Social Vulnerability to Drought Risk Barometer 2016

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Content

Introduction

Due to ongoing climate change, an increase in climate variability is present. This process strongly enhances the risk of droughts. As a result, by 2080, most parts of the world can experience an increase of twenty percent in the number of drought days. Also, the number of people exposed to these drought events is likely to increase with 9 to 17 percent by the year 2030 and even with 50 until 90 percent by the year 2080 (Hallegatte et al., 2016). Through destroying yields and capital and by ensuring drinking water shortages, droughts have a strong impact on the livelihoods and food security of hundreds of millions of people worldwide. As a result food shortages and reductions of household incomes arise (Winsemius et al., 2015 & WFP, 2015).

In nearly all cases, poor people are the most vulnerable to hazardous events. This can partly be explained as, on average, poor people experience a higher exposure, which makes them more likely to be affected by disasters. Even though both nonpoor and poor people live in risky areas, the poor people settle in the most risky places, since the prices there are more affordable as a result of local housing markets and the availability of land (Hallegatte et al., 2016). Winsemius et al. (2015) have assessed the disproportionate exposure of poor people to drought and flood events by calculating poverty exposure bias (PEB) at country level. It was found that over-exposure of the poor is present worldwide, however the degree of this uneven distribution differs strongly across countries. The strongest PEB was found for almost all countries in Africa and many countries in South-East Asia. In these countries with a high poverty exposure bias, social vulnerability to natural hazards is likely to be high. In these countries with a high poverty exposure bias, social vulnerability to natural hazards is likely to be high. Social vulnerability entails the exposure of the poor, as well as the coping and recovery capacity to mitigate the effects of the natural hazards.

Different definitions of social vulnerability to drought might be present as a result of the use of different conceptual models and frameworks. This report defines social vulnerability to drought as the social capacity of a group to react to drought, which includes the anticipation, resistance and the ability to cope with and recover from drought events (Cutter, Emrich, Webb & Morath, 2009). This definition follows the definition specified by Iglesias, Moneo and Quiroga (2009). When a country is at a high risk of social vulnerability to drought, this corresponds to a high risk of the poor being disproportionally affected by drought events and to have a lower coping capacity.

Although predictions of consequences of drought events can be made and the vulnerability to drought events can be assessed, there still is a poor understanding of the specific reasons that ensure a population or group to suffer from drought, the response and the resistance they have to drought events and therefore the ability to cope. As a result, measures taken by governments to mitigate the negative consequences of droughts are in many regions not sufficient (Iglesias, 2012).

Since no such research was found, this report aims to provide a simplified indication of this risk on social vulnerability to drought at country level. This risk will be determined by creating a Social Vulnerability to Drought Risk Barometer (SVDRB), which is based on four different indicators. Unfortunately PEB is not used as indicator due to data deficiency. The nation-wide PEB for droughts was only present for 36 countries, which is too limited for this world-wide research. The first indicator is an alternative for PEB and can be seen as a proxy for a country's vulnerability to drought; the weighted amounts of people affected by drought events. Two indicators cover the social inequality in a country. These indicators include the performance on inclusive growth and development and social progress. The last indicator focusses on the economic status of the country; the GDP per capita. The barometer will provide for 146 countries an indication of the answer to the question: what is the social vulnerability risk of countries based on past drought events and social inclusiveness?

It is expected that when in a country relatively many people are affected by drought events and when these countries also score bad on the other indicators described, this country will have a high risk on social vulnerability to drought events and therefore the country's score on the SVDRB will be high. As a result, the possibility that poor people in the country are disproportionally affected by drought events will also be high. This barometer is created to be a first step in assessing the risk that countries are facing at the moment and to provides a simple framework which could be included in decision making on drought adaptation policies.

In order to select suitable indicators for the Social Vulnerability to Drought Risk Barometer, a clear understanding of the processes present in the problem should be present. Therefore, this report will start with a small literature study focusing on social vulnerability to drought events and on what makes a country at risk for social vulnerability. Also, comparable researches will be discussed. Next, the methods used for this research will be described and choices made will be explained. Hereafter the results will be presented and analysed. The report will finish with a discussion and concluding remarks.

Conceptual framework

Analysing the problem

While vulnerability to drought is the susceptibility of the population to be harmed from the exposure to the drought event, social vulnerability focuses exclusively on the socioeconomic and demographic factors that enhance or weaken the impacts the local population experiences as a result of the event. Social vulnerability assesses who is at risk, and to what degree these people can be harmed (Tierney et al., 2001 & Heinz Center, 2002).

In their research Hallegatte et al. (2015) state that poor people do not only experience a higher exposure to drought events, but they are also more socially vulnerable to the events. When focusing on loss of assets and annual income, historical data shows that even though wealthy people lose a larger absolute amount, poor people loose relatively more as a result of disasters. Welfare and livelihoods depend strongly on these relative losses rather than the absolute ones. A reasons for the bigger relative losses for poor people is that in many cases they do not save their money at institutions, such as banks. As a result, most of the little wealth they have is present in vulnerable forms, such as livestock. Also, the quality of their assets, and therefore the resilience of these assets to hazards, is often lower than those of average households (Hallegatte et al., 2016).

In addition, poor people have limited access to instruments existing that could help them to cope with the droughts. Examples of these instruments are financial tools and social safety nets (Hallegatte et al., 2016). For instance, poor people may lack access to insurance products, formal saving and formal borrowing, because they are unable to pay for bank accounts or do not have the right documentation to open one. Many also wish to stay in the informal sector or simply do not have the knowledge about the advantages that financial tools can provide for the management of risk (Allen, Demirgüc-Kunt, Klapper & Martinez Peria, 2012). In addition, support from social safety nets (i.e. work programs and cash transfers) is limited, since in many countries less than half of the poorest quantile is covered by these social programs. Another important aspect is that even when social protection schemes cover poor households, often no progress is made, since the amounts received are simply to small (Hallegatte et al., 2016 & del Ninno, Dorosh & Smith, 2003).

