

DISCUSSION PAPER: Cross Cutting Climate Change: How to integrate Climate Change in the Post 2015 Framework

Lead authors: Jo Phillips, Consultant; Bernadette Fischler, CAFOD; Ruth Fuller, WWF UK;

With support from Sarah Wykes and Graham Gordon, CAFOD, Alison Doig, Christianaid, Rachel Garthwaite, Save the Children, Lis Wallace, Progressio. 4 October 2013

Executive Summary

This discussion paper makes the case for climate change to be effectively mainstreamed through the post-2015 agenda. It is science based, drawing on the latest peer-reviewed literature and evidence to clearly articulate the relevance of climate change to post-2015 goal areas, and then, through proposing climate smart targets and indicators, it provides practical solutions for effective climate mainstreaming.

Climate smart refers to strategies and interventions that achieve so called ‘triple wins’ of adaptation, mitigation and reduces poverty whilst also reducing green house gas emissions and enabling adaptation to climate impacts.

The need for a climate smart post-2015 development framework.

Without addressing climate change comprehensively, goals on eradicating poverty will be ineffective and short term, and fail to ensure sustainable development. Cross-cutting climate change also integrates key components for mapping sustainable pathways for future development, and helps to ensure progress in one goal area does not undermine another or future sustainability overall.

It is also important to recognize that it is not a given that all responses to climate change will be sustainable or automatically benefit poor or vulnerable people. For example, adaptation policies and interventions that focus on reducing specific climate sensitivities such as predicted changes in precipitation or hydrological regimes, can adversely affect vulnerable groups and create social inequality. To be climate-smart, the post 2015 framework needs to address:

- **Mitigation:** The urgency shown by the global carbon budget – CO₂ emissions need to peak within this decade and rapidly decline thereafter to prevent unmanageable climate change.
 - **Equity and fairness:** in terms of global justice, common but differentiated responsibilities and the right to develop, framed by planetary boundaries. Developed countries continue to have a particular responsibility to take action, but with increasing carbon-intense lifestyles around the world all countries and citizens need to take action according to their different contexts and respective capabilities.
 - **Adaptation, resilience and DRR:** The needs of those already affected and dealing with climate impacts and uncertainty now through effective disaster risk reduction and redress for loss and damage, as well as building resilience and adaptive capacity for the change to which we are already committed.
- Monitoring, review and adaptive management:** The dynamic nature and longer timeframes of the climate change process – goals and targets need to be flexible to address increased knowledge or changing global or local conditions. This should increase ambition where possible but not lower it.

“A hundred years from now, the only question that will appear important about the historical moment in which we now live is the question of whether or not we did anything to arrest climate change.”

The Economist, December 2011

Integrating climate change across goal areas in the post-2015 framework

This paper explores the relevance of climate change for five different post-2015 goal areas and suggests concrete targets that should be embedded in the respective goal area to ensure it is climate smart. The research shows that climate change is to a varying degree relevant to different goal areas. In general goals such as income poverty or health don't point as directly to action on climate change as goals on water, energy and food, but to achieve them, all the goals require some degree of action on climate change. Many goal areas are linked and targets can relate to one or more goals. However, the targets on mitigation, adaptation and resilience listed below under 'Eradicating income poverty' are an absolutely essential prerequisite to a successful mainstreaming of climate change. The targets themselves are illustrative: some are qualitative and some quantitative.

Potential targets for "Eradicating income poverty"

The status quo in many countries is to treat poverty reduction and climate change as two separate entities. To have any chance of ending extreme poverty by 2030, climate change must be effectively addressed through coherent actions across the post-2015 development framework. This means addressing not only adaptation needs, especially those of groups living in extreme poverty, but also tackling the causes of climate change by agreeing and implementing the emissions cuts necessary to deliver mitigation commitments under the UNFCCC.

Target: Global emissions peak within this decade and rapidly decline thereafter, with national action based on the principle of common but differentiated responsibility and sound science, in line with the UNFCCC agreement to keep global warming below 2°C.

In addition, to ensure that climate disruption does not make the goal of reducing income poverty unobtainable, the resilience of people living in poverty to current and future climate change impacts must be built. To achieve this, disaster risk reduction (DRR) and adaptation must be integrated into development planning with ongoing learning and sharing of information. There are various aspects to 'integration' but one crucial building block is 'joined-up' national planning across sectors and ministries responsible for development outcomes, with clear political leadership.

Target: Build the resilience and the adaptive capacity of people living in poverty and vulnerable groups to the current and future impacts of climate disruption.

Potential targets for "Access to health"

Climate change has huge and growing implications for our ability to ensure healthy lives across the globe, but particularly in developing countries with higher levels of poverty and lower coverage of health services. Given some climate impacts are already being felt and future impacts cannot be avoided, it is vital that health systems are strengthened to better understand and address how climate disruption affects human health. According to the IPCC (2007) *"...on its own [economic development] will not insulate the world's population from disease and injury due to climate change (very high confidence). Critically important will be the manner in which economic growth occurs, the distribution of the benefits of growth, and factors that directly shape the health of populations, such as education, health care, and public-health infrastructure."*¹ It is crucial that these factors of education, health care, infrastructure – but also the issue of unequal access to these basic services – are specifically addressed.

Target: Health systems ensure that education, care and public infrastructure are climate smart and build the resilience of local and national populations to the impacts of current and future climate disruption.

Resilience and adaptive capacity need to be improved everywhere; impacts of recent hurricanes and heat-waves show that even high-income countries are not well prepared to cope with extreme weather events. However, the poorest and most vulnerable groups of people and areas with weak health infrastructure – mostly in developing countries – will be the least able to cope and need significant international support.

Target: % increase of international support for the poorest and most vulnerable groups, i.e. those with little or no access to health services, to reduce their vulnerability to climate-change related health impacts.

Potential targets for “Food security, nutrition and agriculture”

Climate change has profound implications for agriculture, food security and nutrition. It is imperative that sustainability is at the heart of increasing any or all agricultural productivity. Evidence for this needs to show climate smart agricultural development and adaptation to warming (for example, access to crop varieties with greater drought and heat tolerance, improved and expanded irrigation systems, rainwater harvesting technologies, access to weather and climate information, disaster relief efforts, and insurance programs). Building the resilience of smallholder farmers to intensifying environmental threats and investing in order to make them more food secure should be core and complementary priorities for the post-2015 framework.

Current suggestions for targets cover many critical issues, and are broadly welcomed. For the targets to be successful in meeting the goal, clear links to climate change need to be made. For example:

Target: Support small-holder agriculture to become climate resilient by shifting to eco-system based approaches (rewording 5c of HLP report)

Other targets proposed to address climate change and help meet this goal area include:

Target: Consumption patterns and industrial food systems transformed to reduce greenhouse gas emissions and food waste, including by cutting food waste related to consumption and processing from 40% to 20% by 2020 and from 20% to 10% by 2030.

Potential targets for “Achieve universal access to water and sanitation”

Changing rainfall patterns and the increasing severity and frequency of natural disasters all threaten the availability of clean and safe water that in turn could lead to an increase in food shortages, diarrhoea and waterborne diseases as well as compromise water and sanitation systems and increase the possibility of conflict over scarce water resources. Many economies are at risk of significant episodic shocks and worsened chronic water scarcity and security, which can have direct and severe ramifications on the economy, poverty, public health and ecosystem viability. The HLP report includes a target on universal access to water and sanitation, but fails to address the critical interconnected issue of water resource management, which is vital for supply.

Target: Adopt sustainable, integrated and equitable water management practices, which improve and protect the quantity, quality and timing of water flows, and ensure fair and equitable access for all.

Climate change will put a premium on information about water resources, yet this is lacking in many countries.

Target: Strengthened and transparent water resource monitoring systems addressing quantity, quality, use, distribution and reliability, including for groundwater resources¹.

¹ Whilst the strategic importance of ground water for global water and food security will probably intensify under climate, a lack of groundwater observations currently limits understanding of the dynamic relationship between ground water and climate.

Both WASH and water resources management investments can be ‘screened’ for climate risks to ascertain the extent to which existing development projects consider climate risks; identify strategies for incorporating climate change into projects; and guide project managers towards those options that minimise risk.

Target: WASH and water resources management investments are climate smart, based on the best available science and incorporating local knowledge and that are developed inclusively, with effective participation of affected communities including vulnerable groups.

Potential targets for “Secure sustainable energy”

Most of the current targets proposed under the UN’s Sustainable Energy for All initiative (SE4All)² are not ambitious enough to keep the world below 2°C warming threshold recommended by scientists and ensure secure sustainable energy for all. Energy poverty still afflicts billions of people around the world – notably between 1.3 to 1.6 billion people have no access to electricity and almost 2.7 billion cook or heat with open fires. Access to modern energy is essential for the provision of clean water, sanitation and healthcare and for the provision of reliable and efficient lighting, heating, cooking, mechanical power, transport and telecommunications services.

