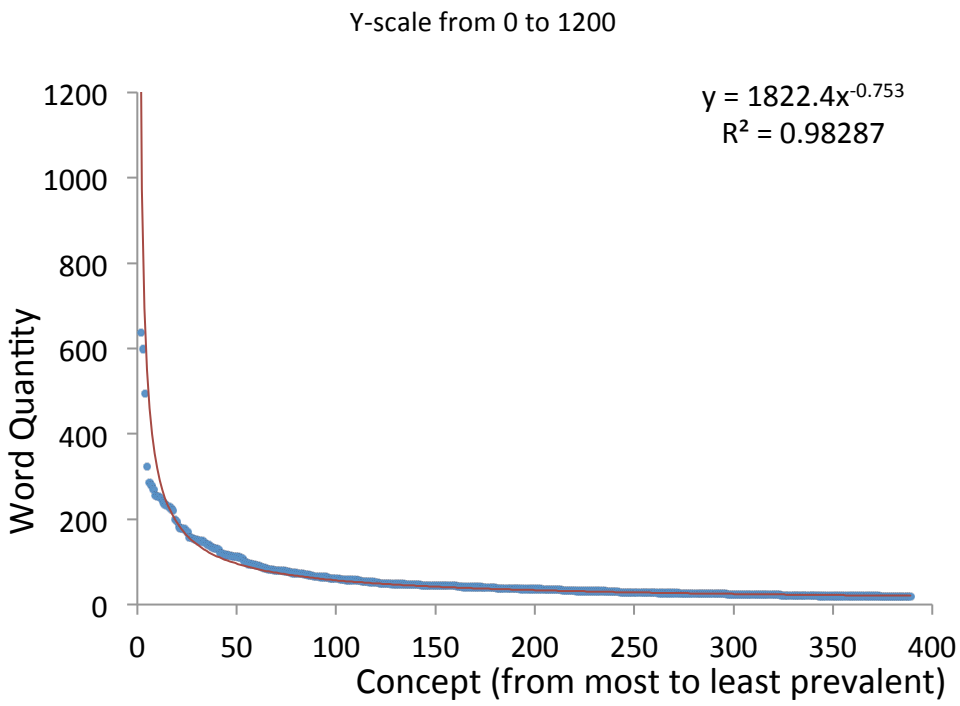
Random Sample Websites Concept Frequency Curve



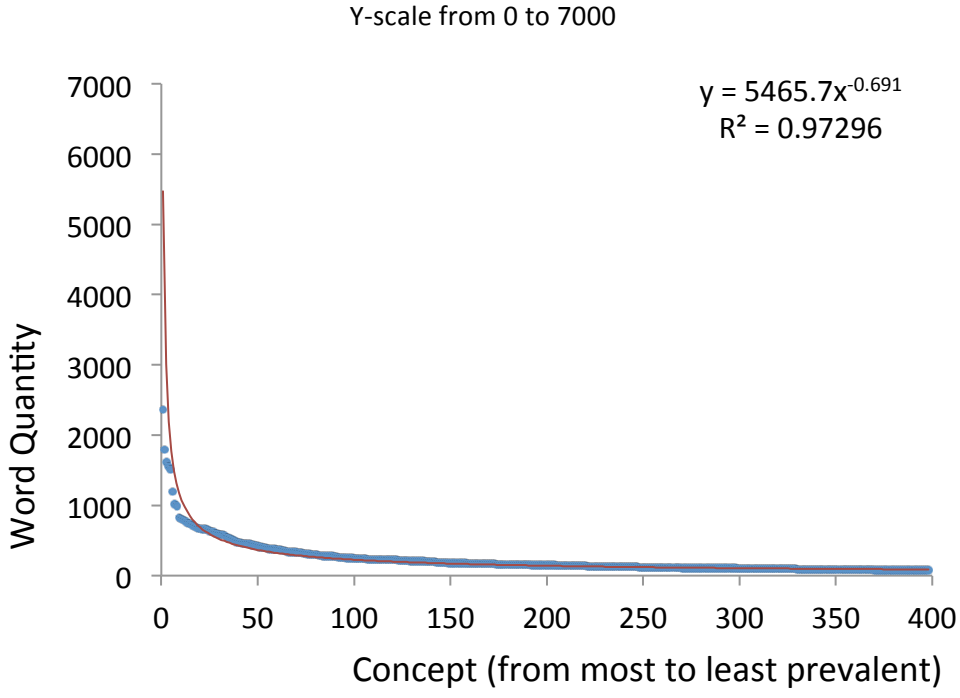
Identified Leaders Websites Concept Frequency Curve



