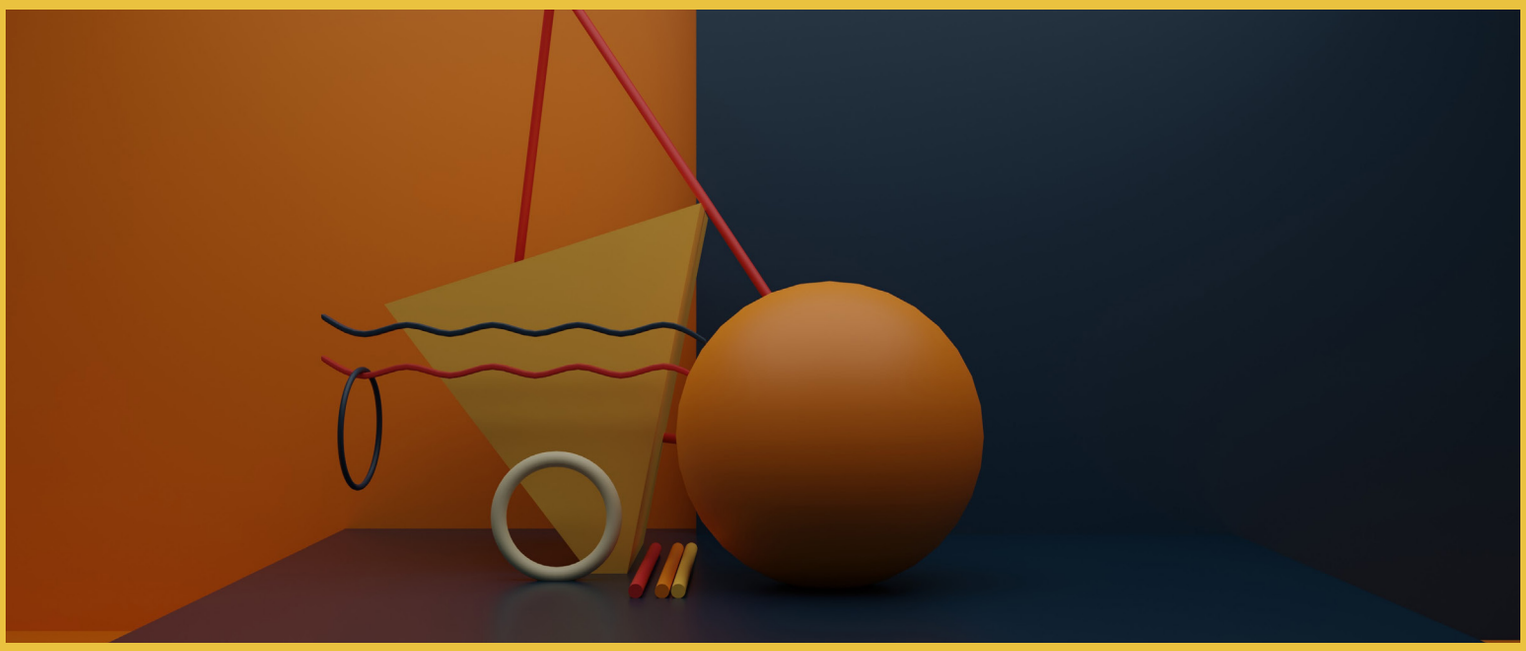
ILLUMINATE 04

DATA AND DESIGN: COMMUNICATING THROUGH VISUALIZATION



In this fourth note of the *Decoding Injustice* Illuminate module, we explore how using graphics can boost our efforts to shed light on the dynamics behind the dominant economic system. Here, activists and changemakers will find different ways in which conveying information visually will boost advocacy efforts, plus guides on how to do it.

Key Questions

How can data visualization help communicate key findings?

What are the basic types of data visualization and what can they be used to show?

What are the key principles of data visualization?

CENTER for ECONOMIC and SOCIAL RIGHTS

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Introduction

To have an impact, your research findings need to be presented, shared, explained and promoted to a variety of audiences. This includes policy-makers, decision-makers, the media, civil society organizations, the general public and rights holders themselves. It's important to communicate your findings in a clear, compelling and easy-to-understand way.

