Annex chapter 3: An exploratory analysis of the suitability of indicators to track progress in adaptation.

This annex describes material prepared to support Chapter 3 of the Adaptation Gap Report 2018 (hereafter ARG2018). It was prepared by Ian Noble[1] who should be contacted for further information.

Rationale

The Adaptation Gap Report from 2017 (UNEP, 2017) concluded that "The Paris Agreement's global goal on adaptation provides a new starting point and impetus for assessing progress on adaptation at the global level, but additional information is required for assessing such progress."

This annex takes up the question of whether there are feasible and robust indicators, based on the aggregation of national data, for measuring collective progress to achieve adaptation goals over periods consistent with the Paris Agreement five-year stocktakes. This rationale differs from most other adaptation frameworks and indices in that they have usually focused on ranking countries in terms of needs or capacities rather than tracking progress towards adaptation goals.

The objective here is not to suggest a particular framework for tracking change, nor to select the indicators for that framework. This is the challenge facing the adaptation community as a whole; social, physical, and biological scientists, policy makers, practitioners, the people most affected by climate impacts and ultimately negotiators. As Magnan and Ribera (2016) have suggested, an Intergovernmental Panel on Climate Change-like or a Sustainable Development Goal (SDG) indicators process may be needed to make a significant step forward in this challenge. Here we are in agreement with Tomkins *et al.* (2018) in that this annex focuses on documenting the state of adaptation rather than evaluating adaptation.

To maintain consistency with chapter 3 of the Adaptation Gap Report 2018 this annex uses terminology consistent with the International Panel on Climate Change (IPCC, 2012; 2014) by accepting that most adaptation actions seek to reduce the exposure of people, ecosystems and physical assets to climate related hazards and to reduce their vulnerability to harm if affected by climate related events. Vulnerability is usually seen as being composed of two broad elements, sensitivity to a hazard and the adaptive capacity of those affected. The scope and the dividing line between these two concepts are much debated and here we use the term vulnerability, without these subdivisions. Similarly, some prefer to use the more positive construct of 'increasing resilience' instead of 'reducing vulnerability' when describing the goals of adaption actions, especially when communicating the need for adaptation. While recognizing the subtle but often important differences between resilience and vulnerability (Nelson *et al.,* 2007), in this chapter we will tend to treat the terms 'decreasing vulnerability', 'increasing resilience' and 'increasing adaptive capacity' as synonyms.

Choosing the indicators to be considered

Selection of indicators to track adaptation will be a complex and possibly contentious process. Here we chose to focus on indicators used in adaptation related indices or frameworks that are already well established in the literature. This list includes the indices identified in Leiter (2017); namely GAIN/ND-GAIN (Chen *et al.,* 2018), INForM (Martin-Ferrer *et al.,* 2017), World Risk Report (BEH, 2017), and also a new index by Phillis *et al.* (2018) and a study of indicators suitable for aggregation for longitudinal studies by Moss *et al.* (2001)[2].