Target: Universal energy access: sustainable, secure, safe and affordable energy services for poor women and men

The International Energy Agency (IEA) has called for an “energy sector revolution” from 2020 onwards, shifting from fossil fuels towards more renewable and efficient energy solutions, or the world will overshoot the internationally agreed danger-threshold of 2°C global warming in the long run.

Target: Reduce total emissions from unabated fossil fuels by x% by 2030, and absolute and wasteful energy consumption levels by XXXX, with benchmarks provided at regular five yearly intervals on the way to 2030.

According to the IEA, over two thirds of current fossil fuel reserves have to stay in the ground in order to have a reasonable chance at preventing catastrophic levels of climate change². This includes stopping new exploration³.

Target: Phase out fossil fuel subsidies by XXXX and replace with support for climate smart, sustainable, clean, energy investment in developed and developing countries.

In turn, climate disruption is already impacting on our energy security by disrupting the systems for producing and transporting energy.^{4 5} It is thus also crucial to build a more climate-resilient energy sector. Accelerated adoption of climate smart, economically sustainable, clean and renewable energy technology and energy efficiency measures would also diversify energy supply and strengthen energy security.

Target: Build resilience within the energy sector to address the impacts of climate disruption, including through building climate smart, systems that ensure sustainable affordable, safe and secure energy services to vulnerable communities.

²SE4ALL Goals: 1) ensure universal access to modern energy services, 2) double the global rate of improvement in energy efficiency, 3) double the share of renewable energy in the global mix.

Introduction

The post-2015 process and climate change

At the September 2010 Millennium Development Summit and the UN Conference on Sustainable Development in 2012 ('Rio+20'), UN Member States and other stakeholders initiated important steps towards advancing the development agenda beyond 2015. At the same time, Member States are preparing under the UNFCCC process a new, ambitious and binding climate deal to be agreed in 2015.

The aim of the post-2015 development framework is to “eradicate extreme poverty in all its forms while ensuring a sustainable development path for all countries”⁶. This aim can only be achieved if climate change is addressed.

Box 1: “The intensifying risks of climate change threaten to reverse our achievements to date and undermine any future gains.” UN SG Report
“Without tackling climate change, we will not succeed in eradicating extreme poverty.” UN High Level Panel Report
“Unless the climate challenge is addressed it may become impossible to end extreme poverty.” UN Sustainable Development Solutions Network

However, whilst climate change has been recognised as a most serious threat to poverty eradication by both, the post-2015 High level Panel (box 2) and the Rio+20 conference⁷, concrete and convincing suggestions on how to address it effectively and across the framework have not been forthcoming. Many goal areas and targets already suggested do not address it at all. This is a serious gap and shortcoming, which could jeopardise current and future action to eradicate poverty and ensure sustainable development.

This discussion paper makes the case for climate change to be effectively mainstreamed through the post-2015 agenda. It is science based, drawing on the latest peer-reviewed literature and evidence to clearly articulate the relevance of climate change to post-2015 goal areas, and then, through proposing climate smart targets and indicators, it provides practical solutions for effective climate mainstreaming.

Climate smart refers to strategies and interventions that achieve so called ‘triple wins’ of adaptation, mitigation and reduces poverty whilst also reducing green house gas emissions and enabling adaptation to climate impacts.

Why mainstream climate change across the post-2015 development framework?

The need for this is clear and urgent. As the SDSN Leadership Council have stated “*Climate change is no longer a future threat but a stark current reality: global temperatures are rising, extreme weather events are becoming commonplace, and the oceans are acidifying.*”⁸ It is also no longer only an environmental issue but is increasingly recognised as a political economy issue. It is a ‘threat multiplier’, amplifying existing social, political, and natural resource stresses.

Climate change is an existential threat, affecting everyone and everything. However it is and will continue to disproportionately affect the poorest and most vulnerable people and places the most, impacting negatively those least responsible for the climate crisis.

Box 2 “Above all, there is one trend – climate change – which will determine whether or not we can deliver on our ambitions. Scientific evidence of the direct threat from climate change has mounted. The stresses of

unsustainable production and consumption patterns have become clear, in areas like deforestation, water scarcity, food waste, and high carbon emissions. Losses from natural disasters – including drought, floods, and storms – have increased at an alarming rate. People living in poverty will suffer first and worst from climate change. The cost of taking action now will be much less than the cost of dealing with the consequences later.” *Report of the HLP of Eminent Persons on the Post-2015 Development Agenda*

Current and projected climate change – the science.

Scientists now concur that it is at least 95 per cent likely that human activities – chiefly the burning of fossil fuels – are the main cause of warming since the 1950s⁹. The world has warmed by approximately 0.8°C over the course of 1901-2010 and will continue to warm at approximately 0.2°C per decade for the next two decades after which temperature rises depend on the specific emissions scenarios.¹⁰ According to a monitor commissioned by the world’s most vulnerable countries and backed by high-level and technical panels, “*climate change causes 400,000 deaths on average each year today, mainly due to hunger and communicable diseases that affect above all children in developing countries. Our present carbon-intensive energy system and related activities cause an estimated 4.5 million deaths each year linked to air pollution, hazardous occupations and cancer*”. According to the research, the impacts are being felt most keenly in developing countries, where damage to agricultural production from extreme weather linked to climate change is contributing to deaths from malnutrition, poverty and their associated diseases¹¹ - areas at the centre of every development agenda.

Despite this reality, and even though the global community has committed itself under UNFCCC to holding warming below 2°C global average above pre-industrial levels to prevent “dangerous” climate change, the sum total of current policies - in place and pledged - will very likely lead to warming far in excess of this. The UNEP Emissions Gap Assessment warns that current warming coupled with the present global emission trends and pledges set us on a path to reach warming in the range of 3-5°C by 2100, with global emissions estimated for 2020 closest to levels consistent with a 3.5-4°C pathway.¹²

Box 3 “*Without further commitments and action to reduce greenhouse gas emissions, the world is likely to warm by more than 3°C above the preindustrial climate. Even with the current mitigation commitments and pledges fully implemented, there is roughly a 20 per cent likelihood of exceeding 4°C by 2100. If they are not met, a warming of 4°C could occur as early as the 2060s. A world in which warming reaches 4°C above preindustrial levels (hereafter referred to as a 4°C world), would be one of unprecedented heat waves, severe drought, and major floods in many regions, with serious impacts on human systems, ecosystems, and associated services*”.

From *Turn Down the Heat: Why a 4°C Warmer World must be Avoided*. (November 2012) A report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics Executive Summary

The world remains dangerously off course in mitigating human-induced climate change. This is despite growing evidence and increasing consensus. As the Leadership Council of the SDSN has stressed “*the situation is far more perilous today than in 1992*”¹³. *Global emissions continue to rise sharply as the global economy expands, dependence on fossil fuels remains very high, and progress in decarbonizing the world’s energy systems remains frustratingly slow*”¹⁴. This provides an essential context for future development, and a post-2015 framework needs to respond to and address the challenges of climate change, and the challenge of redefining so it is truly sustainable.

The costs and impacts of climate change

A global monitor found that *“Climate change caused economic losses estimated close to 1% of global GDP for the year 2010, or 700 billion dollars (2010 PPP).”* Climate change- related losses together with carbon economy costs amounted to over 1.2 trillion dollars in 2010.

Predicted costs are alarming - By 2030, the researchers have estimated that the cost of climate change and air pollution combined will rise to 3.2% of global GDP, with the world's least developed countries forecast to bear the brunt, suffering losses of up to 11% of their GDP. Major economies will also take a hit, as extremes of weather and the associated damage – droughts, floods and more severe storms – could wipe 2% of the GDP of the US by 2030, while similar effects could cost China \$1.2tr by the same date.¹⁵ Many costs are only just being calculated. Recent research published in Nature put a price tag on the impacts to the global economy from the potential release of billions of tons of methane from thawing permafrost beneath the Arctic Ocean – \$60 trillion from the East Siberian Sea, alone¹⁶.

It is likely that overlapping effects of climate change will increase risk as well as the challenge of adaptation, especially in regions where adaptive capacity is low. Moreover, as the scale and number of climate related impacts grow with increasing global mean temperature, interactions between impacts might also increasingly occur, compounding overall impact. For example, a large shock to agricultural production due to extreme temperatures across many regions, along with substantial pressure on water resources, would likely impact health and livelihoods. This could, in turn, cascade into effects on economic development by reducing a population's work capacity, which would then hinder growth in GDP.¹⁷ This emphasises the necessity of climate change being addressed comprehensively across all goal areas.