This note introduces **data visualization**, which — as we've found in our work at the Center for Economic and Social Rights — can be one important tool to convey vital information. It also discusses some of the key features and principles of data visualization. Data visualization does not need to be overly complex; after all, people have represented information graphically for thousands of years, all the way back to the earliest cave drawings. The concepts introduced in this note will be relevant whether you are preparing basic graphs yourself or collaborating with a professional designer on more advanced infographics.

Using Information Strategically

Advocacy involves talking, explaining, following up and persuading. For this reason, it is important to think creatively about your audiences and how to engage with them in different ways.

- **One size does not fit all:** The formats used to package your research have to be right for your different audiences, so it is important to be creative. Additional advocacy materials such as one-page summaries of key points, eye-catching working papers and online videos are all formats that can be effective in reaching policy-makers, for example.
- **Be serious but not dull:** It is right to be serious about the purpose, importance and game-changing nature of your findings and conclusions. However, communicating them in a dull way will fail to engage your audiences, whether they are policy-makers and experts, or activists and the general public.
- **Think about intermediaries, or knowledge brokers:** These are the people who can take your findings and repackage and present them to people and groups that you may not be able to reach as effectively.
- **The media is a key intermediary, but it requires "newsworthy" information:** What do journalists need in order to write accurate and powerful articles that can influence government officials, for example? Sending them a 50-page report is unlikely to be effective. An executive summary, selected graphs, personal stories and a press release with strong quotes are more likely to elicit their attention and ensure that the stories they write are accurate and effective.

GET THE IDEA, GET THE PICTURE, GET THE DETAILS

Tactical Tech advises that effective advocacy should allow the audience to:

This document is organized according to an innovative method for collecting, analyzing and presenting evidence around three steps:

INTERROGATE
Map the problem in depth using OPERA to identify indicators and benchmarks.

ILLUMINATE
Spotlight the underlying issues by collecting, analyzing and visualizing data.

INSPIRE
Take action to build power and hold decision-makers accountable.

- **Get the idea:** exposing the audience to the issue through techniques such as shock, humor, subversion and metaphor to make them think differently.
- **Get the picture:** helping the audience to understand your key points and enticing them to learn more about the issue, presenting evidence selectively to lend credibility to your main arguments, but without "dumbing down".
- **Get the details:** about allowing the audience to explore the issue themselves by giving them all the information you have, in ways that are both useful to them and helpful to your advocacy.

Thinking about these three layers of communication can be helpful in order when designing the advocacy materials that will accompany your report.

USE "KILLER FACTS"

Duncan Green of Oxfam International describes "killer facts" as punchy, memorable, headline-grabbing statistics that can cut through the technicalities to inspire people to change the world, and "kill off" opposing arguments.

Type of killer fact	Example
Big Number: the single statistic that shows the size of the problem	Armed conflict costs Africa $18 billion a year.
Juxtaposition: highlights injustice and double standards	A woman's risk of dying from pregnancy-related causes is 1 in 18 in Nigeria and 1 in 8,700 in Canada.
Absurdity can make a juxtaposition much more memorable	Every EU cow receives over $2 per day in support and subsidies, more than the income of half the world's people.
Surprising statistics	More people die of road traffic accidents in developing countries than die of malaria.
Humanizing abstract issues	12 million more children will go hungry by 2050 because of climate change.
Human scale: Statistics can be so big that we can't comprehend what they mean. They need to be rescaled.	UK aid spending per person per day is less than the price of a cup of coffee.

Coming up with these kinds of facts is simply a matter of applying some basic calculations in a creative way. For example, say you find that 1.3 million people fall into poverty every year. This is a large number that may be difficult to relate to. But you can scale down that number in different ways to make it easier for readers to relate to. First, you can divide it by the total population. If the population is 10.4 million people, that would mean one in eight people in the country fall into poverty every year. You could also calculate how many people fall into poverty every day by dividing the annual figure by 365: that is, more than 3,500 people *every day.*

When using killer facts, make sure to:

- Use a reliable and respected data source that is as up to date as possible; be ready to provide sources to media or politicians.
- Check that the fact cannot be misinterpreted (i.e., that the language is not too convoluted); journalists will likely look to rewrite it in plain terms, and may accidentally twist your meaning.

- Check with a statistics expert to make sure you are not introducing any statistical errors.
- Include the best killer facts in your report's executive summary and accompanying press release.
- Plan ahead, as killer facts can take a long time to develop and often involve calculating statistics in a way they are not usually calculated.