When focusing more specifically on droughts, if agricultural production is impeded or even halted completely, the poor are more vulnerable, since they have a stronger dependence on income from agriculture and are strongly dependent on ecosystems. Also, the poor are less able to cope with resulting spikes in food prices. The unequal distribution of exposure, vulnerability and social vulnerability to droughts and disasters in general, enhances the inequality and interfere with the

reduction of poverty and the increase in economic growth. The government plays an important role in the social vulnerability that poor people experience. It is necessary to adapt policies that promote economic inclusion of all different income groups, in order to limit the unequal distribution of the social vulnerability (Hallegatte et al., 2016).

Different researches have been done that have investigated exposure, risk or overall vulnerability to droughts. In example, Winsemius et al. (2015) have performed research on poverty-specific exposure to floods, droughts and extreme temperatures. By the inclusion of 52 countries, their aim was to receive a first global indication on the differences present in the exposure to drought for the poor and nonpoor. They found that 85 percent of the analysed population lives in countries where poor people are disproportionally high exposed to droughts. Another example, Carrão, Naumanna and Barbosa (2015) have created an empirical framework on global patterns of drought risk. This framework is based on sub-national estimates of hazards, exposure and the vulnerability. It was found that potential drought risk is not mainly driven by hazard occurrence, which showed a weak correlation, but by the exponential growth of regional exposure. In addition, they found that economic wealth shows a stronger relation to drought risk than the relation between social progress and drought risk. It is stated that as a result of their findings it can be suggested that government standards in most regions show less correlation between drought risk than the wealth of the economy and the degree of poverty does. This indicates that for the creation of the SVDRB, economic parameters should receive a stronger weight than social inclusion indicators.

Selecting the indicators

In order to assess the social vulnerability risk of countries to drought events, it is important to find an indicator that shows what the vulnerability of a country is to drought events and then combine this vulnerability with indicators that assess the demographic and socioeconomic situation of the country. The exposure of the socially vulnerable should be taken into account together with the coping capacity or the resistance of the social vulnerable. Unfortunately, a strong limitation on the selection of the indicators for this report was data availability. Not every dataset which seemed suitable on paper, could be used in practice. For instance, the PEB dataset was not complete enough. In addition, the GINI Index and the Poverty Level, both data of the World Bank (2016), would have been suitable indicators to assess the socioeconomic and demographic situation. However, for too many countries no data was present in these datasets. As a result, four indicators with enough data were chosen as input to calculate the Social Vulnerability to Drought Risk Barometer. These indicators together covered the vulnerability of a country to drought events and the socioeconomic and demographic situation of a country. Below, in table 1, an overview is given of the data used for the different indicators. Hereafter the different indicators with their datasets are discussed in more detail.

Indicator	Source	Extent	Quality	Date
Inclusive Growth and Development	- Inclusive Growth and Development Report 2015 (Samans et al., 2015 & World Economic Forum, 2015).	Data for 112 countries is given.	For this research this data is of high quality since the data covers overarching aspects of economic inclusiveness. It can be seen as a proxy for coping capacity.	2015
Social Progress	- Social Progress Index 2016 (Porter, Stern & Green, 2016 & Social Progress Imperative, 2016).	Data for 133 countries is given.	For this research this data is of good quality since it can be seen as a proxy for the coping capacity.	2016
GDP per capita, current value	- The World Economic Outlook Database (International Monetary Fund, 2016)	Provides the GDP per capita current value and the estimates for this GDP for 191 countries, annually from 1980 up and including 2021.	This data is suitable for the research as it provides information about how poor or wealthy the inhabitants of a country are on average. Together with the weighted total people affected by drought events indicator it is a proxy for the exposure of the poor to drought events.	2016

Weighted total people affected by drought events per 1000 inhabitants	- EM-DAT drought data (Guha-Sapir, Below & Hoyois, 2016). - United Nations Population Division (United Nations, 2015).	-EM-DAT: Provides occurrence and effects of 694 drought events worldwide from 1900 up to and including 2016. -United Nations Population Division: Provides the estimates of the total population of both sexes by mayor area, region and country, annually from 1950 up and including 2100.	The two sources are suitable for the research since, when combined, they can be seen as a simplified proxy for overall vulnerability of a country to drought events. In addition, together with the GDP per capita it is a proxy for the exposure of the poor to drought events.	Respectively 2016 and 2015.

Table 1: An overview of the used data for the different indicators.

Inclusive Growth and Development

The first indicator used as input for the SVDRB is Inclusive Growth and Development. For this indicator the Inclusive Growth and Development Report 2015 is used (Samans et al., 2015). This indicator is a proxy for the coping capacity of the country's inhabitants. This source is selected as in their report, written on behalf of the World Economic Forum, a framework is presented with corresponding indicators which shows how well different countries perform on the social participation of the process (productive employment) and the outcome (median household income) of their economic growth. A score is given for 112 countries on 7 different domains, which are based on 15 sub-pillars and in total 140 quantitative indicators. The 7 domains include;

1. Education and skills development
2. Employment and labour compensation
3. Asset building and entrepreneurship
4. Financial intermediation of real economy investment
5. Corruption and results
6. Basis services and infrastructure
7. Fiscal transfers.

The individual countries receive a score ranging from 1 (very bad) to 7 (very good) for every domain. Since the seven domains are all important disciplines for inclusive growth, the higher the IGDS, the better the country performs on inclusive growth and development. The resulting data is given within four different peer groups. These peer groups consist of countries with a comparable level of development, which is defined by income. The four groups of countries are: low-income, lower middle-income, upper-middle income and advanced (Samans et al., 2015). Unfortunately, no overall score is present for inclusive green growth and development per country. However, this problem is solved by calculating the average of the different domains. In this way it is possible to compare the performance of inclusive growth and development of different countries and these values are used as input for the SVDRB. As a result the end-scores had the possibility to range from 1 to 7. However, in practice, the scores range from 2.57 (for Chad) and 5.39 (for Finland). It is presumed that the higher the countries performance on inclusive growth and development, the less socially vulnerable a country will be to drought events.

Social Progress

The second indicator is countries' performance on social progress. For this indicator the Social Progress Index 2016 from the Social Progress Imperative is used (Porter, Stern & Green, 2016 & Social Progress Imperative, 2016). Social progress can be defined as "the capacity of a society to meet the basic human needs of a citizen, establish the building blocks that allow citizens and communities to enhance and sustain the quality of their lives, and create the conditions for all individuals to reach their full potential" (Porter, Stern & Green, 2016, p.12). This report includes all these aspects of social progress in their calculations for the barometer.