Facing up to a fundamental development and economic crisis

At the moment no country has achieved sustainable development. Ambitious targets for developed country are crucial - sustainable development pathways are most urgently needed in high income countries. Climate change, along with resource scarcity and unsustainable development more broadly, are symptomatic of a fundamental development and economic crisis, one which needs to be addressed by the post-2015 framework if we are not to replicate and exacerbate existing problems and at larger scale.¹⁸

Box 4 *“It is also unrealistic to think we can help another one billion people to lift themselves out of poverty by growing their national economies without making structural changes in the ‘world economy’. There is an urgent need for developed countries to re-imagine their growth models. They must lead the world towards solutions to climate change by creating and adopting low-carbon and other sustainable development technologies and passing them on to others. Otherwise, further strains on food, water and energy supplies and increases in global carbon emissions will be inevitable.”*

Report of the HLP of Eminent Persons on the Post-2015 Development Agenda

Leaders in the corporate sector are waking up to the links between finite resources and climate change and business, according the UN Global Compact, wants to lead innovation.¹⁹ Analysts at the London-based financial services company HSBC (the third largest publicly held bank in the world) calculated that if climate change is taken seriously and climate change agreements are upheld, share prices of major oil companies could be cut by up to 60%²⁰ – leading to massive market losses. Professor Lord Stern has noted that *“Smart investors can already see that most fossil fuel reserves are essentially unburnable because of the need to*

reduce emissions in line with the global agreement. They can see that investing in companies that rely solely or heavily on constantly replenishing reserves of fossil fuels is becoming a very risky decision."²¹ Under the international Carbon Disclosure Project (CDP), investors worth \$87 trillion have called on companies to begin disclosing their "carbon risk".²² The shift in focus to a low-carbon transition should likely occur prior to 2017 and continue aggressively thereafter. As stated by the High level Panel *"We can reach large-scale, transformative solutions worldwide with more investment, collaboration, implementation and political will"*.²³ A post-2015 framework is likely to differ from the MDGs in including targets and indicators for private sector impacts and accountability, this needs to extend to carbon reporting and climate impacts.

The need for a climate smart post-2015 development framework.

Without addressing climate change comprehensively, goals on eradicating poverty will be ineffective and short term, and fail to ensure sustainable development. One of the recognised shortcomings of the MDGs was the failure to properly integrate social, economic and environmental aspects of development. It also integrates key components for mapping sustainable pathways for future development, and helps ensure progress in one goal area does not undermine another or future sustainability overall.²⁴

It is also important to recognize that it is not a given that responses to climate change will be sustainable or benefit poor or vulnerable people. For example, adaptation policies and interventions that focus on reducing specific climate sensitivities such as predicted changes in precipitation or hydrological regimes, can adversely affect vulnerable groups and create social inequality.²⁵²⁶ Responses to climate change need to contribute to sustainable development, in terms of both equity and environmental integrity in the long term. Post-2015 goals and targets that fall short of this would be merely 'building castles on sand' and would ultimately fail the poor they are aiming the help. To be climate-smart, the post 2015 framework needs to address:

- **Mitigation:** The urgency shown by the global carbon budget – CO₂ emissions need to peak within this decade and rapidly decline thereafter to prevent unmanageable climate change. The level of impacts that developing countries (and the rest of the world) experience will be a result of government, private sector, and civil society decisions and choices, including their inaction. Sustainable development must be steered towards low-carbon development worldwide, including through sustainable consumption and production patterns.
- **Equity and fairness:** in terms of global justice, common but differentiated responsibilities and the right to develop, framed by planetary boundaries. Developed countries continue to have a particular responsibility to take action, but with increasing carbon-intensive lifestyles around the world all countries and citizens need to take action according to their different contexts and respective capabilities.
- **Adaptation, resilience and DRR:** The needs of those already affected and dealing with climate impacts and uncertainty now – through effective disaster risk reduction and redress for loss and damage, as well as building resilience and adaptive capacity for the change to which we are already committed.
- **Monitoring, review and adaptive management:** The dynamic nature and longer timeframes of the climate change process – goals and targets need to be flexible to address increased knowledge or changing global or local conditions. This should increase ambition where possible but not lower it.

Integrating climate change across goal areas

The following chapters of this discussion paper look at five different goal areas:

- | | |
|---|---|
| 1. Ending income Poverty | 4. Achieve Universal Access to Water and Sanitation |
| 2. Ensure Healthy Lives | |
| 3. Food security, Nutrition and agriculture | 5. Secure Sustainable Energy. |

These five areas are intended to serve as an opener for discussions, putting concrete examples on the table for further examination. Additional goal areas will be added at later stages and colleagues are welcome to add their assessments of further areas, including Empower Girls and Women and Achieve Gender Equality; Education and Lifelong Learning; Create Jobs, Sustainable Livelihoods, and Equitable Growth; Manage Natural Resource Assets Sustainably; Ensure Good Governance and Effective Institutions; Ensure Stable and Peaceful Societies; Create a Global Enabling Environment and Catalyse Long-Term Finance; Tackling inequality.

Each goal area shows how they are linked to climate change, on the basis of the following criteria:

(i) Climate relevance to the goal area

There are varying degrees of relevance to different goal areas depending on their focus. In general goals such as health or education don't point as directly to action on climate change as goals on water, energy and food, but to achieve them, all the goals require some degree of action on climate change.

(ii) Data and statistics

A selection of 'killer facts' underlines why climate change is relevant for the goal area.

(iii) Recommendations on climate-change specific targets for the goal area

Poverty is multi-dimensional. Because a specific goal area is discussed does not automatically mean that it is exactly this goal area where the suggested targets must be integrated into. Many goal areas are linked and targets can relate to one or more goals. Further, the targets on mitigation, adaptation and resilience are sine qua non to a successful mainstreaming of climate change. The targets themselves are illustrative: some are qualitative and some quantitative.

(iv) How climate change is currently addressed under this goal area in key post-2015 texts and processes

The key texts referenced in each table are: HLPEP A New Global Partnership Report (May 2013), SDSN Action Agenda for Sustainable Development (June 2013), Global Compact Corporate Sustainability and the UN Post 2015 Development Agenda (June 2013), Open Working Group - TST issue briefs.³

The 'scoring' for this criterion is based upon explicit references to climate change in the texts (including, for example, mitigation, adaptation, loss and damage, disaster risk reduction, greenhouse gas emissions, carbon footprint and resilience):

- No mention of climate change
- + Climate change mentioned briefly, amongst other issues or threats
- ++ Climate change impact set out in relation to goal area or part of goal area
- +++ Climate change impact addressed comprehensively and in specific detail

³ Goal areas are based on common language used in the HLP, SDSN and UN Global Compact. Where language differs between the various reports, we have used that of the HLP. For example, whilst MDG1 and the SDSN combine ending extreme poverty and hunger, here we have followed the HLP and included hunger in Goal 5 *Ensure food security and good nutrition*.

GOAL AREA: End income Poverty – addressing and integrating climate change

Climate relevance to the goal area “Eradicating income poverty”

The UN estimates that the proportion of people living in extreme poverty (\leq 1.25 USD per day) has been halved at the global level. Despite this achievement, some 1.2 billion people are still living in extreme poverty worldwide. (UNDESA, 2013). In sub-Saharan Africa, almost half the population live on less than \$1.25 a day. The number of people living in extreme poverty has risen steadily, from 290 million in 1990 to 414 million in 2010, accounting for more than a third of people worldwide who are destitute (UNDESA, 2013). Furthermore, Africa is one of the most vulnerable continents to climate change and climate variability.²⁷

Climate change is making the lives of people who live in poverty more challenging, eroding sources of consistent income, and straining coping strategies used to survive hardship. The growing lack of predictability in weather and the increased number of climate shocks are disrupting individual and household planning and budgeting, closing off avenues to climb out of poverty.^{28 29} Recently, a global monitor estimated the impact on labour productivity and therefore income as the most significant near-term impact of climate change in monetary terms.³⁰ Certain population groups are disproportionately represented among the poor, and face additional constraints – such as restricted access to productive resources and markets – to escaping from poverty. These include women; persons with disabilities; children; in many cases, indigenous peoples or those from cultural or ethnic sub-groups; and those living in geographically remote or conflict-affected areas. Some of these population groups may have livelihoods and wellbeing that are closely intertwined with natural resources and the environment.³¹

In general, countries with the fewest resources are likely to bear the greatest burden of in terms of loss of life and relative effect on investment and the economy due to various forms of climate disruption. Many sectors providing essential livelihood services to the poor in developing countries are undergoing serious stress due to current climate variability and disruption, for instance small-holder agriculture³². With increases in temperature greater than 2-3°C, all regions will very likely experience either declines in net benefits or increases in net costs.³³ The need to divert funding to DRR and recovery due to intensifying climate disruption or to adaptive investments could also reduce the public money available to support poverty eradication and social protection, unless additional funds become available.