Make sure ***not*** to:

- Use too many killer facts in one report; focus on the most powerful to prevent overwhelming the reader.
- Rely on facts that have been overused in the past; keep it contemporary, relevant and interesting.
- Use a fact that is not credibly sourced, even if it fits your message. It is not worth damaging your credibility.

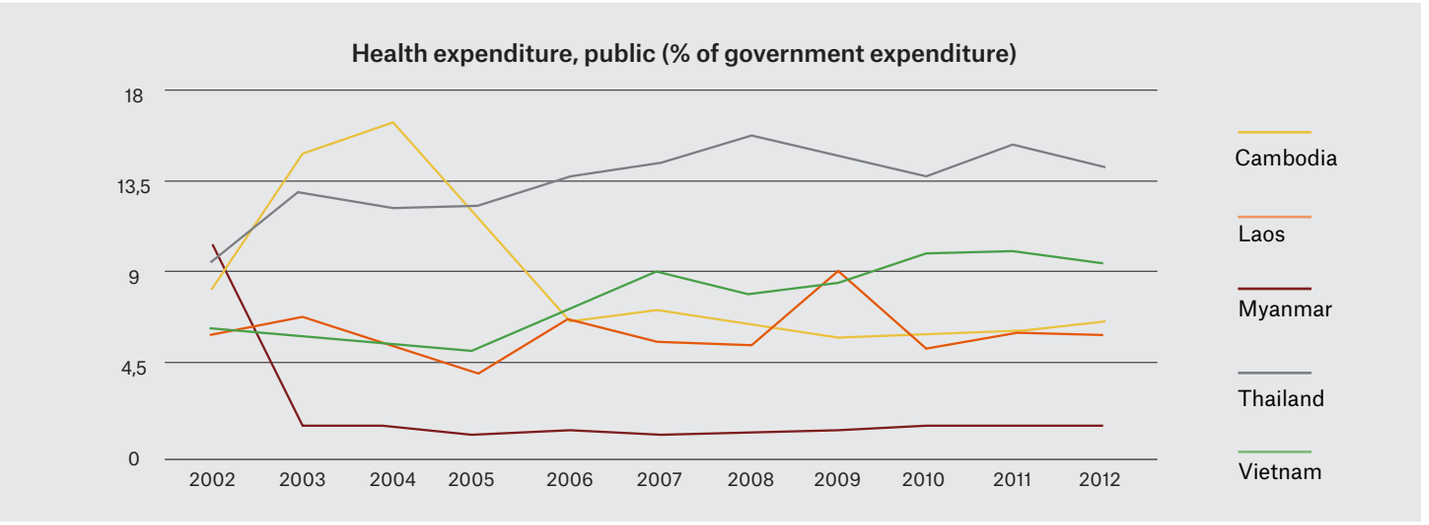
Killer facts will be particularly effective for engaging audiences such as the media and the public. They can also provide useful talking points for politicians and policy-makers.

The Importance Of Visualization In Advocacy

The saying that "a picture is worth a thousand words" — or, in this case, a graph can replace a table full of numbers — is particularly relevant in the context of using data about ESCR. Reports filled with numbers and statistics can easily lose a reader and hide important information. To meet your advocacy goals, it isn't enough to simply cite a lot of quantitative data. You need to *interpret* this data, and highlight insights and important findings about whether the government is complying with its human rights obligations in ways that are easy to understand.

Consider, for example, the table and the graph below, which both contain the same information about the percentage of the budgetary spending on health in selected countries in Southeast Asia. Which of these sends the clearer message about trends in Myanmar's spending on health?

Country Name	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Cambodia	8.35	14.78	16.52	11.64	6.71	7.21	6.39	5.94	6.14	6.21	6.72
Laos	6.06	6.74	5.37	4.11	6.85	5.67	5.48	9.06	5.41	6.08	6.08
Myanmar	10.29	1.60	1.65	0.99	1.35	1.09	1.24	1.30	1.59	1.50	1.50
Thailand	9.77	12.98	12.37	12.36	13.74	14.47	15.82	14.70	13.93	15.35	14.21
Vietnam	6.26	6.00	5.49	5.24	7.48	9.20	8.04	8.52	10.10	10.15	9.47



Presenting information visually allows the reader to quickly identify patterns, trends and outliers in the data. It helps to highlight information that could otherwise remain hidden. For this reason, it is a valuable tool for prompting your reader to think about an issue in a new way.