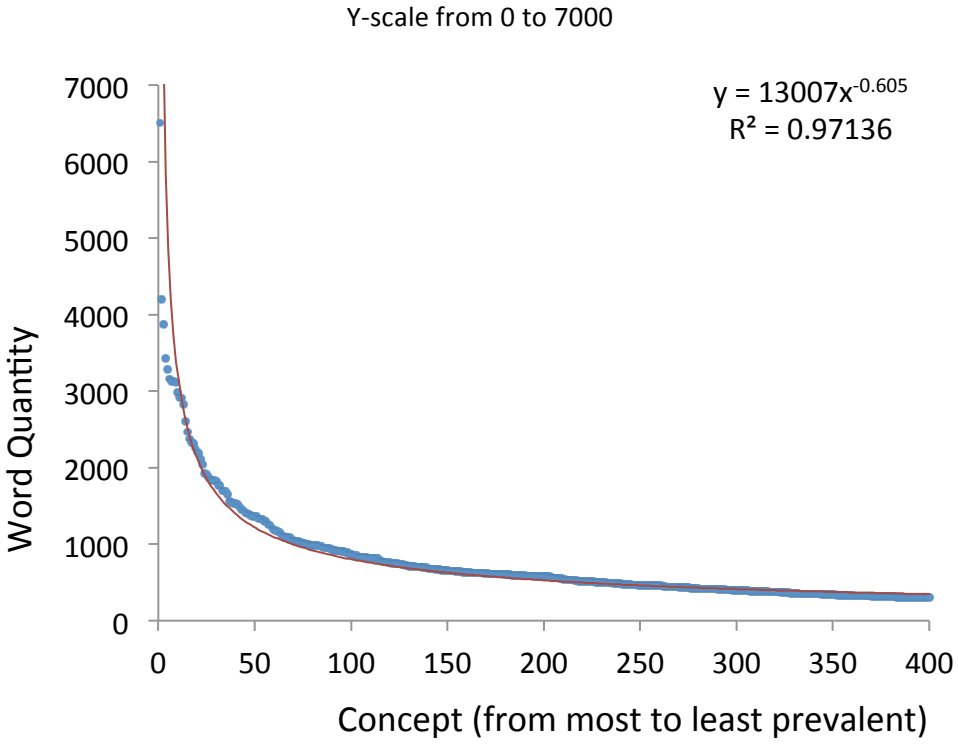
Associations Websites Concept Frequency Curve