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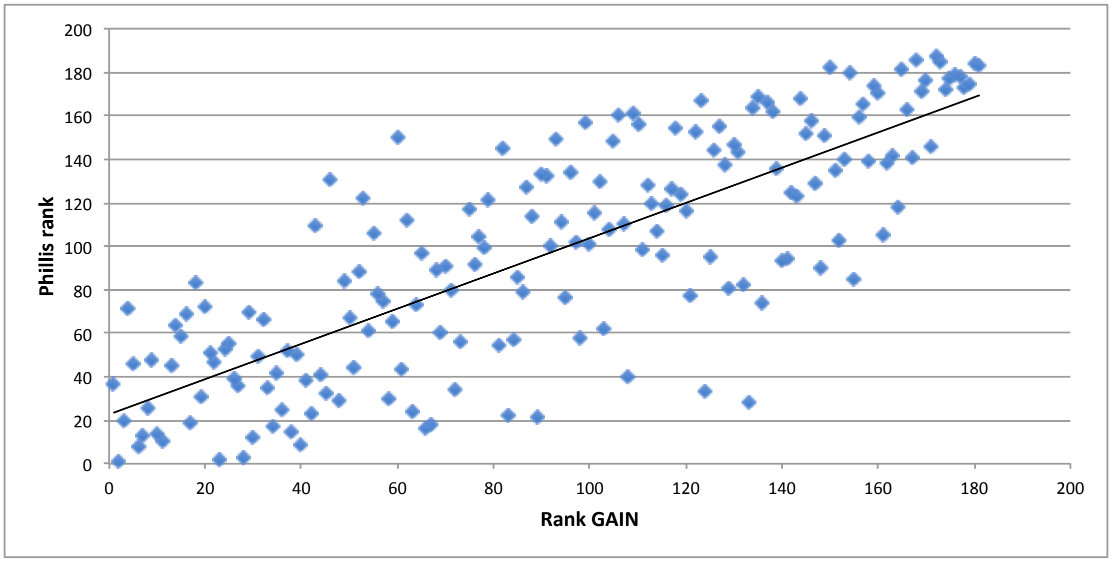
[2] We did not include the Global Climate Risk index (Germanwatch, 2017), as it is an index with a different approach based mostly on the impacts of climate disasters. We also did not consider some indices that are not openly available or are not being updated.

There is broad agreement between the selected indices, which were designed to explicitly or implicitly rank countries in adaptation preparedness. But this agreement is only in the sense that the OECD countries are the most resilient, whereas small, sub-Saharan African and many Small Island Developing States are the least resilient. A comparison between the two most similar indices (ND-GAIN and Phillis et al., 2015 indices) showed that even though they are statistically significantly correlated, the scatter in ranking of individual countries is so wide between indices as to be contentious (see fig. 3.1).

Figure 3.1: The best correlated are indices are GAIN and Phillis. But even with r^2 of 0.64 ($P << 0.001$) countries can differ by over 100 positions between the two rankings.



We analysed these five studies to identify commonly used indicators. Table 3.1 shows the 80 indicators found in the six studies[3]. On average an indicator appeared in 1.6 of the studies, with only 7 appearing in 4 or 5 of the studies. The most common indicators were used as a starting point to select a small set of indicators for further exploratory analysis.

It is essential to have a baseline for any tracking process. Here we have gone further and sought indicators that already have a significant longitudinal data set; ideally with a time series of data from at least 1996 to 2015, which represents not just a baseline but a tracking of change over the equivalent to four Paris stock-takes. Thus, they provide not only the current state of adaptive capacity, but also the trends over the recent past.

The final selection of indicators to be explored further must always be subjective, but we used a set of inclusion and exclusion criteria to guide the choice. The guiding criteria were:

- Used frequently in the five selected studies.
- Data is available from a well curated and open sources. All the indicators selected here for the exploratory set are included in the World Development Indicators, so they would not impose a burden of extra data collection at the national scale.
- Longitudinal data set, ideally from 1996 to 2015, is available.
- Data is available for most countries and especially the low- and middle-income countries, and data are collected with a frequency that justified interpolation and extrapolation between and beyond reporting dates.

[3] Twenty two very specific indicators of exposure used in INFORM were excluded from the analysis as they appeared in no other studies.

- In, or closely related to, the SDG indicators.

In selecting indicators for the exploratory set, we excluded composite indicators such as Governance Effectiveness and Corruption Perception measures. Composite measures may well be included in an agreed set of indicators, but here we were focusing on directly measurable quantities and on transparency. We also excluded direct measures of national wealth such as GNI/capita as many of the indicators are strongly correlated national wealth, and also a core analysis of the exploratory set in chapter 3 is based on national income groups and we did not want to confound the data. We also excluded measures based on statistics about climate disasters. Even when averaged over 5-year periods and blocks of 30 to 40 countries such statistics are still very volatile, driven by the stochasticity of extreme weather events. These measures can be tracked directly in a separate stream of information.