The Social Progress Index measures performances of 133 countries on social and environmental components and combines them into one framework. This framework consists out of three domains;

1. Basic human needs
2. Foundations of wellbeing
3. Opportunity.

These pillars al exist of four sub-pillars which are based on many indicators. For every indicator, a score between 0 (very bad) and 100 (very good) is given. The 0 to 100 scale is based on records for any country in the world since 2004. The best and the worst absolute global performance detected form the boundaries 0 and 100. Every dimension is the average of its four sub-pillars and the Social Progress Index is the average of the domains. The final scores on social progress is calculated by assigning equal weight to the three domains. These scores are therefore also scaled on a range of 0 to 100. In practice the scores range from 30.03 (for Central African Republic) and 90.09 (for Finland). The higher the Social Progress Index, the better the absolute national performance. (Stern, Wares & Hellman, 2016). Therefore, it is presumed that the higher the Social Progress Index, the less socially vulnerable a country will be to drought events.

GDP per capita

The third indicator used to calculate the SVDRB is GDP per Capita current value. Data for this indicator is extracted from The World Economic Outlook (WEO) database (International Monetary Fund, 2016). This database provides, among many other information, the estimates of the GDP per capita current values for 191 countries. This information is given for every year from 1980 up and including 2021.

This indicator is used for calculating the SVDRB since GDP per Capita provides information about how poor or wealthy inhabitants of a country are on average. As already described, the degree of poverty shows a strong relation between the degree of social vulnerability to disasters. Therefore, it is expected that the more poor the average inhabitant of a country is, the more socially vulnerable the country will be if droughts will occur.

Total people affected by drought events

The last indicator, total people affected by drought events, is selected since this indicator focuses specifically on the vulnerability to droughts, while the other three indicators have a focus on poverty and social vulnerability in general. This indicator was calculated by using the EM-DAT dataset and the United Nations Population Division dataset (Guha-Sapir, Below & Hoyois, 2016 & United Nations, 2015).

The EM-DAT (Emergency Events Database) is launched in 1988 by the Centre for Research on the Epidemiology of Disasters (CRED) with the support of the World Health Organisation and the Belgian Government. For the dataset, different sources are used, including agencies of United Nations, insurance companies, NGO's, research institutes and press agencies. The dataset provides information on the occurrence and effects of 22,000 mass disasters worldwide from the year 1900 up to the present day (EM-DAT, n.d., a). For this research, only the data concerning drought events is used. In total 694 mass drought events were recorded worldwide in the period of 1900 up until 2016. For this research the data from 1980 up and including 2015 was used in order to ensure that the data was complete (during the moment of writing the year 2016 is not yet finished, therefore this year was excluded) and relatively recent. As a result, a dataset containing the occurrence and the total people affected of 542 drought events was extracted from the EM-DAT database.

EM-DAT describes total people affected as the sum of the affected, injured and homeless after a disaster. In this case the affected include "people requiring immediate assistance during a period of emergency, i.e. requiring basic survival needs such as food, water, shelter, sanitation and immediate medical assistance" (EM-DAT, n.d., b).

The other source used for this indicator is the United Nations Population Division (United Nations, 2015). This dataset of the United Nations Department of Economic and Social Affairs provides the estimates of the total population of both sexes by major area, region and country. For each year from 1950 up and including 2100 an estimation of the total population is given.

In order to receive a value for each country that is comparable to other countries, for each drought event, the total people affected is calculated per 1000 inhabitants, using the population data corresponding to the year the event occurred. Next, for each year, a rescale value is calculated in order to ensure that recent events have a bigger share in the calculation than events occurring many years ago. The rescaling used is given in Appendix A. The total people affected per 1000 inhabitants per event are multiplied by the rescale values. Hereafter, for each country these values are summed up and divided by the summed amount of the weight rescale values for that country. An example of this calculation is given for Afghanistan in Appendix A. The higher the weighted total people affected per 1000 inhabitants, the more vulnerable the population is to drought events.

For each of the different indicators a map was created which shows the performance of the individual countries on the indicator. These maps can be found in Appendix B.

Calculating and visualising the Social Vulnerability to Drought Risk Barometer

When the different indicators were selected, the next step was to standardise them. All the four indicators were rescaled to values on a scale of 0 to 1. The higher the number, the more socially vulnerable the country is presumed to be to drought events. The rescaling was done by assigning the value of 0 to the most positive score, for instance for the best performance on social progress, and 1 to the least beneficial score, in example for the lowest performance on social progress. Hereafter, in Excel, all the other values were automatically rescaled relative to these lowest and highest scores.

In order to calculate the SVDRB, decisions about the relative importance of the different indicators had to be made. It should be noted that the Inclusive Growth and Development indicator and the Social Progress Indicator have a large common ground. A strong correlation of 0.93 is present between these two indicators, which indicates that the two indicators are very similar to one another and it may even be argued that the indicators could be combined to form one indicator. Correlation between GDP per capita and Inclusive Growth and Development and Social Progress is also present (0.85 and 0.77 respectively). However, it is not as strong as the previously found correlation. As expected, no correlation is present between the total people affected data and the other three indicators (all between 0.26 and 0.27). As been discussed above, research performed by Carrão, Naumanna and Barbosa (2015) gives strong evidence that economic indicators, in this case GDP per Capita, should receive more weight than social inclusiveness indicators, in this case the Inclusive Growth and Development indicator and the Social Progress indicator. Furthermore, it can be argued that the weighted total population affected by drought events indicator should receive more weight, since this is the only indicator that focuses specifically on vulnerability to drought, rather than the other three indicators which focus on aspects of social vulnerability in general. Therefore, weights are assigned in such a way that these discussed differences in importance are included. As a result, the SVDRB was calculated in which both the indicators Inclusive Growth and Development and Social Progress received a weight of 0.15, total people affected by drought events 0.40 and GDP per capita 0.30. When data for an indicator was missing, the SVDRB was calculated by using the other indicators. This was only done for countries for which the total people affected data was present, or for countries for which all the other three indicators were present. In other words, if for a country data was present for less than three indicators, the score was only calculated if data was present for the total people affected by drought events indicator. The weight assigned to the missing indicator or indicators was equally divided among the present indicators in order to ensure the same mutualisation between them.