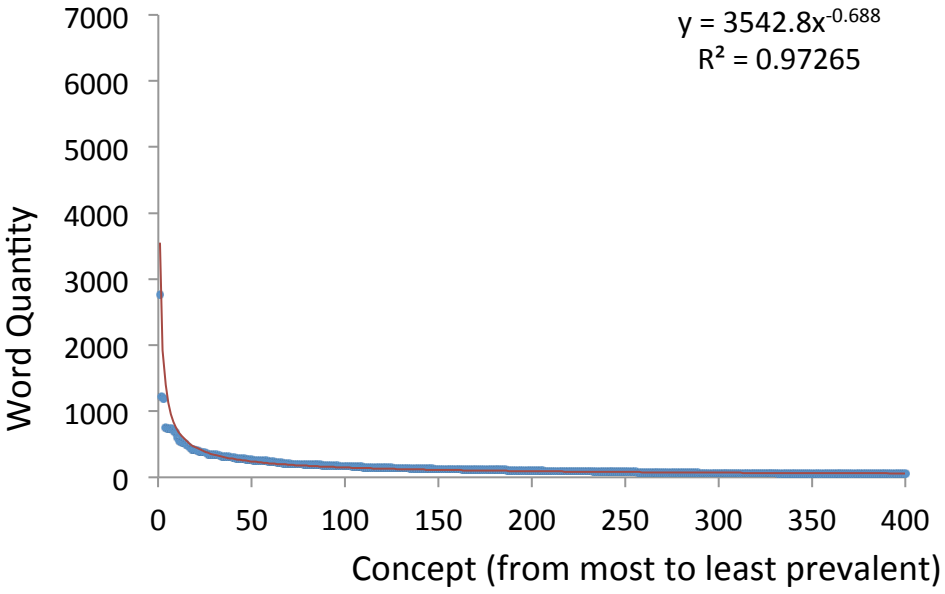
Random Sample Annual Reports Concept Frequency Curve



Identified Leaders Annual Reports Concept Frequency Curve



Associations Annual Reports Concept Frequency Curve



Comparative Analysis Type 1

Comparison of Cooperative Sample Frequency Curves to Sustainability Literature Frequency Curves

The tables and figures below display a comparison of the frequent concepts in the cooperative samples to the frequent concepts in the 50 selected pieces of sustainability literature (i.e., the selection used in the preliminary analysis). This analysis first involved calculating total references in the sustainability literature of the most frequent terms used in the literature (this was done for each of the social, environmental, and economic groups). Then, the literature was searched for references to terms produced through each of the cooperative sample frequency curves and these totals were calculated. Finally, a 'strength of comparison value' was calculated by dividing the number of references to the cooperatives samples terms by the number of references to the sustainability literature terms, resulting in a proportionate value:

$$[\text{Strength of Comparison Value}] = \frac{[\text{Occurrences of Cooperative Sample Terms in Sustainability Literature}]}{[\text{Occurrences of Sustainability Literature Terms in Sustainability Literature}]}$$

Below are results of two analyses. The 'Narrow Context' work refers to terms collected from the frequency curves that are right of the -1 slope mark. These represent all terms with (estimated) unique frequencies in the text, and thus can be consider as distinct, prevalent terms. The Narrow Context analysis provides an idea as to whether the focuses of the cooperatives materials are similar to that of the sustainability literature. The 'Broad Context' compares terms that are right to the -0.1 slope mark on the frequency curves. This includes more terms because a term at slope of -0.1 can be estimated to be of similar frequency to approximately 10 other terms, and thus, not surprisingly, the strength of comparison values are higher than that of the Narrow Context. Broad Context analysis provides an impression as to whether similar language is being used between the cooperative samples and the sustainability literature.

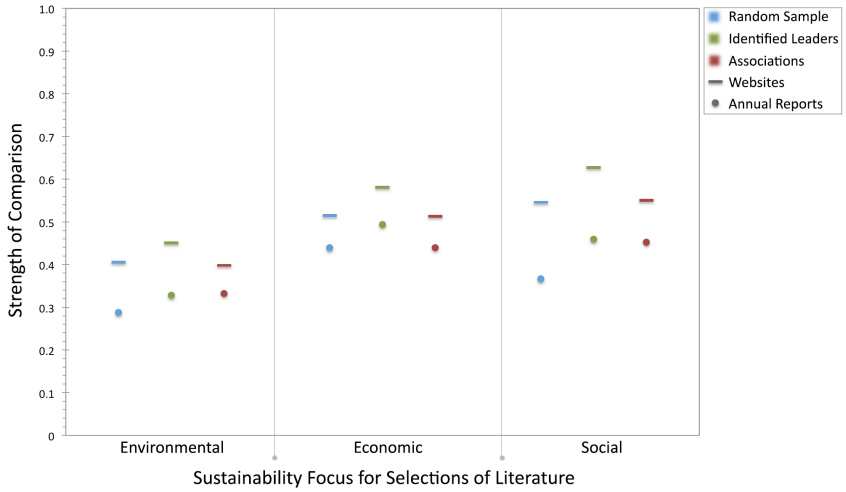
It is important to note that the numbers of frequent terms for each sample were kept at the same number for a given analysis, as to not weight any sample more heavily than the others. This means, that the resulting output is actually an average of an analysis using the number of top terms found with the sample with the lowest number at -1 slope mark and an analysis using a number of top terms found with the sample with the highest number at the -1 mark (the same was done for -0.1).