A joint report by development banks, intergovernmental bodies and governments stressed that *“Adaptation is necessary and there is a need to integrate responses to climate change and adaptation measures into strategies for poverty reduction to ensure sustainable development.”*³⁴

Data and statistics – the killer facts

By 2100, in South Asia and sub-Saharan Africa, up to 145 - 220 million additional people could fall below the \$2-a-day poverty line, compared with a world without climate change. (World Bank, 2013)

Climate change caused economic losses estimated close to 1% of global GDP for the year 2010, or 700 billion dollars (2010 PPP). Together, carbon economy- and climate change- related losses amounted to over 1.2 trillion dollars in 2010 (DARA, 2012).

Recommendations including potential targets for “Eradicating income poverty”

The status quo in many countries is to treat poverty reduction and climate change as two separate entities. To have any chance of ending extreme poverty by 2030, climate change must be effectively addressed through coherent actions across the post-2015 development framework. This means addressing not only adaptation needs, especially those of groups living in extreme poverty, but also tackling the causes of climate change by agreeing and implementing the emissions cuts necessary to deliver mitigation commitments under the UNFCCC.

Target: Global emissions peak within this decade and rapidly decline thereafter, with national action based on the principle of common but differentiated responsibility and sound science, in line with the UNFCCC agreement to keep global warming below 2°C.

Possible indicators:

- Agreement on global and national carbon budgets and emissions cuts in line with the 2°C target agreed under UNFCCC.
- Decarbonisation strategies implemented for key sectors (e.g. power, transport etc) with effective social protection for those living in extreme poverty and vulnerable groups.

In addition, to ensure that climate disruption does not make the goal of reducing income poverty unobtainable, the resilience of people living in poverty to current and future climate change impacts must be built. To achieve this, disaster risk reduction (DRR) and adaptation must be integrated into development planning with ongoing learning and sharing of information. There are various aspects to ‘integration’ but one crucial building block is ‘joined-up’ national planning across sectors and ministries responsible for development outcomes, with clear political leadership³⁵.

Target: Build the resilience and the adaptive capacity of people living in poverty and vulnerable groups to the current and future impacts of climate disruption.

Possible indicators:

- DRR and climate change adaptation is integrated across all national, sub-national, and sectoral development planning, such as Poverty Reduction Strategies (PRS) or national sustainable development strategies.
- Checks are in place to ensure planned development activities do not undermine the capacity of the poor to adapt to climate variability and disruption, including screening activities for climate risk.
- The needs of the most vulnerable and poor communities are reflected in local and national development policy, planning and project implementation – especially social protection policies – through genuine participatory planning (number of vulnerable and poor people participating in local and national development policy, planning and implementation)
- Number of national, regional and local land use plans incorporating hazards and risk through participatory development and land-use planning.

Summary of how climate change is being addressed under Goal “End Poverty” in key outputs informing goals and targets for a post-2015 global development framework

The table below summarises how climate change is addressed in current key texts supporting the post-2015 development process related to this goal (narrative and targets):

	Goal narrative and current climate change related targets	SCORE
HLPEP A New Global Partnership Report (May 2013)	Goal: Climate change impact on people living in poverty recognised. Resilience highlighted to address challenges. c) Cover x% of people who are poor and vulnerable with social protection systems d) Build resilience and reduce deaths from natural disasters by X%	+
SDSN Action Agenda for Sustainable Development (June 2013)	Goal: Climate change increasing risk of hunger. Many vulnerable countries severely affected by climate change... and need to strengthen resilience. Target 1 b [Other suitably revised targets of MDGs 2-7 included here or below]??	+
Global Compact Corporate Sustainability and the UN Post 2015 Development Agenda (June 2013)	A supportive relationship between economy and environment.	- /+
Open Working Group - TST paper on social protection	Social protection policies can support climate change adaptation and help to ensure a just transition towards more sustainable development patterns. <i>Goals and targets not yet proposed</i>	<i>Poverty eradication: + Social protection: ++</i>

GOAL AREA: access to health – addressing and integrating climate change

Climate relevance to the goal area “Access to health”

Climate change currently contributes to the global burden of disease and premature deaths and this will progressively increase with increasing disruption of the climate system and associated impacts.³⁶ Climate change affects the social and environmental determinants of health – clean air, safe drinking water, sufficient food and secure shelter. The IPCC predicts that the health status of millions of people will be affected by climate change, through a number of direct and indirect routes. Direct routes include changing weather patterns and extreme weather events, such as heat waves, floods and forest fires. Indirect routes include changes in air quality, water, crop yields and agriculture, vector ecology and ecosystems. Many of the major killers such as diarrhoeal diseases, malnutrition, malaria and dengue are highly climate-sensitive and are expected to worsen as the climate changes.³⁷

The IPCC and WHO both stress that adverse health impacts will be greatest in low-income countries. Whilst climate change could bring some benefits to health, including fewer deaths from cold, it is expected that these will be outweighed by the negative effects of rising temperatures worldwide, especially in developing countries. Steps to reduce greenhouse gas emissions on the other hand could have positive health effects. For example, replacing open fuel wood, dung or charcoal stoves and heating in developing countries or promoting the safe use of public transportation and active movement - such as biking or walking. Many low carbon solutions improve air pollution (indoor and outdoor) and associated respiratory and cardiovascular diseases.

Data and statistics – the climate related killer facts on health

Climate-sensitive diseases are among the largest global killers. Diarrhoea, malaria and protein-energy malnutrition alone caused more than 3 million deaths globally in 2004, with over one third of these deaths occurring in Africa. (WHO 2013 - website³⁸)

Estimates suggest that one-quarter of the global burden of disease can be attributed to environmental risks, including climate change.³⁹

Recent studies suggest that the record high temperatures in Western Europe in the summer of 2003 were associated with a spike of an estimated 70 000 more deaths than the equivalent periods in previous years. (WHO, 2013 – website⁴⁰)

The direct damage costs to health (i.e. excluding costs in health-determining sectors such as agriculture and water and sanitation), is estimated to be between US\$ 2-4 billion/year by 2030. (WHO, 2012)

Projected trends in climate-change and related consequences for human health (adapted from IPCC 2007 and WHO 2012).

<i>Climate-change trends</i>	<i>Climate-change-related consequences for human health</i>
<i>Extreme weather (heat-waves, floods, storms, fires and droughts)</i>	<ul style="list-style-type: none">• Increased malnutrition and consequent disorders, including those relating to child growth and development;• Increased number of people suffering from death, infectious diseases, respiratory symptoms and mental health problems;• Increased burden of diarrhoeal diseases (e.g. from water borne contamination and food poisoning)• Rodent-borne diseases are likely to increase.• Higher pollen and other aeroallergen levels in extreme heat, triggering asthma.
<i>Changes in temperature and precipitation patterns</i>	<ul style="list-style-type: none">• Continuing changes to the range of some infectious disease vectors;• Mixed effects on malaria; in some places the geographical range will contract, elsewhere the geographical range will expand;• Increased number of people at risk of dengue.

	<ul style="list-style-type: none"> • Changing levels of allergenic pollen are likely to lead to an increase in the incidence and intensity of allergic rhinitis; • Animal health will also be threatened – 60 cases of bluetongue virus were reported in the UK for the first time ever in 2007, partly as a result of weather. • Reduced crop yields and increased malnutrition in tropical developing regions, where food security is already a problem.
<i>Increasing exposure to UV radiation</i>	<ul style="list-style-type: none"> • Increased UVR-induced cortical cataracts, cutaneous malignant melanoma, etc. • Possibly weakened immune response to certain vaccinations, which would reduce their effectiveness.
<i>Slow onset events (sea level rise, ocean acidification, water scarcity)</i>	<ul style="list-style-type: none"> • Increased traumatic, infectious, nutritional, psychological and other health consequences, including from displacement in the wake of climate-induced economic dislocation. • Water scarcity encourages people to transport water long distances and store supplies in their homes. This can increase the risk of household water contamination, causing illnesses.