For the calculated barometer, a map was created using ArcGIS which provides an overview of the results. First, the data was imported as CSV in ArcGIS and joined to a shapefile providing ISO codes and the boundaries of different countries in the world (ESRI, 2014). Hereafter, the data was reclassified in 5 groups with the same interval of 0.2. As a result, the data is presented in different categories, which provides a clear visual overview of the scores.

Results

The assigned SVDRB scores range from 0.01 (for Luxembourg) to 1 (for North Korea, Eritrea and South Sudan). Table 2 presents the 15 countries with the lowest SVDRB scores. The higher the SVDRB score, the higher the expected risk of social vulnerability to drought. Consequently, these countries are expected to be at the highest risk for this vulnerability. In Appendix C the scores and ranks of all the 146 countries can be found.

Of course there are many countries in the world which do not have a climate that has the characteristics to experience droughts. It is therefore likely that these countries do not end up at a high rank in the table. However, adversely, this research tries to point out that countries that do experience drought events do not automatically experience a high social vulnerability to droughts. For instance, between 1991 and 2006, Australia has experienced 5 major drought events affecting 7,080,000 people in total (Guha-Sapir, Below & Hoyois, 2016). However, mainly due to a high level of income, but also due to good performance on inclusiveness of all levels of society in the economy and development, which can be detected due to good performance in Inclusive Growth and Development, Social Progress and GDP per capita, the calculated SVDRB is relatively low, resulting in a low predicted risk on social vulnerability to drought.

When the calculated SVDRB scores are relatively high, it is presumed these countries have a strong risk to social vulnerability to drought. This implies that in these countries the poor are disproportionately affected when drought events occur. Logically, a low SVDRB implies the opposite. In these countries an even distribution of social vulnerability among different income groups is expected.

Rank	Country	SVDRB
1	North Korea	1.00
2	Eritrea	1.00
3	South Sudan	1.00
4	Guyana	0.98
5	Mauritania	0.94
6	Benin	0.93
7	Yemen	0.93
8	Niger	0.92
9	Sierra Leone	0.91
10	Lesotho	0.89
11	Swaziland	0.88
12	Tajikistan	0.88
13	Ghana	0.86
14	Gambia	0.86
15	Kyrgyzstan	0.86

Table 2: The 15 countries with the lowest SVDBP scores and therefore which are expected to be at highest risk of social vulnerability to drought.

Below the resulting map showing the SVDRB scores for 146 countries is presented.

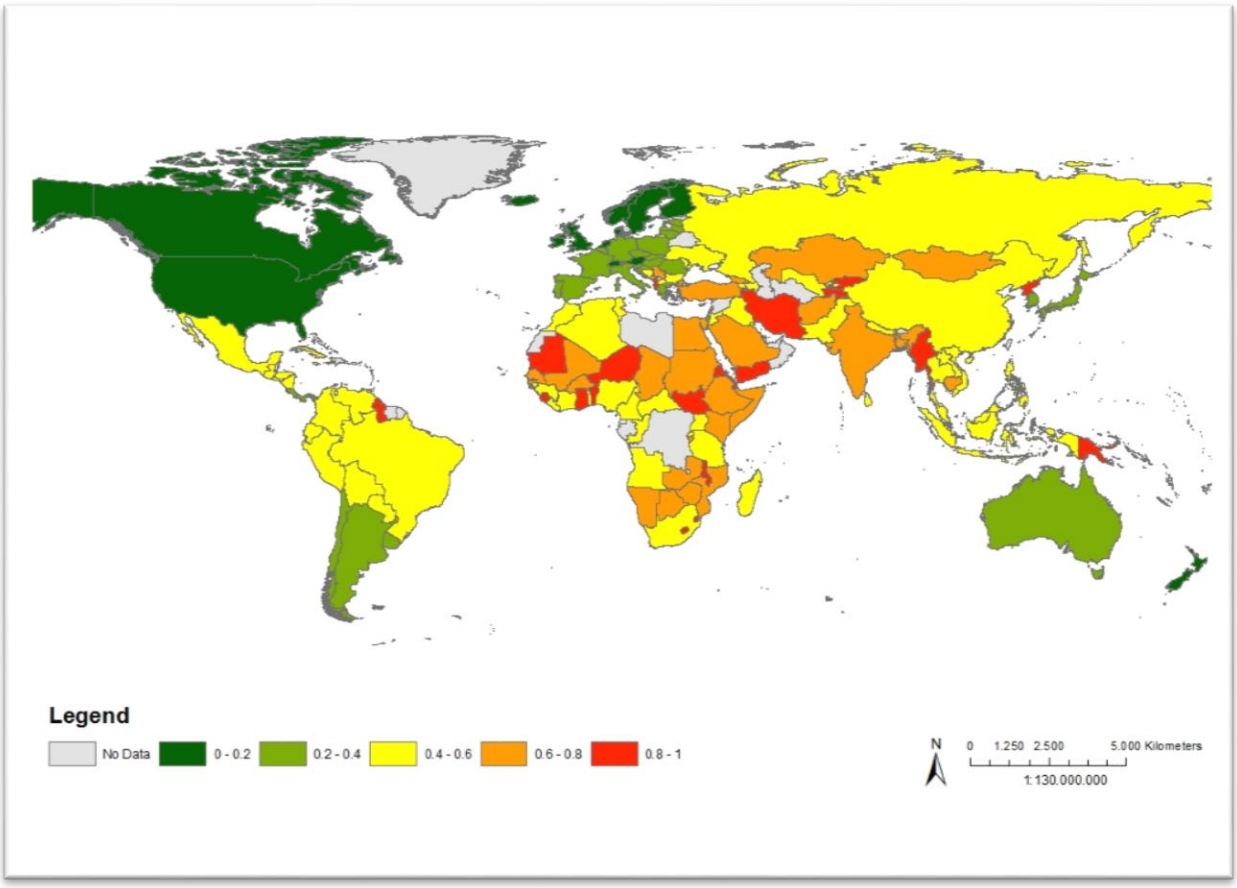

Figure 1: The countries' scores on the SVDRB visualised in clustered groups. An enlargement of this map can be found in Appendix C (Adapted by Amber Mulder).