In making the final selection for the exploratory set for chapter 3 we also sought a mix of indicators to track both near term objectives, such as achieving better health related goals, and longer-term drivers of vulnerability such as urbanization, population shifts and age dependency. Thus, the focus of this chapter is the immediate past and present. Also, in keeping with the theme of this Adaptation Gap Report, we gave priority to health-related measures. The broader set considered is shown in table 3.2, and the final set of 12 indicators in table 3.3.

Table 3.1: The set of indicators found in the six studies. Y indicates inclusion and V the inclusion of a conceptually similar variant. The categories codes are used only to aid the readability of the list.

	CAT	INDICATOR	Moss et al	ND-GAIN	INFORM	WRR	Phillis et al	Count
People of Concern	C	Total Persons of Concern (absolute)			Y			1
	C	Total Persons of Concern (relative)			Y			1
	C	Proportion of population affected by natural disasters (past three years)			Y			1
	C	Hyogo Framework for Action		V	Y			2
	C	Pop living <5m above SL	V	Y	V	V	V	5
	C	Sea level rise impact on population					Y	1
	C	People killed by disasters					Y	1
	C	Economic losses from disasters					Y	1
	C	People affected by disasters (vector, water, & atopic diseases)					Y	1
	C	Frequency of disasters					Y	1
Devel., Poverty, Inequality	D	Human Development Index			Y			1
	D	Multidimensional Poverty Index			Y	V		2
	D	Gini Coefficient	Y	V	Y		V	4
	D	Public Aid per capita			Y			1
	D	Net ODA Received (% of GNI)			Y			1
	D	GDP /cap	Y			Y	Y	3
	D	% Popn in workforce	Y					1
	D	GDP inplicity deflator					Y	1
	D	Central govt debt					Y	1
Educat'n	E	Adult literacy rate	Y	V	Y	Y		4
	E	Gross School Enrolment				Y		1
	E	Teriary Enrolment		Y				1
Food	F	Domestic Food Price Level Index			Y		Y	2
	F	Domestic Food Price Volatility Index			Y			1
	F	Fertilizer use	Y	V				2
	F	Cereal productivity	Y				Y	2
	F	Food Import Dependency		Y				1
	F	Sea level rise impact on rural land					Y	1
	F	Irrigated agricultural land					Y	1
Gender	G	Gender Inequality Index			Y	Y		2
	G	Gender parity in education				Y		1
	G	Female reps in parliamet				Y		1
Health	H	Child Mortality			Y			1
	H	Prevalence of HIV-AIDS above 15years			Y			1
	H	Tuberculosis prevalence			Y			1
	H	Malaria mortality rate			Y			1
	H	Access to Improved water source (% of pop with access)	Y	Y	Y	Y	Y	5
	H	Access to Improved sanitation facilities (% of pop with access)	Y	Y	Y	Y		4
	H	Physicians density		V	Y	Y	Y	4
	H	Health expenditure per capita			Y	V		2
	H	Measles immunization coverage			Y			1
	H	Hospital Beds per 100,000				Y	Y	2
	H	Life expectancy at birth	Y			Y		2
	H	Public & Private health expendiure - separated				Y	V	2
	H	dependency on external resource for health services		Y				1
Infrastructure	I	% energy from renewables					Y	1
	I	Road density (km of road per 100 sq. km of land area)		V	Y			2
	I	Quality trade related infrastructure		Y				1
	I	Dependency on imported energy		Y			Y	2
	I	Enery intensity					Y	1
	I	Energy consumption per cap					Y	1
	I	Access to electricity (% of population)		Y	Y		Y	3
Nutrit'n	N	Children Underweight		V	Y			2
	N	Prevalence of undernourishment			Y	Y	Y	3
	N	Average dietary supply adequacy			Y			1
	N	Animal protein demand	Y					1
Governance	O	Current Subnational Conflict Intensity		V	Y		V	3
	O	Government effectiveness		V	Y		V	3
	O	Corruption Perception Index		V	Y		Y	3
	O	International engagement		Y				1
	O	Political rights					Y	1
Pop'n	P	Dependency Ratio		Y		Y	V	3
	P	Birth rate	Y				V	2
	P	Popn Density	Y					1
Habitat'n	R	% rural population		Y				1
	R	urban concentration		Y				1
	R	slum population		Y				1
	S	Insurance				Y		1
Technol.	T	Internet Users (per 100 people)		V	Y			2
	T	Mobile cellular subscriptions (per 100 people)		V	Y			2
	T	Renewable energy consumption per cap					Y	1
Environment	V	Biodiversity & habitat protection	V	V		Y		3
	V	Forest mgmt				Y	Y	2
	V	% Non-managed Land	Y					1
	V	% Managed Land	Y					1
	V	SO_2 Emissions	Y					1
	V	Natural Capital Dependency		Y				1
	V	Ecological footprint		Y				1
Water	W	Water resources	V	V		Y	Y	4
	W	Dam capacity per capita		Y				1
		Total = 136	19	32	33	22	34	