Nevertheless, using data to create a narrative for advocacy requires a careful balancing act. It is important to:

- **Think strategically about the position of your audience:** What do they already know or not know? What is it that you want them to understand and why?

- **Work outwards from the data:** Be clear about what the data does and does not say. Consider whether the data needs to be simplified, contextualized or complemented with other data to make your key point.
- **Design your data:** How will you bring your story together with the details in your data? How can you frame it in a succinct and compelling way without misleading or overgeneralizing?
- **Find visual stories:** What visual devices will you use to present the information in an engaging way? How will the visual design help organize and give meaning to the information?

These questions can help you decide on the type of data visualization that will be most appropriate and effective for your report.

Types Of Data Visualization

Graphs are a visual representation of the relationship between different pieces of quantitative data (called variables). Some types of graphs illustrate some types of relationships better than others. The first question in deciding what kind of graph to use is: What is the type of relationship that you want to show? For example, do you want to compare one variable over time? Rank multiple variables? Show one variable as a percentage of another? Your analysis of the data should help to answer this question. The following table provides an overview of some of the different visualization formats you can use to present the data.

What do you want to do?	Chart format
Compare values from different variables	Column or Bar
Follow values over time (time series)	Line
Show proportional breakdowns	Pie
Show the interaction between two values	Scatter

COLUMN AND BAR CHARTS

Column and bar charts are the most common way to present quantitative data. They are simple to create and to understand. They are best used when comparing data from different categories. For example, you might want to show differences in the unemployment rate across age groups.

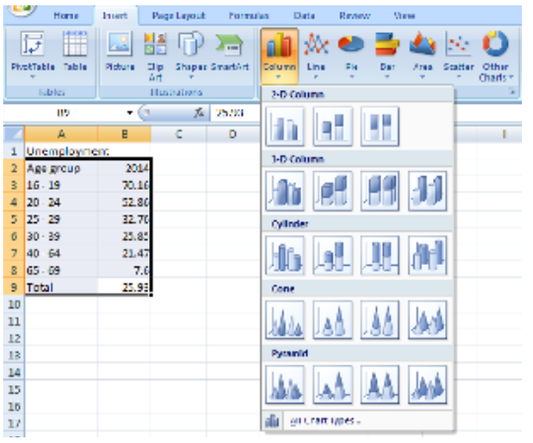
Reading column and bar charts is simple. The values are usually ordered as categories on the "X" or "Y" axis (for column and bar charts, respectively). In the example below, these values are the age groups. The values are expressed as bars (horizontal) or columns (vertical) and the extent of the bars is the value. As simple as it is, there are a few rules to keep in mind when using these kind of charts:

- Do not overload column and bar charts. Although you use multiple colors and include multiple categories, the chart may become confusing if you use too many.
- Always label your axes. The reader needs to understand what units or values are being presented.
- It is generally advisable to start your values at "0" so that the chart shows contrast in an appropriate scale.

You can build column or bar charts in Excel by following these steps:

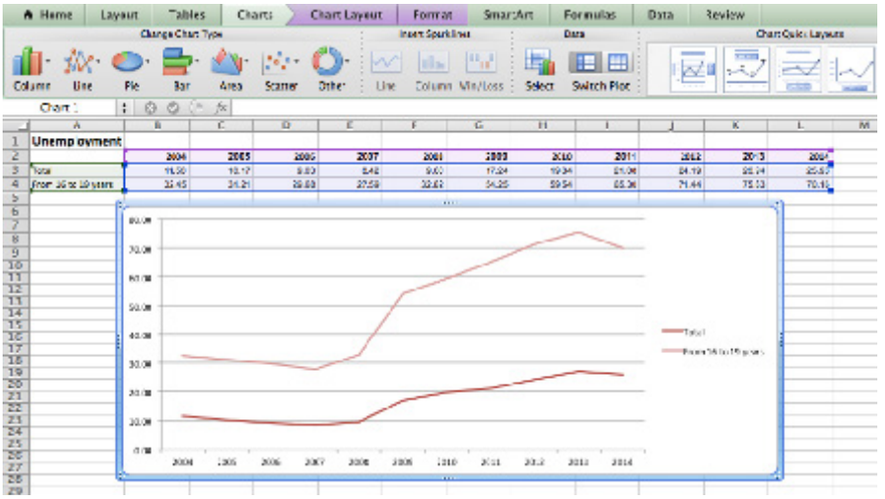
1. Filter and sort the data you are interested in visualizing (sorting by ascending or descending order makes the chart easier to read).
2. Select the data you want to use to create the chart and select "Column" from the "Insert" tab at the top of the page.