When interpreting the data below, several observations can be made. Firstly, the Identified Leader group has a distinctly stronger correlation with the sustainability literature (in all three areas) than the other two groups. This observation has been supported through Chi-squared analysis (the output for these tests can be provided, if needed). Secondly, the websites appear to be more strongly related to the sustainability literature than the annual reports. This could relate to the differences between communicating a cause and discussing operations (as can be seen, the results imply economic language is higher in the annual reports than environmental and social language). Thirdly, as was seen in the preliminary analysis, the cooperatives materials relate most strongly to the social aspect of the literature.

The source data and the tables are available in the spreadsheet file in sheet number 2 ("2 - Coop Comparisons to Lit"). Full sized figures are available in jpeg format.

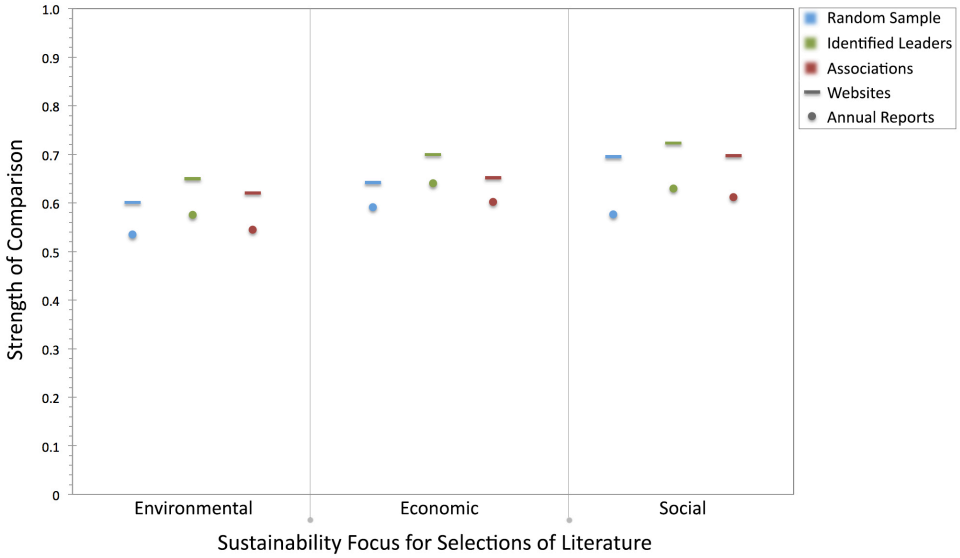
Narrow Context

	Environment		Economic		Social	
	Websites	Report	Websites	Report	Websites	Report
Random Sample	0.405	0.288	0.515	0.439	0.546	0.366
Identified Leaders	0.451	0.328	0.581	0.494	0.627	0.459
Associations	0.398	0.332	0.513	0.440	0.550	0.452



Broad Context

	Environment		Economic		Social	
	Websites	Report	Websites	Report	Websites	Report
Random Sample	0.601	0.535	0.642	0.592	0.695	0.577
Identified Leaders	0.650	0.575	0.700	0.640	0.723	0.630
Associations	0.621	0.545	0.652	0.602	0.697	0.612



Comparative Analysis Type 2

Comparison of Cooperative Sample Frequency Curves to Sustainability Literature Frequency Curves

The second type of comparative analysis compared the codes derived in the preliminary analysis to cooperatives samples. This involved comparing each of the codes with the frequency curves for each of the samples. The strength is measured as an absolute (i.e., positive) value of what the tangential slope would be at that point in the curve. As discussed earlier, slopes of 1 and above are of particular interest.