The main result presented in this annex is not the particular selection of indicators, as these were selected with some focus of the health theme and other priorities in the AGR2018. Rather, of the twelve indicators selected for full analysis 10 were assessed to be effective for tracking progress in adaptation. They would provide sufficient changes over Paris stocktakes to assess whether globally we are making progress and provide an indication of which sectors we are doing better or worse. These indicators could be applied at a national scale, but the results would have to be treated with more caution as they will be affected by just when the indicators are updated.

But within the context of the negotiations, despite the fact that adaptation lacks mitigation's greenhouse gas emissions reduction criterion, progress towards an adaptation goal will need to be, and probably can be, tracked based on a small number of agreed indicators.

Table 3.2: Thirty five indicators selected for more detailed assessment.

CAT	INDICATOR	Count	
C	Population living <5m above MSL	5	Included, but infrequently reported
H	Access to Improved water source (% of pop with access)	5	Included
H	Access to Improved sanitation facilities (% of pop with access)	4	Included
H	Physicians per 1000 population	4	Included
N	Adult literacy rate	4	Excluded, weak reporting
W	Burden placed on available water resources	4	Excluded, diversity of measures used
D	Gini Coefficient or Share of income of poorest percentile	4	Included
D	GNI /capita	3	Excluded, see text
N	Prevalence of undernourishment	3	Included, as depth of food deficit
O	Current Subnational Conflict Intensity	3	Excluded, composite measure
O	Government effectiveness	3	Excluded, composite measure
O	Corruption Perception Index	3	Excluded, composite measure
P	Dependency Ratio (ratio <16 or >65 to working age poipulation)	3	Included
I	Access to electricity (% of population)	3	Included
V	Biodiversity & habitat protection	3	Excluded, composite measure
G	Gender Inequality Index	2	Excluded, composite measure
C	Hyogo Framework for Action compliance	2	Excluded, composite measure
D	Multidimensional Poverty Index	2	Excluded, composite measure
F	Domestic Food Price Level Index	2	Not used
F	Fertilizer use	2	Not used
F	Cereal productivity	2	Not used
H	Health expenditure per capita	2	Not used
H	Hospital Beds per 100,000	2	Not used
H	Life expectancy at birth	2	Not used
H	Public & Private health expendiure - separated	2	Not used
N	Children Underweight	2	Not used, child stunting and mortality included
P	Birth rate or population growth rate	2	Incorporated in Population living <5m above MSL
T	Mobile cellular subscriptions (per 100 people)	2	Included
T	Internet Users (per 100 people)	2	Not used, but discussed with mobile phone usage
U	Road density (km of road per 100 sq. km of land area)	2	Not used
U	Dependency on imported energy	2	Not used
V	Forest management quality	2	Excluded, composite measure
H	Immunization, measles (% children aged 12-23 months)	0	Included, health focus
H	Mortality rate, under 5 (per 1,000 live births)	0	Included, health focus
H	Stunting, height for age (% of children under 5)	0	Included, health focus

Table 3.3: An interpretation of each of the 12 indicators in the exploratory analysis.