Recommendations including potential targets for “Access to health”

Climate change has huge and growing implications for our ability to ensure healthy lives across the globe, but particularly in developing countries with higher levels of poverty and lower coverage of health services. Given some climate impacts are already being felt and future impacts cannot be avoided, it is vital that health systems are strengthened to better understand and address how climate disruption affects human health. According to the IPCC (2007) “...on its own [economic development] will not insulate the world’s population from disease and injury due to climate change (very high confidence). Critically important will be the manner in which economic growth occurs, the distribution of the benefits of growth, and factors that directly shape the health of populations, such as education, health care, and public-health infrastructure.”⁴¹ It is crucial that these factors of education, health care, infrastructure – but also the issue of unequal access to these basic services – are specifically addressed in the targets and indicators of a goal on health and more widely across the framework.

Target: Health systems ensure that education, care and public infrastructure are climate smart and build the resilience of local and national populations to the impacts of current and future climate disruption.

Possible indicators:

- % increase in national and local health plans and strategies integrating climate change action
- % of public-health infrastructure that builds the resilience of local and national populations to the impacts of current and future climate disruption % of national health education guidelines and outreach that addresses climate change.
- % [increase in] support to developing countries to develop and implement climate-smart health systems, including care, education and infrastructure.

Resilience and adaptive capacity need to be improved everywhere; impacts of recent hurricanes and heat-waves show that even high-income countries are not well prepared to cope with extreme weather events. However, the poorest and most vulnerable groups of people and areas with weak health infrastructure – mostly in developing countries – will be the least able to cope and need significant international support.

Target: % increase of international support for the poorest and most vulnerable groups, i.e. those with little or no access to health services, to reduce their vulnerability to climate-change related health impacts.

Possible indicators:

- % increase in international support reaching the poorest and most vulnerable groups of people to reduce their vulnerability to climate-change related health impacts.
- % increase in health financing strategies that ensure equal access for all to health services, including care and education

Summary of how climate change is being addressed under Goal on “Access to health” in key outputs informing goals and targets for a post-2015 global development framework

The table below summarises how climate change is addressed in current key texts supporting the post-2015 development process related to this goal (narrative and targets):

	Goal narrative and current climate change related targets	Score
HLPEP A New Global Partnership Report (May 2013)	<i>Goal 4: Ensure healthy lives</i> e) Reduce the burden of disease from HIV/AIDS, tuberculosis, malaria, neglected tropical diseases and priority non-communicable diseases.	-
SDSN Action Agenda for Sustainable Development (June 2013) *targets need to be specified at country or sub-national level.	<i>Goal 5: Achieve health and wellbeing at all ages</i> <i>Goal 7: Empower inclusive, productive and resilient cities</i> Target 7c. Ensure safe air and water quality for all, and integrate reductions in greenhouse gas emissions, efficient land and resource use, and climate and disaster resilience into investments and standards.*	-
Global Compact paper (June 2013)	<i>Goal 7: Universal health coverage</i>	-
Open Working Group - TST issue briefs	<i>Health and sustainable development</i> <i>Goals and targets not yet proposed</i>	+(+)

GOAL AREA Food security, nutrition and agriculture – addressing and integrating climate change

Climate relevance to the goal area “Food security, nutrition and agriculture”

Whilst there has been a substantial decline in the number of hungry people worldwide, progress has slowed since 2007 and world food supply and demand have been precariously balanced - climate change threatens to tip this balance. Climate change affects agricultural production and food security. Impacts will be felt most dramatically in the poorer areas of the world.⁴² Agriculture is a key sector for poor people. Some 2.5 billion people in the developing world rely for their livelihoods⁴³ with small-holder farming being the major economic activity in LDCs. Agriculture is one of the most climate-sensitive industries.

The effect of increased temperature on many crops has been found to involve thresholds, above which yields rapidly decline, and changes in precipitation can reduce agricultural production. Additional or new pests and diseases are anticipated with increasing climate change. Further to this, sea level rise will have negative effects on agriculture, including through inundation and salt water intrusion affecting freshwater supplies, cultivated land and fisheries.⁴⁴

Historically, farmers, pastoralists, forest dwellers and fishers have learned to cope with climate variability and have often adapted crops and farming practices to suit new conditions. But the severity and pace of climate change is presenting new, unprecedented challenges.⁴⁵ It is important to note that 85% of the world's farmers are smallholders and cultivate plots of land no bigger than 2 hectares⁴⁶.

As set out by the IPCC, all four dimensions of food security, namely food availability (i.e., production and trade), stability of food supplies, access to food, and food utilisation (FAO, 2003a) will likely be affected by climate change. A recent review of key scientific papers on food security and climate change states that the stability of whole food systems may be at risk under climate change because of short-term variability in supply.⁴⁷

Climate change threatens to significantly increase hunger and malnutrition worldwide.⁴⁸ As well as direct impacts on crop harvests, it can be anticipated that food access and utilization will be affected indirectly via collateral effects on household and individual incomes, and food utilization could be impaired by loss of access to drinking water and damage to health (for example, a loss of access to drinking water can cause diarrhoea and so reduce the goodness derived from food).⁴⁹ By 2050, the decline in calorie availability could increase child malnutrition by 20 per cent relative to a world with no climate change. Climate change would eliminate much of the improvement in child malnourishment levels that would occur with no climate change.⁵⁰

Agriculture is itself a major source of the greenhouse gases that cause global warming (14% and growing) - with deforestation, transport, processing and waste, the food chain is responsible for up to 40% of human caused emissions.⁵¹

Data and statistics – the climate change facts

Projected reductions in yield in some sub-Saharan countries could be as much as 50% by 2020 due to reduction in the length of growing season as well as the loss of large regions of marginal agriculture. By 3°C warming, this reduction could be more than 90%. (World Bank, 2013)

Potential fish catches off the coast of West Africa, where fish accounts for as much as 50 per cent of the animal protein consumed, is likely to be reduced by as much as 50 percent by the 2050s (compared to 2000 levels). (World Bank, 2013)

In Ethiopia and Kenya, two of the world's most drought-prone countries, children aged five or less are respectively 36 and 50 per cent more likely to be malnourished if they were born during a drought. For Ethiopia, that translates into some 2 million additional malnourished children in 2005. (HDR 2008/9)

The global agricultural sector could potentially reduce and remove 80 to 88% of the carbon dioxide that it currently produces. 70% of technical mitigation potential from agriculture is in developing countries (FAO, 2008)⁵²

The increasing risk from unpredictable weather patterns and the resulting volatility in prices makes it more likely that [small scale] farmers will invest less in agricultural production, threatening food output levels (FAO, IFAD & WFP, 2013).

Recommendations including potential targets for "Food security, nutrition and agriculture"

Climate change has profound implications for agriculture, food security and nutrition. It is imperative that sustainability is at the heart of increasing any or all agricultural productivity. Evidence for this needs to show climate smart agricultural development and adaptation to warming (for example, access to crop varieties with greater drought and heat tolerance, improved and expanded irrigation systems, rainwater harvesting technologies, access to weather and climate information, disaster relief efforts, and insurance programs). Building the resilience of smallholder farmers to intensifying environmental threats and investing in order to make them more food secure should be core and complementary priorities for the post-2015 framework.

Current suggestions for targets cover many critical issues, and are broadly welcomed. For the targets to be successful in meeting the goal, clear links to climate change need to be made. For example:

Target: *Support small-holder agriculture to become climate resilient by shifting to eco-system based approaches (rewording 5c of HLP report)*

Possible indicators for this could include:

- % Increase in use of eco-system based methods of farming (in countries, regions, globally?)
- % increase in weather forecast and climate information available to small scale farmers, especially women farmers
- Increased access by small-scale farmers to knowledge, resources and methods to build their resilience to the impacts of climate disruption and to protect the ecosystem services of agricultural land and deliver sustainable improvements in their productivity, nutritional status and health.
- Number of national and local policies supporting SH farmers and reflecting their needs through participatory planning.

Other targets proposed to address climate change and help meet this goal area include:

Target: Consumption patterns and industrial food systems transformed to reduce greenhouse gas emissions and food waste, including by cutting food waste related to consumption and processing from 40% to 20% by 2020 and from 20% to 10% by 2030.

Possible indicators:

- Precise metric focused on developed / high income countries? Meat and dairy consumption footprint reduced by XX in ways that support rural livelihoods and respect people's agency.
- Global % decrease in food and agriculture related greenhouse gas emissions, including from production, deforestation, transport, processing and food waste
- % Reduction in food waste.

How climate change is being addressed under Goal on “Food security, nutrition and agriculture” in key outputs informing goals and targets for a post-2015 global development framework.

Please note that hunger is addressed within in this goal.