Discussion and conclusion

The aim of this report was to compile a simplified barometer that assesses the risk on social vulnerability to drought at country level, since no such barometer exists at the moment of writing. It can be concluded that when the calculated SVDRB scores are relatively high, presumably these countries have a strong risk to social vulnerability to drought. Therefore it is expected that in these countries an uneven distribution is present, with as a result that the poor are excessively affected by drought events. In the countries with a SVDBR close to zero, it is presumed that an even distribution of social vulnerability among different income groups is present.

It should be noted that the SVDRB was created since, at the moment of writing, no such barometer was present and it can be considered as a first step in a field were many more research needs to be done. The SVDRB provides a first indication of the situation in the different countries and can be seen as an entrance to stimulate further research. The use of four indicators is sufficient to fit the purpose of this research, however to come with more reliable results, more or different indicators should be included, such as a more complete version of the PEB data. In example, initially it was planned to combine the EM-DAT people affected by droughts data with data on the climatological and hydrological severity of the drought events and hereafter compare these findings with the other social indicators. Unfortunately no access to this type of severity data was present. However inclusion of this data for the drought events will strongly improve the framework.

A strong limitation on the selection of indicators was data deficiency. Indicators that could have been used to improve the results showed a lack of data of too many countries, which made them unserviceable. If these datasets, such as the GINI-index and the Poverty Level from the World Bank, will be made more comprehensive, they can function as important indicators for the assessment of social vulnerability risk.

Measuring countries' performance on social vulnerability to drought is a difficult task. During the process many decisions were made about selecting and processing the data. These decisions are influential on the final results. For instance, if different standardization techniques were used, deviating outcomes may have appeared. In addition, the Inclusive Growth and Development scores were calculated by taking the average of the seven different domains presented by the report. When no data was present for one of the domains, the Inclusive Growth and Development score was calculated by taking the average of the remaining domains. However, when no data is present for a specific domain, it might be possible that this domain is not well organised in a country, which would mean that that country would actually perform really low in that domain. Since this domain is not included in the calculation, the Inclusive Growth and Development score would in practice be significantly lower. Also, for this same dataset, some indicators used for countries with a specific economy (i.e. lower income economy) variated from indicators used for countries with other economies. Therefore, domains of different economies are not strictly comparable. The same problem arises when calculating the SVDRB scores. When data for an indicator was missing, the SVDRB was calculated by using the other indicators. This was only done for countries for which the total people affected data was present, or for countries for which all the other three indicators were present. This method does influence final results since the absent indicator might have strongly pushed the country to a different position. This uncertainty of the reliability of the final scores is especially important to take into account for countries where total people affected by droughts data was missing and where a possibility exists that affected people are present. These countries include Egypt, Kazakhstan, Kuwait, Lebanon, Myanmar, Montenegro, Saudi Arabia, Sierra Leonne, Serbia, Turkey and Yemen.

In addition, when calculating the total people affected indicator, all the weighted total people affected over the years were summed up per country. Of course, it is possible that a person is affected multiple times, by different droughts. As a result, for countries were many people were affected the calculated people affected per 1.000 inhabitants exceeded the 1.000 inhabitants. When this occurred, it was chosen to set the total people affected to a maximum of 1.000.

Despite of some influential decisions made, the resulting SVDRB is considered to be informative and a promising framework on which further research can be built. It is recommended that further research is done which results in an extension of this framework, including more indicators and less simplified standardization techniques.

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Appendix

A.

Occurrence of drought event (years ago)	Weight
0-5	1
5-10	0.8
10-20	0.6
20-40	0.8
>40	0.2

Table I: Assigned weights for the different drought events based on how recent the event has occurred.

Year drought event	Total people affected	Population (thousands)	Total people affected per 1000 inhabitants	Rescale value	Rescaled people affected	Sum total people affected per 1000 inhabitants	Sum of rescale values	Weighted total people affected per 1000 inhabitants
2000	2,580,000	19,702	2,580.000/19,702= **130.95**	0.6	130.95*0.6=**78.57**	78.57+60.36+8.44+60.74=**208.12**	0.6+0.8+0.8+1= **3.2**	208.12/3.2=**65.04**
2006	1,900,000	25,184	1,900,000/25,184=**75.45**	0.8	75.45*0.8=**60.36**			
2008	280,000	26,529	280,000/26,529=**10.55**	0.8	10.55*0.8=**8.44**			
2011	1,750,000	28,809	1,750,000/28,809=**60.74**	1	60.74*1=**60.74**			

Table II: Calculation for the weighted total people affected by drought events per 1000 inhabitants for Afghanistan.

B.