Indicator	Description	Suitability, usage, links to SDGs, and WDI code for the data set
% Population with access to Improved water source and % Population with access to Improved sanitation	These two indicators provide similar information and both show how much the LICs, and to a lesser extent the L-MICs are lagging other countries. When grouped by vulnerability classes, SSA is seen to lag behind other low-income countries including the SIDS especially on improved sanitation services. These remain strong indicators of progress in two areas vulnerable to disruption by climate events and important to maintaining public health.	Effective and widely used in indices. SDG 6.1.1 SH.H2O.BASW.ZS
Number of physicians per 1000 people	Show similar information as the indicators on access to improved water and sanitation. Again, SSA is lagging well behind other LICs, but in this case the SIDs are also lagging. They have almost 4 times the numbers of physicians per population than in SSA, but they still have only half the number that other LICs & MICs do.	Effective and widely used in indices. SDG 6.2.1 SH.STA.BASS.ZS
Immunization, measles (% of children ages 12-23 months)	These data show the value of focused effort to improve health outcomes. Both LICs, MICs and SSA are approaching vaccination levels of HICs. There are signs that the rates of increase are falling and that vaccination rates have tended to stabilize over the past 5 to 10 years. There are similar trends in Hep B and DPT vaccinations. These are important to monitor but they may not be good long-term indicators of progress in adaptive capacity.	Effective, but approaching saturation (i.e. there will remain little room to improve). SDG 3.b.1 SE.MED.PHYS.ZS
Mortality rate, under-5 (per 1,000 live births)	The LICs, MICs and SSA countries are performing similarly in reducing child mortality by 40 to 50% over the past 20 years. But they still have mortality rates of 10 to 20 times that of OECD countries. SSA has mortality rates that are double other developing country groups.	Effective. SDG 3.2.1 SH.IMM.MEAS
Prevalence of stunting, height for age (% of children < 5 years-old)	Similar to the above child mortality indicators, with LICs, MICs and SSA countries reducing the prevalence of stunting by about 20% over the past 20 years. However, countries with poor child health outcomes vary significantly on the two measures.	Effective and commonly used in indices. SDG 2.2.1 SH.DYN.MORT
Depth of the food deficit (kilocalories per person per day)	All groups have reducing the food deficit by about 30% to 50% over 20 years. But the LICs have not reached the average of L-MICs of 20 years ago, and similarly L-MICs have not reached levels of U-MICs. The indicator suggests there is progress but at a rate much slower than desired.	Effective and commonly used in indices. SDG 2.1.2 SH.STA.STNT.ZS
Dependency Ratio (here ratio of 0-	Dependency ratios are falling across all developing countries. This is probably due to lower birth rates and is a positive	Effective and commonly used; a

14yr & over 65 year-olds to 15-65 year-olds)	indication that they are in a better position to support education, and have fewer dependent people needing help in extreme events etc. This indicator is available separately for dependency of young and elderly people and probably a more nuanced assessment could be made.	breakdown into dependent young and older people may increase its value. Not in SDGs SN.ITK.DFCT
Income share held by bottom 10th percentile of income earners	There are small improvements in all developing countries but there remains more inequality than in higher income countries, where inequality has increased slightly. There are different interpretations of how well inequality is measured by such broad-brush economic indicators. The Gini coefficient, which measures across all income groups, is often used to measure inequality. The indicators are strongly correlated (r^2 =0.8)	Widely used but less effective; more socially based indicators of inequality might be better. SDG 10 SP.POP.DPND
% Population with access to electricity	Electricity access is increasing everywhere, although HICs and even U-MIC are close to full coverage. But, in 1996-2000 LICs had 41% fewer people connected than the L-MICs. 15 years later they have more people connected but are still 42% behind U-MICs.	Effective and commonly used. SDG 7.1.1 DI.DST.FRST.10
Mobile phone users (per 100 people)	Low income countries were slow to adopt this technology but over the past decade or so their rate of uptake has been very rapid. They will reach levels equivalent to high income countries within a decade. Internet usage may give a clearer measure of progress and probably better captures access to modern information services. .	Effective and commonly used; likely to saturate over the next decade. SDG 16.6.2
Population living in areas where elevation is below 5 metres (in 1,000s)	A commonly used indicator of an important component of exposure, but not effective for tracking progress as currently collected. Only two estimates have been made over the past 20 years with very little change in terms of the estimated percent of population exposed. The numbers of people exposed has increased along with population increase.	Widely used but less effective due to low granularity and frequency; other indicators might be more useful. SDG 11 EN.POP.EL5M.ZS