	Goal and narrative	Current climate change related targets
HLPEP Report (May 2013)	<i>Goal 5 Ensure food security and good nutrition:</i> No mention of climate change under Goal 5	7c. Double the global rate of improvement in energy efficiency in buildings, industry, agriculture and transport
SDSN Action Agenda for Sustainable Development (June 2013)	<i>Goal 1 End extreme poverty including hunger:</i> In many regions climate change, water stress, and other environmental threats are making the food supply unstable, increasing the risk of hunger. Strategies to address hunger need to include food safety nets for natural disaster and emergencies. Urgency and complexity of fighting hunger emphasised, and links to other challenges including climate change. Need to strengthen resilience of vulnerable countries and regions affected by climate and other environmental changes. <i>Goal 6: Improve agricultural systems and raise rural poverty:</i> Human induced climate changes seen as one of several environmental dangers threatening our ability to feed the world population. Contribution to greenhouse gas emissions from farming recognised. States that on-going climate change will underscore the importance of adaptation to ensure resilient agriculture and infrastructure. Infrastructure built today must be designed to withstand much higher temperatures, more frequent extreme precipitation, etc. To minimize agricultural productivity losses resulting from climate change, particularly in low-latitude regions, governments and businesses must invest in research and development of new drought and heat resistant crops, improved water management infrastructure, and new farming techniques.	Target 1b. [Other suitably revised targets of MDGs 2-7 included here or below.] Target 6a. Ensure sustainable food production systems with high yields and high efficiency of water, soil nutrients, and energy, supporting nutritious diets with low food losses and waste.* Target 6b. Halt forest and wetland conversion to agriculture, protect soil resources, and ensure that farming systems are resilient to climate change and disasters.* Target 6c. Ensure universal access in rural areas to basic resources and infrastructure services (land, water, sanitation, modern energy, transport, mobile and broadband communication, agricultural inputs, and advisory services).
Global Compact Corporate Sustainability and the UN Post 2015 Development Agenda (June 2013)	<i>Goal 5 Good nutrition for all through sustainable food and agriculture systems:</i> Food/agriculture is a primal human need; provides critical resources for economies, especially in the developing world; and overlaps with the water/sanitation and energy in terms of management and impact (resource triad). All are integrally tied to the causes and effects of climate change. Global Compact Local Network consultations placed climate change fourth in list of top priority for action in the world in the years ahead.	Stop and turn back annual increases in greenhouse gas emissions and deforestation resulting from farming and livestock production
Open Working Group - TST issue briefs	<i>Poverty eradication:</i> Extreme poverty in rural areas highlighted, noting poor tend to be small producers, landless agricultural workers and family farmers. Climate change degrading resource quality. <i>Food security and nutrition:</i> Highlights the environment for food production is increasingly challenging – particularly for small holders – including due to environmental and climate-related constraints. Notes The agricultural sector is also under pressure from environmental and climatic factors and from population growth. Agriculture-led growth can only lead to sustainable improvements in food security if it is rooted in more productive, sustainable, resilient, and inclusive agriculture systems. Progress in raising average calorie intake and improving nutritional status is sensitive to price shocks, such as those affecting global food markets over the past six years. Price volatility is generally expected to become more common in the future. Highlights one key lesson from a country-disaggregated review of trends in food security and nutrition is the importance of insecurity, conflict, climate variability, and vulnerability to shocks and crises. <i>Sustainable Agriculture: to be completed if needed</i> <i>Desertification, land degradation and drought: to be completed if needed</i>	

GOAL AREA Universal access to water and sanitation – addressing and integrating climate change

Climate relevance to the goal area “Achieve universal access to water and sanitation”

‘Observational records and climate projections provide abundant evidence that freshwater resources are vulnerable and have the potential to be strongly impacted by climate change, with wide-ranging consequences for human societies and ecosystems.’ (IPCC, 2008)⁵³

Changing rainfall patterns and the increasing severity and frequency of natural disasters all threaten the availability of clean and safe water that in turn could lead to an increase in food shortages, diarrhoea and waterborne diseases as well as compromise water and sanitation systems and increase the possibility of conflict over scarce water resources. Many economies are at risk of significant episodic shocks and worsened chronic water scarcity and security, which can have direct and severe ramifications on the economy, poverty, public health and ecosystem viability.⁵⁴ Developing countries are particularly vulnerable to the impacts of hydrologic variability and climate change given weak institutions and institutional capacity, high levels of poverty, insufficient sanitation and water management and services infrastructure, and dependence of the rural economy on agriculture.⁵⁵

Whilst other stresses such as population growth, changing economic activity, land-use change and urbanisation may seem to pose bigger threats to water resources and water-dependent services than climate change over the short-medium term, climate change is a threat multiplier and climate smart forward planning and investment are essential to avoid maladaptive development pathways.

A focus on *universal access* to water and sanitation needs to address water resource management and climate change along with important issue of entitlements and equity to ensure sustainable infrastructure and on-going supply for all. It is important to also note that extending access to reliable and affordable water and sanitation services remains key to strengthening livelihoods and building people’s resilience.

Data and statistics – the water and sanitation climate-related facts

By 2020, between 75 million and 250 million people in Africa are projected to be exposed to increased water stress due to climate change. By 2050, 350-600 million people are projected to be exposed to increased water stress. If coupled with increased demand, this will adversely affect livelihoods and exacerbate water-related problems. (IPCC, 2007)

Globally, water scarcity already affects 4 out of every 10 people. A lack of water and poor water quality can compromise hygiene and health. (WHO, 2013 – website⁵⁶)

Melting glaciers and loss of mountain snow will increase flood risk during the wet season and threaten dry-season water supplies to one-sixth of the world’s population - over one billion people. (Stern 2007)

About 40 per cent of the world’s irrigation is supported by flows originating in the Himalayas and other large mountain systems. The loss of glaciers worldwide has been one of the strongest indicators of global warming. (FAO 2012)⁵⁷

Recommendations including potential targets for “Achieve universal access to water and sanitation”

The current HLPEP has a target on universal access to water and sanitation, but fails to address the critical interconnected issue of water resource management, which is vital for supply.

Target: Adopt sustainable, integrated and equitable water management practices, which improve and protect the quantity, quality and timing of water flows, and ensure fair and equitable access for all.

Possible indicators:

- Number of national and local water resource management plans that address the current and future balance of demand and supply across water-dependent sectors⁴ and ensure equitable access to water across regions and populations.
- Improved watershed and resource management, integrating different natural resources – water, soil, flora and fauna – through, for example, the promotion of Integrated Water Resources Management (IWRM) processes.
- Better demand management - reducing water consumption and improving water use efficiency [in high income countries]
- Number of national and local water resource management plans that provide specific protection for vulnerable groups e.g. through improved access to potable water and sanitation and are developed through participatory planning.

Climate change will put a premium on information about water resources, yet this is lacking in many countries.

Target: Strengthened and transparent water resource monitoring systems addressing quantity, quality, use, distribution and reliability, including for groundwater resources⁵.

Possible indicators:

- Systems in place at national and local level
- Improved information and early warning systems provide land and water users with timely and adequate information and knowledge about availability and suitability of water resources.
- Information exchange and dialogue takes place between the agriculture, water and climate communities at national levels and at trans-boundary river basin level;
- Participation of stakeholders, especially local communities and vulnerable groups in measuring and monitoring

Both WASH and water resources management investments can be ‘screened’ for climate risks to ascertain the extent to which existing development projects consider climate risks; identify strategies for incorporating climate change into projects; and guide project managers towards those options that minimise risk.

Target: WASH and water resources management investments are climate smart, based on the best available science and incorporating local knowledge and that are developed inclusively, with effective participation of affected communities including vulnerable groups.

Possible indicators:

- % increase in Water Safety Plans or such documents that include screening for climate change risks and impacts.
- New or revised design standards and criteria are developed and available for a changed hydrology characterized by increased variability and uncertainty
- Water and sanitation planning includes outcomes that build adaptive capacity and climate resilience of all stakeholders at all levels.
- Effective participation of affected communities, civil society and vulnerable groups in investment screening, planning and implementation.

⁴ Water dependent sectors include rain-fed and irrigated agriculture, livestock, fisheries, forestry, nature and biodiversity, manufacturing and industry, and municipal water use.

⁵ Whilst the strategic importance of ground water for global water and food security will probably intensify under climate, a lack of groundwater observations currently limits understanding of the dynamic relationship between ground water and climate.