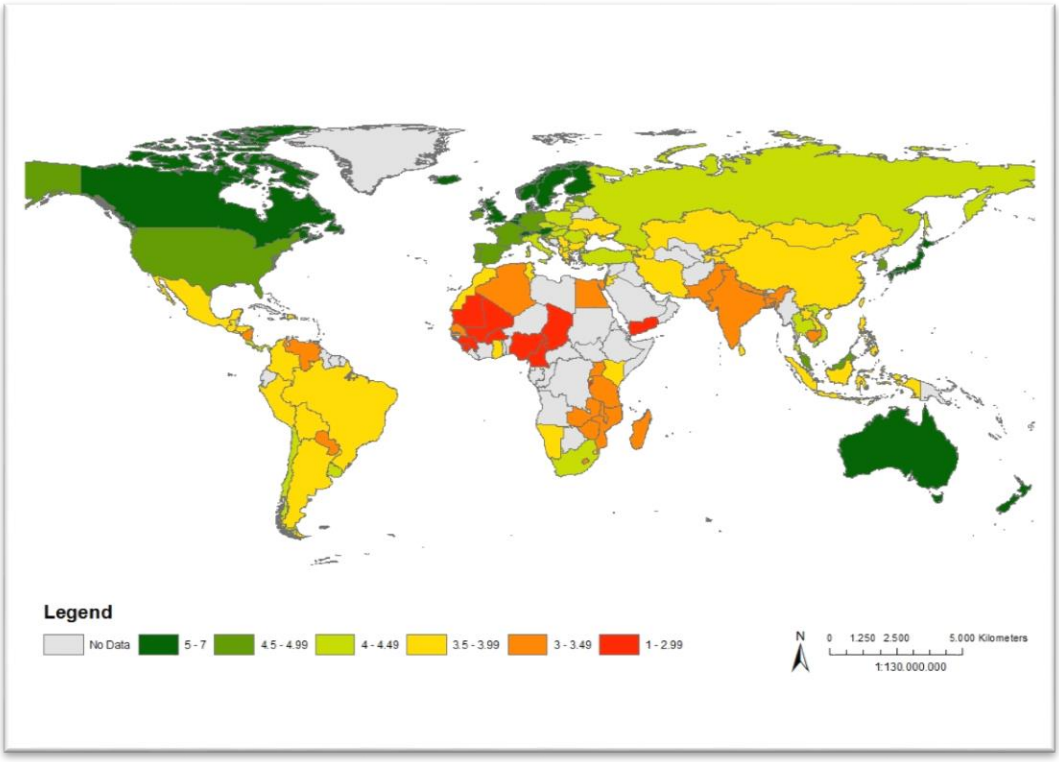


Figure I: The inclusive growth and development score at country level and data clustered in groups (World Economic Forum, 2015. Adapted by Amber Mulder).

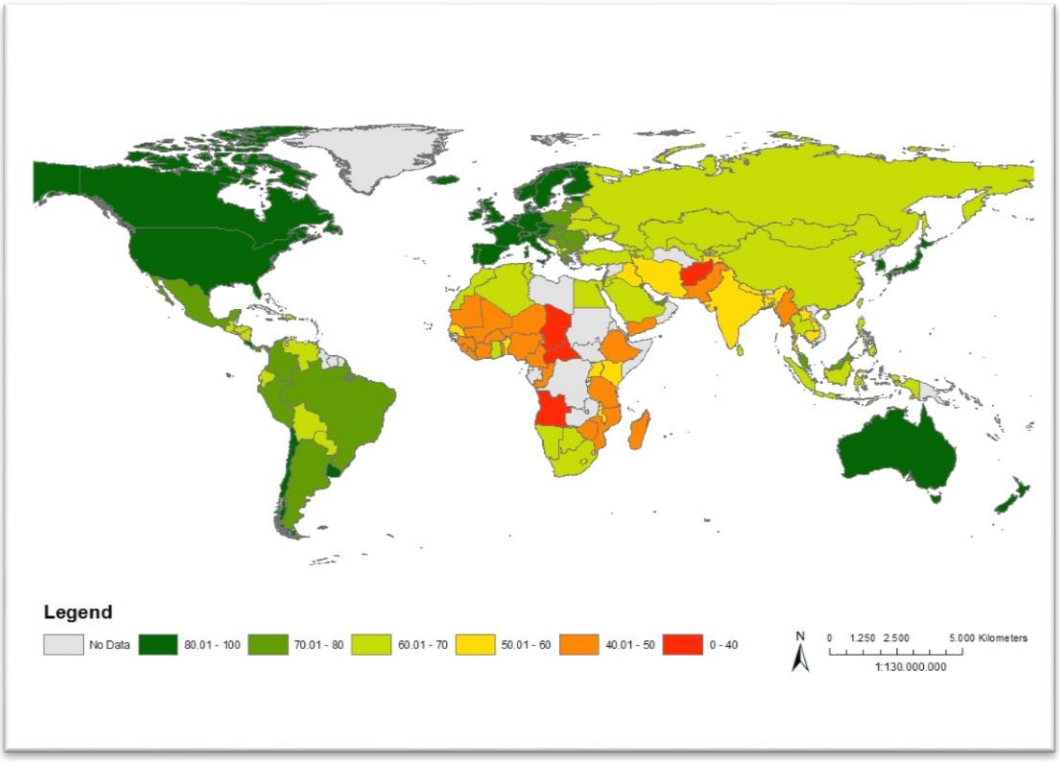


Figure II: The Social Progress Index at country level. The data is clustered in groups (Social Progress Imperative, 2016. Adapted by Amber Mulder).