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Annex chapter 4.

This annex describes material prepared to support Chapter 4 of the Adaptation Gap Report 2018

Annex 4.1 Updated evidence on the estimated costs of climate change and adaptation

Global estimates

- More estimates have been published of the global economic costs of climate change, with further updates to integrated economic assessment models (for example, see IWG (2016)), but also computable general equilibrium models (for example, OECD (2015)), econometric studies (for example, Burke *et al.* (2015)) and studies that combine or synthesize these estimates in new modelling analyses (for example, Ricke *et al.* (2018)). These global studies are usually presented in terms of the economic impacts expressed as an equivalent percentage of Gross Domestic Product (welfare-equivalent income loss, expressed as a percentage of income), as this provides the simplest comparable metric for aggregate damage (note that dollar values vary with year and socio-economic scenario). Recent studies generally indicate higher economic costs (as a percentage of Gross Domestic Product) compared to earlier studies (for example, see Sterner, 2015) as do recent updates to existing models (for example, Nordhaus (2017) for the DICE model). Some of the newer studies indicate significantly greater damage than other models (for example, Burke *et al.,* 2015: Burke *et al.,* 2018).
- Studies estimate that global adaptation costs up to 2040 will be broadly similar between scenarios, but diverge strongly by the end of the century. For example, Hof *et al*. (2014) reports that global adaptation costs without mitigation (>4°C) will be about five times higher than a 2°C scenario by the end of the century.
- There are strong differences in regional residual damage and adaptation costs, which are masked if global studies alone are considered. For example, De Cian *et al.* (2016) report large regional disparities. This is particularly the case in India, Africa, Southeast Asia and Indonesia, where the climate change impacts associated with a 2°C warmer climate were found to be as high as 3-4 percent without adaptation, and still 2-3 percent with adaptation. The distribution of damage and adaptation costs will therefore remain profoundly unequal, irrespective of the stringency of the mitigation effort and the possibility of adapting to climate change.
- The importance of adaptation is also much greater under the scenario without mitigation, as a failure to invest in adaptation measures will lead to much greater additional damage. Mitigation is therefore a strategy to reduce the risk of uncertain damage and the failure to invest optimally in adaptation.
- The timing of mitigation also influences adaptation costs and residual damage (Admiraal *et al.,* 2015). Global damage and adaptation costs mainly occur in the second half of the century. Between 2040 and 2100, adaptation costs and residual damage differ between mitigation scenarios as a result of their different projections of transient temperature increases. These annual costs amount to about 1 percent (range 0.2–1.5 percent) of global Gross Domestic Product in the mitigation scenarios and 3.5 percent.
- (range 0.5–5.5 percent) in the baseline. The present value of the damage and adaptation costs (for both a 2 percent and 5 percent discount rate) in the early action scenario is 10 percent lower compared to a delayed action path.
- There is very little evidence on the costs of adaptation for a 1.5°C scenario. Indeed, there are limited studies even of the economic costs of such scenarios (Burke *et al.,* 2018), though intuitively the costs of adaptation should be lower for such a scenario.