Summary of how climate change is being addressed under Goal on “Achieve universal access to water and sanitation” in key outputs informing goals and targets for a post-2015 global development framework

The table below summarises how climate change is addressed in current key texts supporting the post-2015 development process related to this goal (narrative and targets):

	Goal narrative	Current climate change related targets
HLPEP A New Global Partnership Report (May 2013)	<i>Goal 6: Achieve universal access to water and sanitation: -</i>	c) Bring freshwater withdrawals in line with supply and increase water efficiency in agriculture by x%, industry by y% and urban areas by z%.
SDSN Action Agenda for Sustainable Development (June 2013)	<p><i>Goal 6: Improve agriculture systems and raise rural prosperity: ++</i></p> <p><i>Goal 7: Empower inclusive, productive and resilient cities: ++</i></p> <p><i>Goal 9: Secure ecosystem services and biodiversity, and ensure good management of water and other natural resources: +</i></p>	<p>6c Ensure universal access in rural areas to basic resources and infrastructure services (land, water, sanitation, modern energy, transport, mobile and broadband communication, agriculture inputs, and advisory services).</p> <p>7b Ensure universal access to a secure and affordable built environment and basic urban services including housing; water, sanitation and waste management; low-carbon energy and transport; and mobile and broadband communication.</p> <p>7c. Ensure safe air and water quality for all, and integrate reductions in greenhouse gas emissions, efficient land and resource use, and climate and disaster resilience into investments and standards</p> <p>9c All governments and businesses commit to the sustainable, integrated, and transparent management of water, agricultural land, forests, fisheries, mining, and hydrocarbon resources to support inclusive economic development and the achievement of all SDGs.*</p>
Global Compact paper (June 2013)	<i>Goal 6: Water and sanitation for all: +</i>	Fresh water use brought in line with supply
Open Working Group - TST issue briefs	<i>Water and sanitation: +</i>	<i>Goals and targets not yet proposed</i>

GOAL AREA secure sustainable energy – addressing and integrating climate change

Climate relevance to the goal area “Secure sustainable energy”

Securing universal access to modern energy services (i.e. services that are secure, sustainable, safe and affordable) is central to solving both the climate change crisis and the global poverty crisis. Energy is the greatest source of man-made climate emissions.⁵⁸ The global energy system (which supplies fuels and electricity to the residential/commercial, industrial and transportation end-use sectors) is currently responsible for about 80% of global CO₂ emissions¹. Therefore, if global greenhouse gas emissions are to fall by more than 80-95% by 2050, as required to keep the world below the 2°C warming threshold recommended by scientists, there will have to be a rapid decarbonisation of the energy sector during the lifetime of the post-2015 framework. The International Energy Agency (IEA) has called for an “energy sector revolution” from 2020 onwards, shifting from fossil fuels towards more renewable and efficient energy solutions, or the world will overshoot the internationally agreed danger-threshold of 2°C global warming in the long run. According to the IEA, over two thirds of current fossil fuel reserves have to stay in the ground in order to have a reasonable chance at preventing catastrophic levels of climate change⁵⁹. This includes stopping new exploration⁶⁰.

Current targets proposed under the UN’s Sustainable Energy for All initiative (SE4All)⁶ are a step forward but far more ambitious action is needed and before 2030 on cutting emissions overall, including through shifting the energy sector away from fossil fuels, in order to keep global warming below the 2°C limit. High-energy consuming countries need to make the deepest cuts first and urgently. Energy poverty still afflicts billions of people around the world⁶¹ – notably between 1.3 to 1.6 billion people have no access to electricity and almost 2.7 billion cook or heat with open fires.⁶² Access to modern energy is essential for the provision of clean water, sanitation and healthcare and for the provision of reliable and efficient lighting, heating, cooking, mechanical power, transport and telecommunications services.

Concerns that achieving modern energy access for all would undermine action on climate change are unfounded, as it would only increase global energy demand by 1% in 2030 and CO₂ emissions by 0.6%.⁶³ To achieve universal access, 55% of new electricity production would have to come from off-grid or mini-grid sources (90% of which are renewable) and 70% of rural areas are best served by such sources.⁶⁴

In turn, climate disruption is already impacting on our energy security by disrupting the systems for producing and transporting energy.^{65 66} It is thus also crucial to build a more climate-resilient energy sector. Accelerated adoption of climate smart, economically sustainable, clean and renewable energy technology and energy efficiency measures would also diversify energy supply and strengthen energy security.

Data and statistics – the killer facts

Carbon dioxide emissions rebounded to a record high; energy efficiency of the global economy worsened for [the] second straight year; spending on oil imports is near record highs. The door to a 2°C global warming is closing. (IEA, 2011)⁶⁷

The UN SE4All renewable energy target would only take the world to a 30% renewable energy share of the energy mix by 2030, however calculations for achieving a 100% renewable energy sector by 2050 estimate that 42% renewable energy is needed by 2030, with far more rapid renewable energy expansion from 2030 to 2050 (WWF, 2011)⁶⁸.

US\$409bn was spent globally on subsidies to fossil fuels in 2010 (IEA, 2013 –website)⁶⁹

Recommendations including potential targets for “Secure sustainable energy”

⁶SE4ALL Goals: 1) ensure universal access to modern energy services, 2) double the global rate of improvement in energy efficiency, 3) double the share of renewable energy in the global mix.

Most of the current targets on sustainable energy are not ambitious enough to keep the world below 2°C warming threshold recommended by scientists and ensure secure sustainable energy for all. We recommend strengthening targets to meet this goal in the following ways:

Target: Universal energy access: sustainable, secure, safe and affordable energy services for poor women and men

Possible indicators:

- Number of people with access to affordable, secure, safe and sustainable energy
- Percentage of decentralized projects as a share of new electricity investment using local energy sources.
- Number of SE4All national implementation plans developed on multi-stakeholder consultation and reflect the views of people living in energy poverty and vulnerable groups
- Effective participation of people living in energy poverty and civil society in the design and delivery of energy services at national & local level

Target: Reduce total emissions from unabated fossil fuels by x% by 2030, and absolute and wasteful energy consumption levels by XXXX, with benchmarks provided at regular five yearly intervals on the way to 2030.

Possible indicators:

- Robust and effective reporting and monitoring frameworks using participatory methods are in place at national level
- National plans in place to reduce energy consumption and increase efficiency
- X% increase of investment in energy efficiency (globally and nationally)

Target: Phase out fossil fuel subsidies by XXXX and replace with support for climate smart, sustainable, clean, energy investment in developed and developing countries/

Possible indicators:

- Reduction in subsidies for fossil fuel production by X date
- Transparent reporting system in place outlining the nature and value of all fossil fuel subsidies, and particularly producer subsidies
- X% increase in investment in renewable energy (globally, nationally etc)

Target: Build resilience within the energy sector to address the impacts of climate disruption, including through building climate smart, systems that ensure sustainable affordable, safe and secure energy services to vulnerable communities.

Possible indicators:

- Number of nationally-owned low carbon development plans in place by 20XX
- % increase in international financial support given to low carbon development
- Number of low carbon development plans that provide specific protection and increased access to energy services for vulnerable groups
- Effective participation of civil society and vulnerable groups in low carbon development planning and implementation

Note: A new metric is needed that does not just for define and measure energy access in terms of grid connection and megawatts of power but on the quality and reliability of services i.e. whether they meet in end users' needs and wants, in the context of their wider development needs and their local context.^{70 71}

Summary of how climate change is being addressed under Goal on “secure sustainable energy” in key outputs informing goals and targets for a post-2015 global development framework

The table below summarises how climate change is addressed in current key texts supporting the post-2015 development process related to this goal (narrative and targets):

	Goal narrative and current climate change related targets	Score
HLPEP A New Global Partnership Report (May 2013)	<p><i>Goal 7: Secure sustainable energy</i></p> <p>Target 7a) Double the share of renewable energy on the global energy mix</p> <p>Target 7b) Ensure universal access to modern energy services</p> <p>Target 7c) Phase out inefficient fossil fuel subsidies that encourage wasteful consumption</p>	+
<p>SDSN Action Agenda for Sustainable Development (June 2013)</p> <p>*targets need to be specified at country or sub-national level.</p>	<p><i>Goal 6: Improve agriculture systems and raise rural prosperity</i></p> <p>Target 6c Ensure universal access in rural areas to basic resources and infrastructure services (land, water, sanitation, modern energy, transport, mobile and broadband communication, agriculture inputs, and advisory services).</p> <p><i>Goal 7: Empower inclusive, productive and resilient cities</i></p> <p>Target 7b Ensure universal access to a secure and affordable built environment and basic urban services including housing; water, sanitation and waste management; low-carbon energy and transport; and mobile and broadband communication. [Target 7c. Ensure safe air and water quality for all, and integrate reductions in greenhouse gas emissions, efficient land and resource use, and climate and disaster resilience into investments and standards.*]</p> <p><i>Goal 8: Curb human-induced climate change and ensure sustainable energy</i></p> <p>Target 8a Decarbonise the energy system, ensure clean energy for all, and improve energy efficiency with targets for 2020, 2030 and 2050.*</p> <p>Target 8b Reduce non-energy related emissions of greenhouse gases through improved practices in agriculture, forestry, waste management, and industry.*</p> <p>Target 8c Adopt incentives, including pricing greenhouse gas emissions, to curb climate change and promote technology transfer to developing countries.*</p> <p><i>Goal 9: Secure ecosystem services and biodiversity, and ensure good management of water and other natural resources</i></p> <p>Target 9c All governments and businesses commit to the sustainable, integrated, and transparent management of water, agricultural land, forests, fisheries, mining, and hydrocarbon resources to support inclusive economic development and the achievement of all SDGs.*</p>	++
Global Compact paper (June 2013)	<p><i>Goal 7: Sustainable energy for all</i></p> <ul style="list-style-type: none"> • Universal access to modern energy services • Double the global rate of improvement in energy efficiency in production, distribution and consumption. • Double the share of renewable sources in the energy mix. • Reduce by at least 50% the particulate concentration in urban air, not to exclude achievement of more stringent regional targets. 	+(+)
Open Working Group - TST issue briefs	<p>--</p> <p><i>Goals and targets not yet proposed</i></p>	