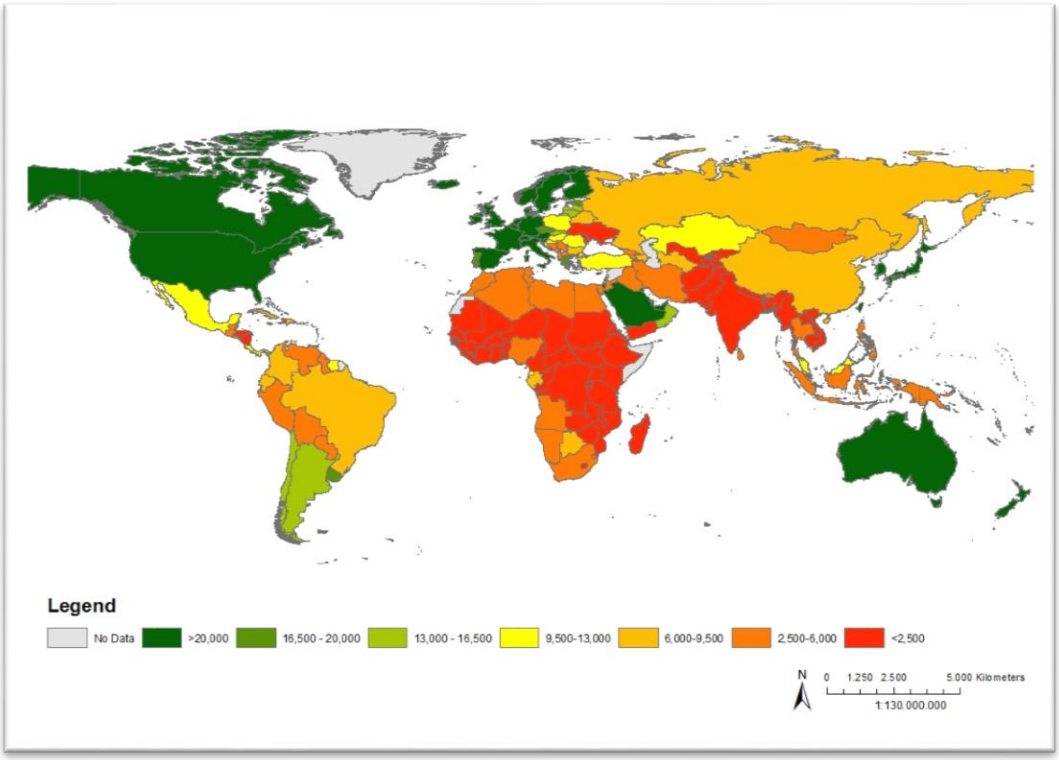


Figure III: GDP per Capita, current value, for individual countries in US dollars (International Monetary Fund, 2016. Adapted by Amber Mulder).

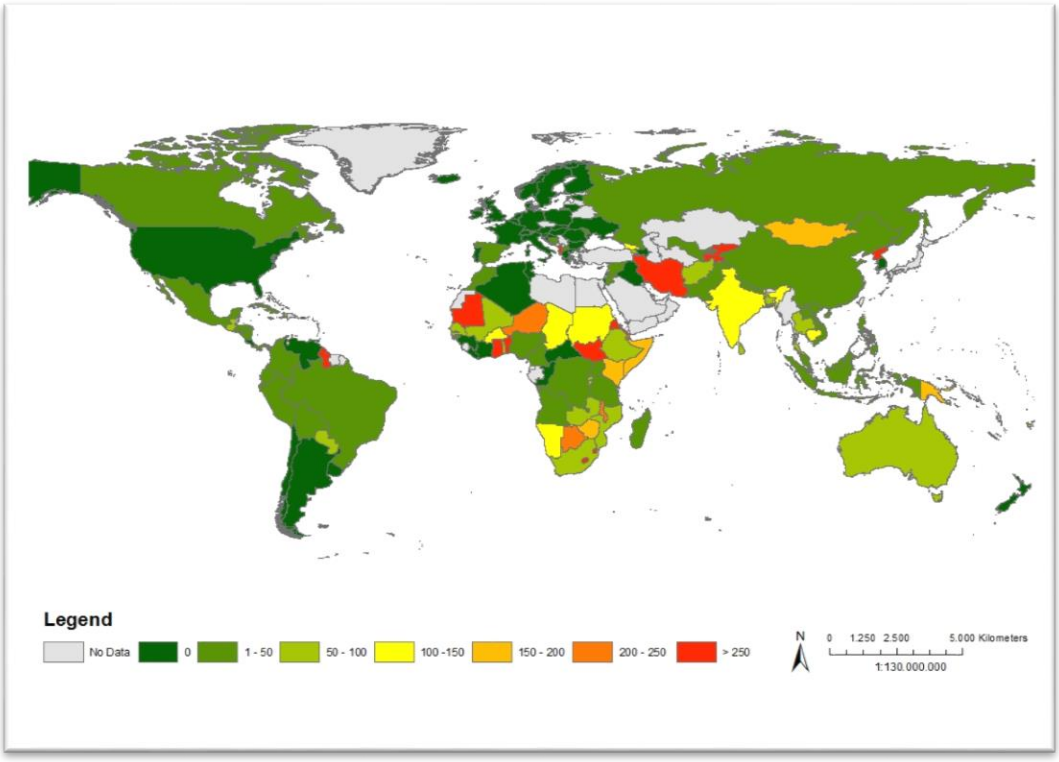
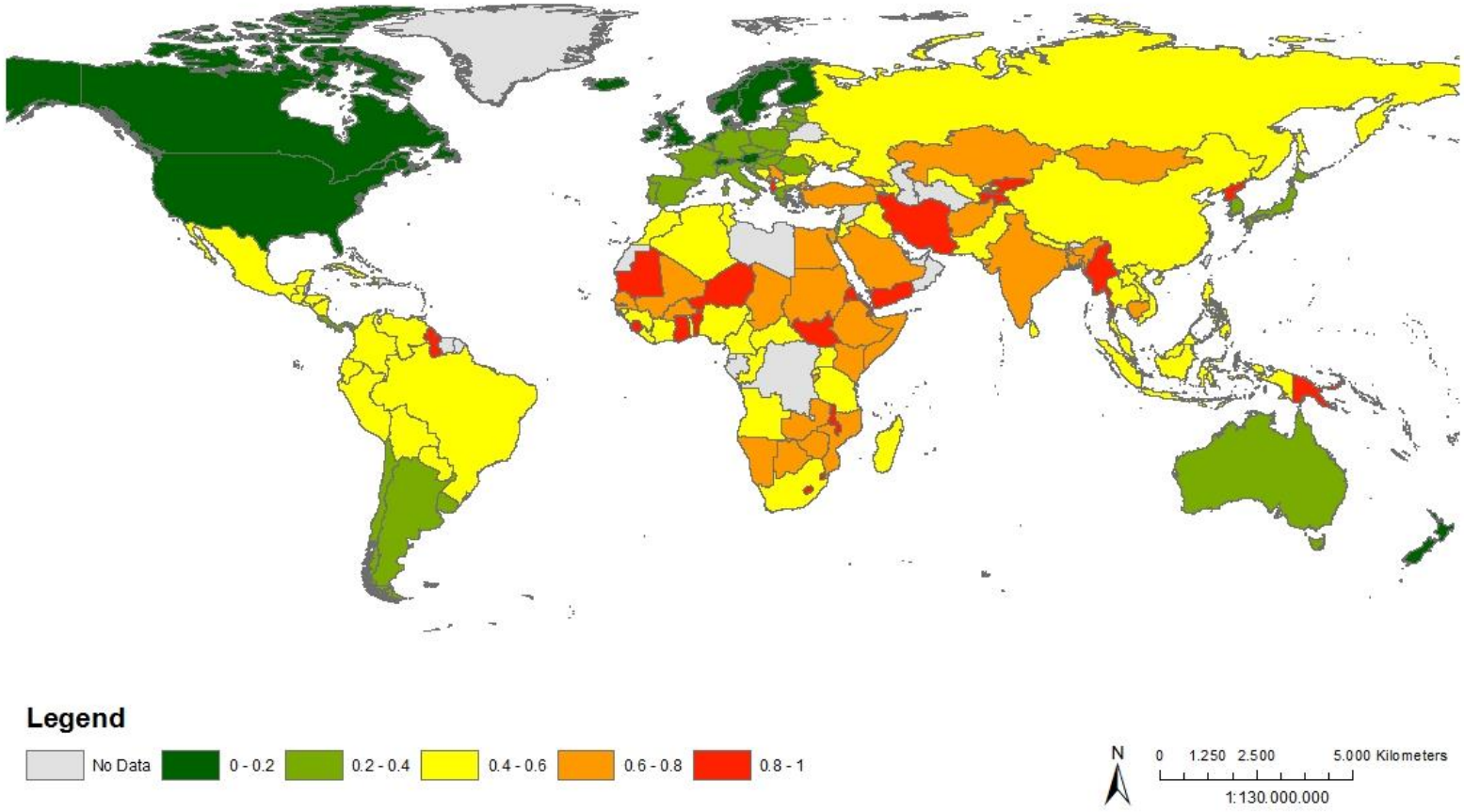