Sector estimates

- Previous global studies of adaptation have drawn on sector impact studies. There are updated sector estimates of the costs and benefits of adaptation both globally and regionally.
- In the coastal sector, new global and regional estimates are available from the DIVA model from the RISES-AM study (Hinkel, 2014). This reports global annual investment and maintenance costs of US$ 12–71 billion in 2100, finding that coastal dikes reduce impacts by two to three orders of magnitude. The study also provides new estimates of extremely high sea level rise scenarios (for example, above current IPCC estimates), which show much higher economic costs globally (up to US$50 trillion in annual flood damage under the high-end scenario without adaptation (RISES-AM, 2017)), and would increase the costs of adaptation very significantly. A larger number of more detailed national and local studies are also emerging.
- Estimates of global river flooding adaptation costs are also now available (Ward *et al.,* 2017). This study concludes that adaptation costs vary considerably according to the adaptation approach (optimized response, constant relative or constant absolute risks) and scenarios. The annual global costs of adaptation (over the period 2020–2100) are estimated at between US$27 billion per year (RCP6.0/SSP3/optimized response) to US$219 billion per year (RCP8.5/SSP5/constant absolute risk). Here to a larger number of more detailed national and local studies are emerging.

- In the agricultural sector a larger number of studies have been produced, including inter-comparison global analyses. There has been more work on adaptation globally and regionally for both trade (autonomous market) and planned adaptation. These studies report significantly higher costs than the earlier Economics of Adaptation to Climate Change: for example, Ignaciuk and Mason-D'Croz (2014) estimated OECD adaptation costs at between US$16 and US$20 billion per year by 2050, while Mosnier *et al.* (2014) estimated global adaptation costs of between US$12 and US$ 19 billion per year in 2050. Computable general equilibrium modelling assessments of autonomous trade adaptation (Szewczyk *et al.,* 2016) and planned adaptation (Parrado *et al.,* 2016) have also been conducted.
- In the energy sector, there are now more studies of global energy demand (including cooling demand; for example, De Cian and Sue-Wing, 2017; Hasegawa *et al.,* 2016; Labriet *et al.,* 2015). These indicate large increases in cooling demand and autonomous adaptation costs (for example, rising household cooling demand in warmer countries). Note that, even though globally the changes in energy demand are moderate (between heating and cooling), the additional adaptation costs of cooling fall primarily on developing countries and represent additional adaptation costs for the countries affected. This is because there are no transfers between reduced heating demand in some countries and higher cooling in others. These adaptation costs are not included in previous global studies (such as Economics of Adaptation to Climate Change) and would increase country and regional estimates (notably in Africa and Asia) very significantly. There are also now studies of energy supply adaptation costs, for example, Van Vliet *et al.* (2016).
- In the health domain previous estimates have been updated, but there has also been more focus on labour productivity impacts (occupational health) and adaptation responses (for example, OECD, 2015; Lloyd, 2016).
- Coverage of the costs of adaptation in other sectors is less developed, being particularly low for business and industry, and biodiversity and ecosystem services. The latter is a particular omission. While there is some literature on the costs and benefits of ecosystem-based adaptation, there is almost no literature on the costs of actions to ensure that ecosystems adapt.
- There are now some inventories of adaptation costs that collate bottom-up studies (see ECONADAPT inventory[4]).
- There is relatively little literature on the potential co-benefits of adaptation. Certain types of adaptation (for example, climate-smart agriculture, ecosystem-based adaptation) do have potentially large co-benefits, but there are no aggregated estimates of their potential. There have also been some studies that have started to look at the adaptation economy, stressing that adaptation might generate new growth and employment opportunities, though to date these have focused on the national or city scale (Georgeson *et al.,* 2016).