Experiment with the Chart Layouts and Chart Styles settings to remove or reposition the legend, change the color of your columns and so on. You can also change it to a bar chart using these settings. You can experiment with other types of chart by following the same instructions.



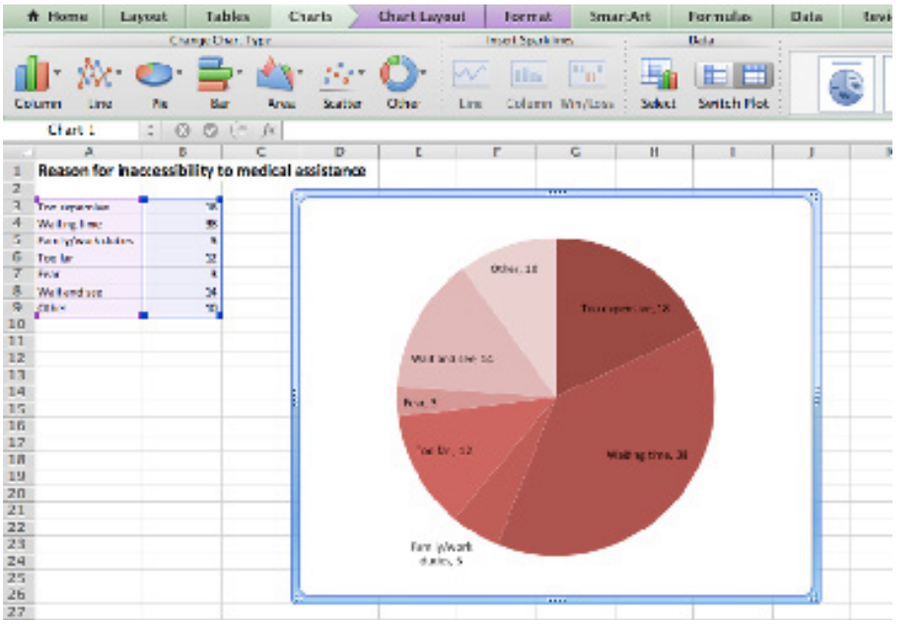
LINE CHARTS

Line charts are appropriate when you have categories and values over time (e.g., unemployment rates by age groups from 2004-2014). The values will remain on the "Y" axis, with time on the "X" axis. For example, you might want to show changes in youth unemployment over the past 10 years. You can also add multiple lines to the chart, and, for example, compare the trend in youth unemployment with that of total unemployment.



PIE CHARTS

Pie charts are used to show percentage or proportional data. Generally, the percentage represented by each category is provided next to the corresponding slice of pie. These are a visual way of displaying data that might otherwise be given in a small table. They are useful for displaying data that are classified into nominal or ordinal categories (for example, the reasons people are unable to access health services, or how satisfied people are with the quality of education in their country). Like column and bar charts, pie charts should display data for around eight categories or fewer. More than this makes it difficult for the reader to distinguish between the relative sizes of the different sectors, making the chart difficult to interpret.