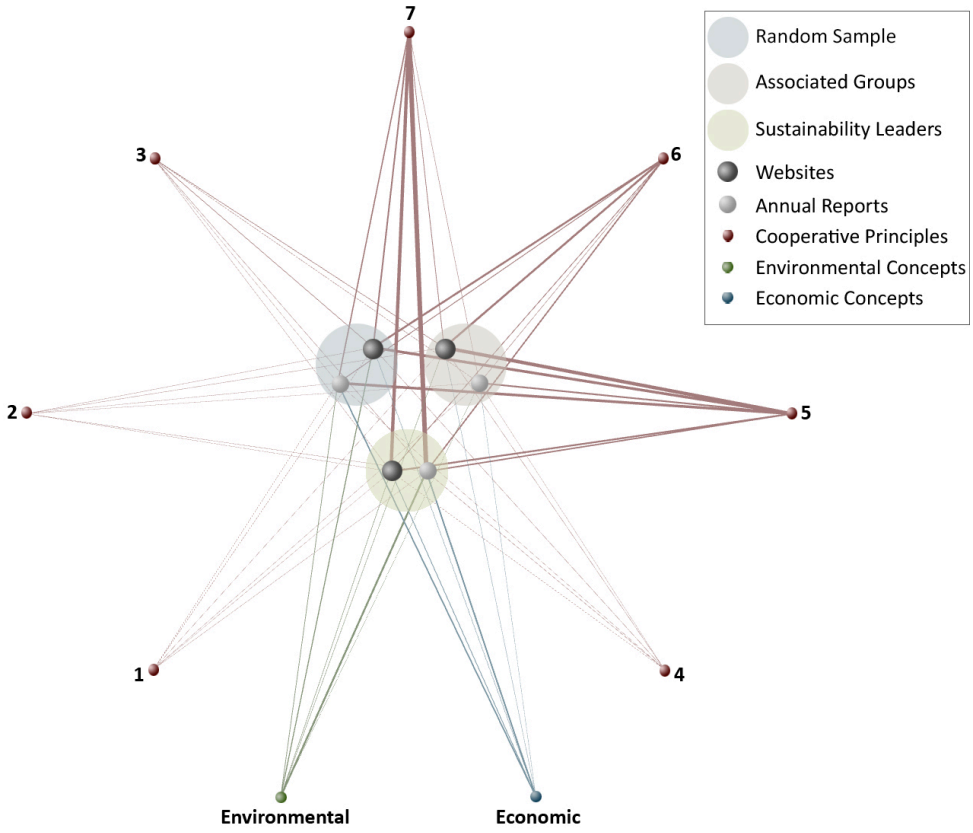
The table below is derived from frequency curve slope values collected for each of the terms. Slopes were averaged for each of the groups (Cooperatives Principles 1 to 7, environment, and economy) using a measure that incorporates median, mean, and mid-point between maximum and minimum values. The reason for incorporating several types of averaging measures is to ensure that the final measure represents an average while accounting for both range and outliers. Slope values for all the codes (and ontologies) are available in sheet number 1 ('1 - Concept Comparison to Coops') of the spreadsheet file, as well as are the calculated means, medians, maximums and minimums.