Annex 4. 2. Major multilateral climate change funds supporting adaptation

Major multilateral climate change funds supporting adaptation

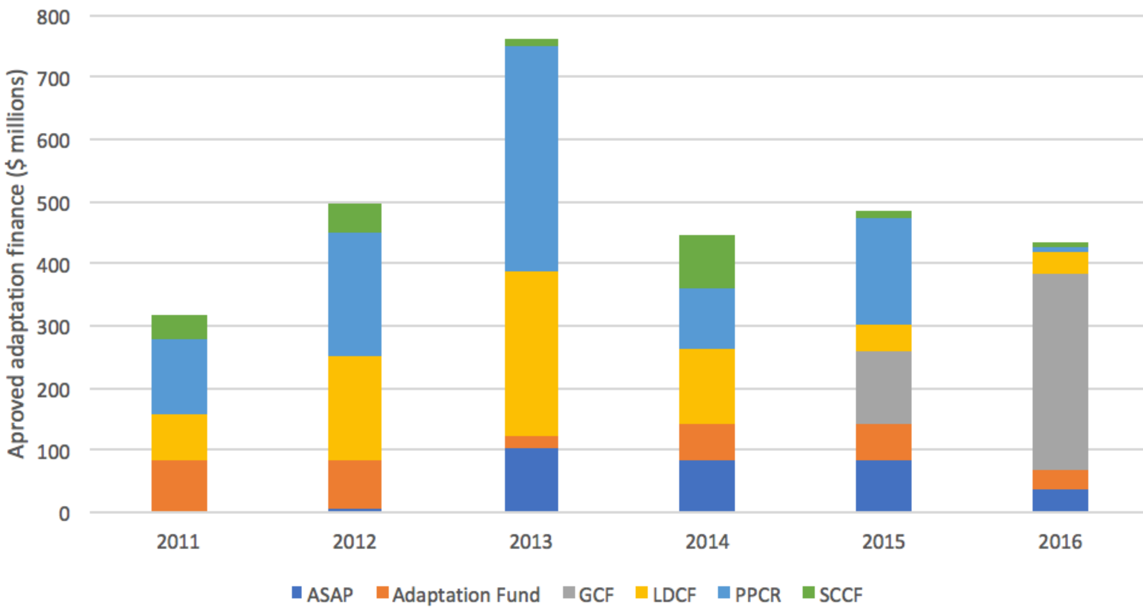
Multilateral climate funds pool contributor finance and spending to focus on specific climate objectives, operating through multilateral, regional or national organizations. Finance is highly concessional, often Official Development Assistance provided in the form of grants, concessional loans and more recently as guarantees and equity. The funds are in theory able to take on more risk than development finance institutions in order to stimulate further climate finance. Many, however, operate with or are implemented by Multilateral Development Banks.

There are five multilateral climate funds within the United Nations Framework Convention on Climate Change (UNFCCC). The Green Environment Facility manages the Least Developed Countries Fund and the Special Climate Change Fund, both of which are adaptation focused. The Global Environment Facility also manages a trust fund on climate change as a focal area, although this is more broadly targeted on mitigation activities. The Adaptation Fund, which operates under the Kyoto Protocol rather than the Financial Mechanism of the UNFCCC, like the other funds mentioned here, is a legal entity in its own right, with the World Bank as the interim Trustee. The Green Climate Fund, the newest and largest multilateral fund dedicated to climate change, became operational in 2015. Although supporting adaptation and mitigation, it aims to budget 50 percent of its resources for adaptation (Schalatek *et al.,* 2017).

Multilateral climate funds that focus on adaptation outside the UNFCCC include the Pilot Program Climate Resilience and the Adaptation for Smallholder Agriculture Programme. The former is an adaptation targeted program of the Climate Investment Funds that aims to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning, provide incentives for scaled-up action and initiate transformational change. The Adaptation for Smallholder Agriculture Programme is a special fund of the International Fund for Agricultural Development designed to channel climate and environmental finance to smallholders and to scale up climate change adaptation in rural development programmes.

[4] Available at: www.econadapt.eu/

Figure 4.1: Adaptation finance approved through key multilateral climate funds



Source: *CFU, 2018.*

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