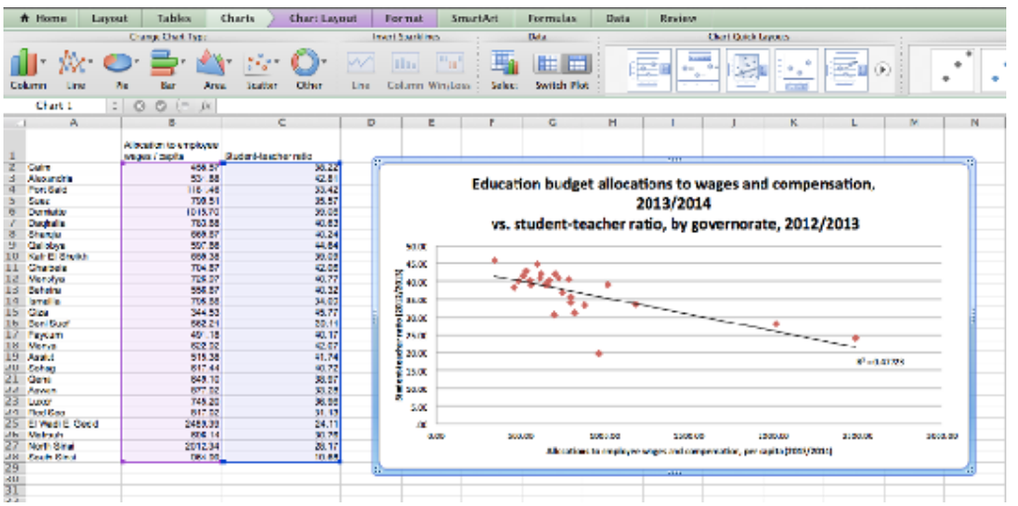


SCATTER PLOTS

Scatter plots are useful to show how different variables interact with and relate to each other. One variable is plotted on the "Y" axis and another on the "X" axis; their intersecting points show the relationship patterns. For example, in investigating the right to education in your country, you might seek to chart the relationship between expenditure on teachers' wages and student-teacher classroom ratios across municipalities.

The relationship between the two variables is called their correlation. When the two data sets are strongly linked, it can be said that they are *highly correlated*. Correlation is positive when the values increase together, and correlation is negative when one value decreases as the other increases. In this example there is a negative correlation between the two variables; more spending on teachers' wages is associated with lower student-teacher ratios.

You can also add a trend line to the scatter plot to make the negative/positive relationship clear for the reader. This is particularly useful when you have only few data points. The R^2 coefficient provides a statistical estimate of how closely the data points are correlated. An R^2 of 1 indicates that the two data points are perfectly correlated; an R^2 close to 0 indicates that there is very little relationship between the two data points.



Basic Design Principles

The effectiveness of data visualization can be judged according to its:

- **Appeal:** It should attract the reader's attention.
- **Comprehension:** It should enable clear understanding of the information, so the reader can get meaning from it.
- **Retention:** It should be memorable, so that the reader takes away a key message.

The weight given to each of these factors will depend on the objective you are trying to achieve. For example, if you are presenting your findings to a parliamentary committee, it is important that the information is seen as clear and unbiased. In this case, comprehension would be the primary goal. On the other hand, if the data is being used to support a public awareness campaign, retention might be the key priority because you want people to share what they have learned with others.

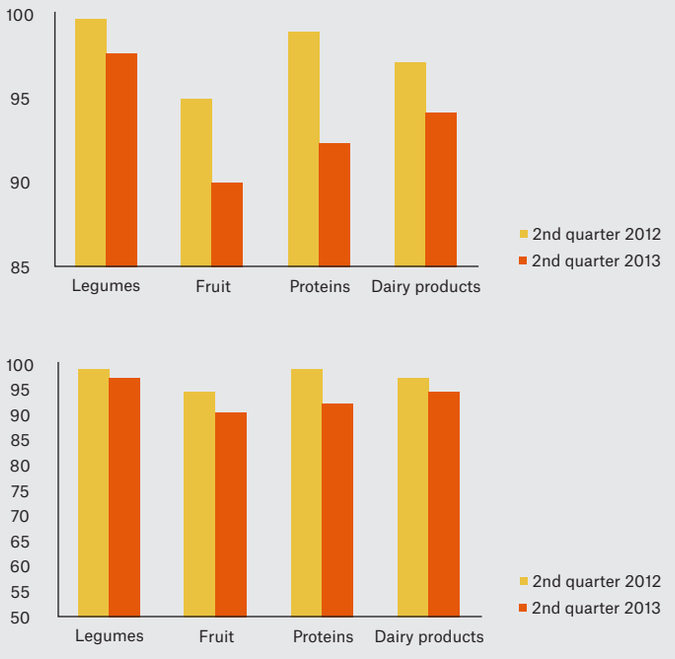
Do not manipulate data into a predefined narrative. Bad visualization can harm an advocacy message, draw attention away from the main point, or even become misleading. Below are some basic principles to follow for accurate and effective data visualization.

SIZE MATTERS

In data visualization, the size of the axis really does matter. For example, the two column charts here show the percentage of vulnerable households that consumed selected food items weekly in 2012, compared to 2013.

What conclusions would you draw from each of these graphs? Looking at the graph on the left, you might assume there was a large drop in the consumption of nutritious food. With the graph on the right, you might conclude that consumption had remained relatively stable, even though both graphs show exactly the same data.