It is important to note that this method measures **relative** frequencies; therefore, albeit references to a concept might be higher in gross number for a given sample, the slope might not show the same if these references are not higher in comparison to the total number of references it is being compared to. For example, in the table below, actual references to codes derived from

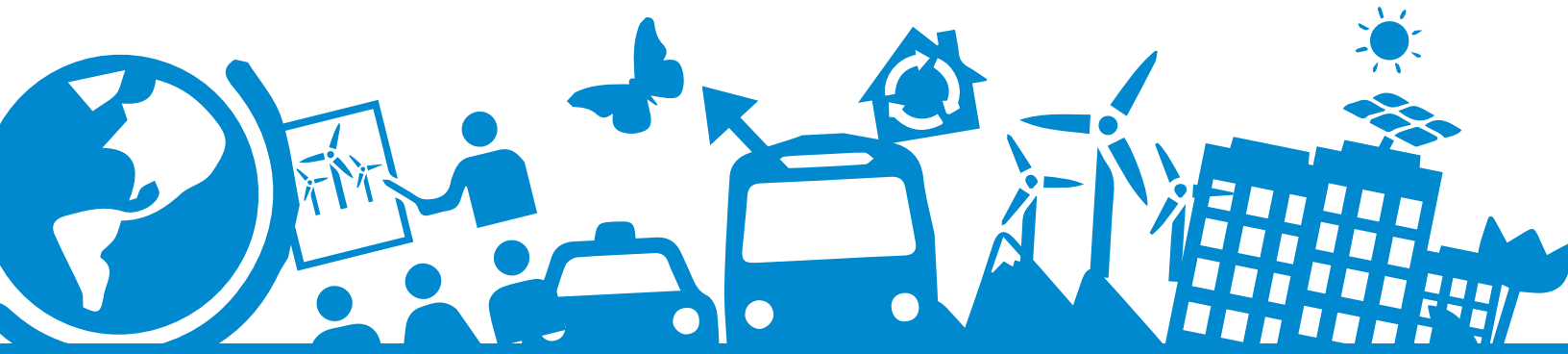
Cooperatives Principle 5 are higher in the Identified Leaders sample than the Random Sample; however, the total numbers of references to all concepts in the Identified Leaders frequency curves are much higher than that of the Random Sample. Therefore, the Cooperatives Principle 5 codes are **more prominent** in the Random Sample and thus have higher slope value. The actual counts of code references are available in '1 - Concept Comparison to Coops'.

	Random Sample		Identified Leaders		Associations	
	Websites	Annual Reports	Websites	Annual Reports	Websites	Annual Reports
Cooperatives Principle 1	0.055	0.007	0.062	0.006	0.022	0.034
Cooperatives Principle 2	0.121	0.076	0.127	0.042	0.153	0.008
Cooperatives Principle 3	0.662	0.052	0.269	0.099	0.700	0.225
Cooperatives Principle 4	0.178	0.006	0.170	0.004	0.169	0.015
Cooperatives Principle 5	4.707	4.591	2.263	2.869	6.117	2.631
Cooperatives Principle 6	3.342	1.108	2.196	1.022	3.554	0.436
Cooperatives Principle 7	2.498	1.975	8.212	5.947	0.883	0.333
Environment	1.496	0.790	3.087	0.481	0.394	0.165
Economic	0.370	2.125	2.353	0.934	0.213	0.117

The 'Cooperative Star' is a visualization based on the values in the table above. Lines are weighted according to the strength of relationship between the sample and the codes (i.e., using averaged slope values). The strongest relationships in the table below can be seen with Cooperative Principle 5, 6, and 7, which correspond to education/training, collaboration/partnership, and sustainability/community, respectively. In addition, Identified Leaders websites exhibit strong relationships with environmental and economic sustainability codes.


7
3
6
2
5
1
4
Environmental
Economic
Random Sample
Associated Groups
Sustainability Leaders
Websites
Annual Reports
Cooperative Principles
Environmental Concepts
Economic Concepts

Cooperatives and Sustainability: An investigation into the relationship



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