Figure IV: The weighted total amount of people affected by drought events per 1000 inhabitants (Guha-Sapir, Below & Hoyois, 2016 & United Nations, 2015. Adapted by Amber Mulder).



C.

Figure V: The countries' scores on the SVDRB visualised in clustered groups (Adapted by Amber Mulder).

Rank	Country	SVDRB
1	North Korea	1.00
2	Eritrea	1.00
3	South Sudan	1.00
4	Guyana	0.98
5	Mauritania	0.94
6	Benin	0.93
7	Yemen	0.93
8	Niger	0.92
9	Sierra Leone	0.91
10	Lesotho	0.89
11	Swaziland	0.88
12	Tajikistan	0.88
13	Ghana	0.86
14	Gambia	0.86
15	Kyrgyzstan	0.86
16	Myanmar	0.85
17	Papua New Guinea	0.85
18	Iran, Islamic Republic of	0.85
19	Malawi	0.84
20	Djibouti	0.84
21	Albania	0.83
22	Botswana	0.79
23	Chad	0.79
24	Zimbabwe	0.76
25	Egypt	0.76
26	Burkina Faso	0.73
27	Somalia	0.72
28	Kenya	0.72
29	Mongolia	0.71
30	Montenegro	0.69
31	Lebanon	0.69
32	Sudan	0.69
33	Mali	0.67
34	Cambodia	0.66
35	Serbia	0.66
36	India	0.65
37	Kazakhstan	0.65
38	Georgia	0.64
39	Afghanistan	0.64
40	Zambia	0.63
41	Turkey	0.63
42	Ethiopia	0.63
43	Saudi Arabia	0.62
44	Burundi	0.62
45	Namibia	0.62
46	Bangladesh	0.61
47	Mozambique	0.61
48	Senegal	0.60
49	Rwanda	0.59
50	Nigeria	0.59
51	Madagascar	0.58
52	Angola	0.58
53	Tanzania	0.58
54	Togo	0.58
55	Armenia	0.57
56	Haiti	0.56
57	Uganda	0.56
58	Guinea	0.56
59	Lao PDR	0.55
60	Sri Lanka	0.55
61	Central African Republic	0.55
62	Guatemala	0.55
63	Pakistan	0.54
64	Cameroon	0.54
65	Paraguay	0.53
66	Nicaragua	0.53
67	Guinea-Bissau	0.52
68	Bolivia	0.52
69	Kuwait	0.51
70	South Africa	0.51
71	Nepal	0.50
72	Liberia	0.50
73	El Salvador	0.50
74	Honduras	0.49
75	Côte d'Ivoire	0.48
76	Uzbekistan	0.48
77	Thailand	0.48
78	Congo (Brazzaville)	0.48
79	Jordan	0.47
80	Viet Nam	0.47
81	Algeria	0.47
82	Moldova	0.47
83	China	0.47
84	Venezuela	0.46
85	Iraq	0.46
86	Peru	0.46
87	Philippines	0.46
88	Morocco	0.45
89	Brazil	0.45
90	Indonesia	0.44
91	Cuba	0.44

92	Ukraine	0.43
93	Malaysia	0.43
94	Bosnia and Herzegovina	0.43
95	Azerbaijan	0.43
96	Tunisia	0.43
97	Colombia	0.42
98	Jamaica	0.42
99	Mexico	0.42
100	Macedonia, Republic of	0.41
101	Russian Federation	0.41
102	Bulgaria	0.40
103	Ecuador	0.40
104	Argentina	0.39
105	Romania	0.38
106	Panama	0.38
107	Mauritius	0.37
108	Costa Rica	0.36
109	Croatia	0.36
110	Hungary	0.36
111	Lithuania	0.35
112	Greece	0.35
113	Latvia	0.35
114	Poland	0.35
115	Slovakia	0.35
116	Uruguay	0.34
117	Chile	0.34
118	Spain	0.33
119	Czech Republic	0.32
120	Estonia	0.31
121	Portugal	0.30
122	Cyprus	0.30
123	Slovenia	0.29
124	Italy	0.29
125	South Korea	0.28
126	Israel	0.26
127	Australia	0.24
128	Japan	0.23
129	France	0.22
130	Germany	0.20
131	Belgium	0.20
132	Austria	0.19
133	Ireland	0.18
134	New Zealand	0.18
135	United Kingdom	0.18
136	Netherlands	0.18
137	Canada	0.17
138	Singapore	0.17
139	Finland	0.17
140	United States of America	0.16
141	Sweden	0.16
142	Iceland	0.15
143	Denmark	0.14
144	Norway	0.05
145	Switzerland	0.04
146	Luxembourg	0.01

Table III: The Social Vulnerability to Drought Risk Barometer scores for 146 countries on a scale of 0 (no risk of social vulnerability to drought) to 1 (strong risk of social vulnerability to drought).