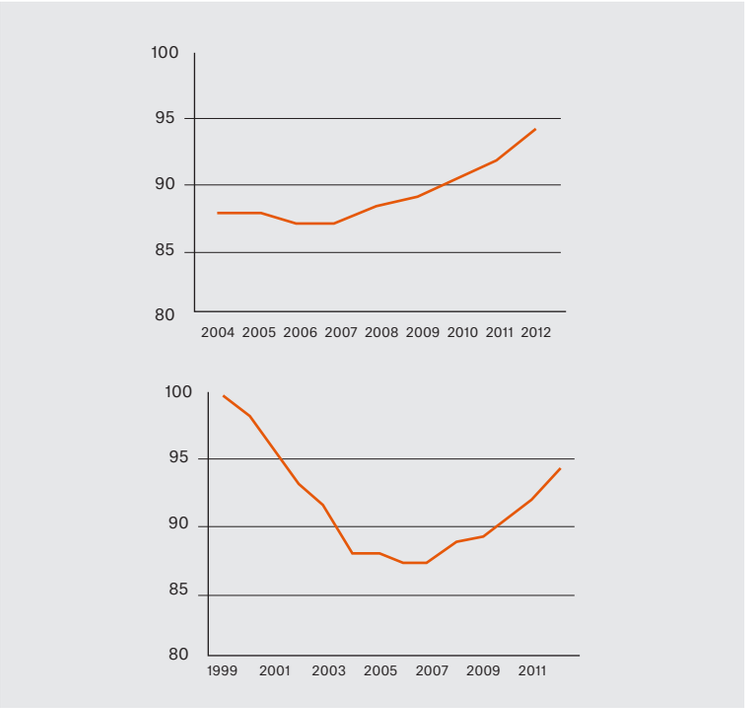
Generally, the "Y" axis (the vertical axis) ranges from "0" to the maximum value of the data. However, sometimes the range may be changed to better highlight the differences. Taken to an extreme, this technique can make differences in data seem much larger than they are.



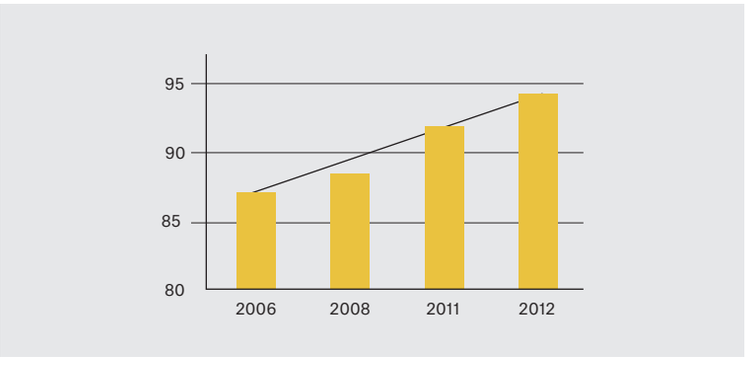
TIMELINES MATTER

Timelines are also critical when displaying data.

First, the overall date range will affect how readers interpret the trends in the data. For example, the two graphs here visualize World Bank data on school enrollment rates in the West Bank and Gaza. What conclusions would you draw from each?



Second, the date intervals need to be consistent. It is not uncommon for a data series to be missing some data points. However, it is important to avoid misleading the reader about the consistency or rate of change. The same data on school enrollments is shown below. How might it be misleading? How could it be corrected?



CLARITY MATTERS

To be effective, a reader looking at a graphic for the first time should be able to sum up the main message in a few words or short sentences. Accordingly, it is important that all the relevant pieces of information necessary to understand the graphic are clearly labeled and that different presentation elements (e.g., colors, layout, fonts) do not distract the reader's attention from the key message.

CONCLUDING THOUGHTS

Data visualization can be used wherever you want to emphasize a particular finding of your research. There is no set number of visualizations that should be included in a report. It will depend entirely on the data that you want to show. Data visualization can be incorporated into research reports or featured in supplementary advocacy materials. For example, CESR has produced a series of factsheets called *Visualizing Rights* to accompany submissions to international human rights bodies.

A good starting point for deciding what forms of visualization to include in your report is to brainstorm the following questions: Who is the intended audience? What do you want to say to them? This will help you to identify the issues or ideas that your audience would be interested to know more about. Once you have some ideas for your graphics, go back to the spreadsheets that you analyzed in your research and experiment with the data to see what options are possible. If you have ideas that you are not able to create yourself, consult with colleagues or a professional graphic designer.