- ¹ Confalonieri, U., B. Menne, R. Akhtar, K.L. Ebi, M. Hauengue, R.S. Kovats, B. Revich and A. Woodward, 2007: Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 391-431.
- ² International Energy Agency, 2011.
- ³ "No more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2 °C goal". World Energy Outlook 2012, IEA. See: <https://www.iea.org/newsroomandevents/pressreleases/2012/november/name,33015,en.html>. See also Unburnable Carbon 2013: Wasted capital and stranded assets, the Carbon Tracker and The Grantham Institute on Climate Change and the Environment (at LSE). <http://www.carbontracker.org/wastedcapital>.
- ⁴ See <http://energy.gov/articles/climate-change-effects-our-energy>
- ⁵ Christian Aid's Low carbon Africa report
- ⁶ Ref (TOR Ruth)
- ⁷ The future we want (paragraphs 25 and 190). Annexed to resolution adopted by the General Assembly (A/RES/66/288), United Nations, 11 September 2013
- ⁸ *An Action Agenda for Sustainable Development – report for the UN Secretary General*, 6 June 2013, Leadership Council of the Sustainable Development Solutions Network (page 2).
- ⁹ IPCC (2013). New Report reference. Note: this report has been produced before the release of the IPCC report in 2013 hence does not take into account the information released in that report.
- ¹⁰ IPCC. (2007). *Climate Change 2007 - The Physical Science Basis* (Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change ed.). (S. D. Solomon, Ed.) Cambridge, United Kingdom: Cambridge University Press.
- ¹¹ DARA and the Climate Vulnerable Forum, Climate Vulnerability Monitor 2nd Edition (2012) A Guide to the Cold Calculus of a Hot Planet
- ¹² United Nations Environment Programme (UNEP), The Emissions Gap Report 2012, A UNEP Synthesis Report.
- ¹³ Date when the UNFCCC was signed and came into force
- ¹⁴ *An Action Agenda for Sustainable Development – report for the UN Secretary General*, 6 June 2013, Leadership Council of the Sustainable Development Solutions Network (page 19).
- ¹⁵ DARA and the Climate Vulnerable Forum, Climate Vulnerability Monitor 2nd Edition (2012). A Guide to the Cold Calculus of a Hot Planet
- ¹⁶ Researchers at the University of Cambridge and Erasmus <http://www.nature.com/nature/journal/v499/n7459/full/499401a.html>
- ¹⁷ World Bank. 2012. *Turn Down the Heat: Why a 4°C Warmer World must be Avoided*. A report for the World Bank by the Potsdam Institute for Climate Impact Research and Climate Analytics. Washington DC: World Bank.
- ¹⁸ Evans, A. *Climate, Scarcity and Sustainability in the Post 2015 Development Agenda*, December 2012, Centre on International Cooperation, New York University.
- ¹⁹ Corporate Sustainability and the United Nations Post-2015 Development Agenda, Perspectives from UN Global Compact Participants on Global Priorities and how to engage business towards Sustainable Development Goals, Submitted by UN Global Compact to the UN Secretary General, 17 June 2013
- ²⁰ Spedding, P., Mehta, K. and Nick Robins, N., Oil & carbon revisited - Value at risk from unburnable reserves, 25 January 2015 HSBC Bank Plc © Copyright 2013, HSBC Bank plc, ALL RIGHTS RESERVED. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, on any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of HSBC Bank plc. MICA (P) 038/04/2012, MICA (P) 063/04/2012 and MICA (P) 110/01/2013
- Robins, N., Knight, Z., Chan W-S. and Singh C., Peak Planet - The next upswing for the climate agenda, 25 March 2013, HSBC Bank Plc © Copyright 2013 MICA (P) 038/04/2012, MICA (P) 063/04/2012 and MICA (P) 110/01/2013
- ²¹ Unburnable Carbon 2013: Wasted capital and stranded assets, the Carbon Tracker and The Grantham Institute on Climate Change and the Environment (at LSE). Forward by Lord Stern.
- ²² Carbon Disclosure Project (CDP) <https://www.cdproject.net/en-US/Pages/About-Us.aspx>
- ²³ *A New Global Partnership: Eradicate Poverty and Transform Economies through Sustainable Development*. The Report of the High-Level Panel of Eminent Persons on the Post-2015 Development Agenda (May 2013) page 44
- ²⁴ DARA and the Climate Vulnerable Forum, Climate Vulnerability Monitor 2nd Edition (2012). A Guide to the Cold Calculus of a Hot Planet, Executive summary page 18
- ²⁵ Eriksen, S. and O'Brien, K., 2007. Vulnerability, poverty and the need for sustainable adaptation measures. *Climate Policy*, 7. 337–352
- ²⁶ Eriksen, S., & Brown, K. (2011). Sustainable adaptation to climate change. *Climate and Development*, 3, 3-6.

- ²⁷ Boko, M., I. Niang, A. Nyong, C. Vogel, A. Githeko, M. Medany, B. Osman-Elasha, R. Tabo and P. Yanda, 2007: Africa. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge UK, 433-467.
- ²⁸ McDonald M. et al. (September 2010) Climate Change Impacts on the Achievement of the Millennium Development Goals: Can We Afford Not to Integrate? *Realizing Rights, GCAP and GCCA*
- ²⁹ CAFOD. Setting the post-2015 development compass: voices from the ground. 2013.
- ³⁰ DARA and the Climate Vulnerable Forum, Climate Vulnerability Monitor 2nd Edition (2012). A Guide to the Cold Calculus of a Hot Planet, Executive summary page 19.
- ³¹ TST Issue Brief – Poverty eradication (2013) UNDESA and UNDP, <http://sustainabledevelopment.un.org/content/documents/1728tstissuespoverty.pdf>
- ³² Smallholder farmers grow 50 per cent of the world's food and also account for over half of the world's hungry people. The recent FAO, IFAD and WFP report, *State of Food Insecurity in the World*, highlights that "the low capacity of small-scale producers, such as smallholder farmers, to cope with large swings in input and output prices makes them risk-averse, lowers their propensity to adopt and invest in new technologies and ultimately results in lower overall production". FAO, IFAD & WFP, 2013. Quoted in 'Climate change one of the leading risks to food security, says UN', *Financial Times*, 1 October 2013.
- ³³ IPCC 2007 *Climate Change 2007 - Impacts, Adaptation and Vulnerability* Contribution of Working Group II to the Fourth Assessment Report. Summary for Policymakers (Neil Adger et al.)
- ³⁴ Poverty and Climate Change – reducing the vulnerability of the poor through adaptation (2003) African DB, Asian DB, DFID, EC, Federal Ministry for Economic Cooperation and Development – Germany, Ministry of Foreign Affairs - Development Cooperation - The Netherlands, OECD, UNDP, UNEP, World Bank <http://www.oecd.org/env/cc/2502872.pdf>
- ³⁵ CAFOD and Tearfund, 2012. Quick off the blocks? UK adaptation financing and integrated planning & Tearfund, 2011. Adaptation United: building blocks from developing countries on integrating adaptation.
- ³⁶ Confalonieri, U., B. Menne, R. Akhtar, K.L. Ebi, M. Hauengue, R.S. Kovats, B. Revich and A. Woodward, 2007: Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 391-431.
- ³⁷ WHO Climate change and health fact sheet No. 266, October 2012
- ³⁸ WHO website - see http://www.who.int/features/factfiles/climate_change/facts/en/index.html
- ³⁹ TST issues brief: HEALTH AND SUSTAINABLE DEVELOPMENT
- ⁴⁰ WHO website - see http://www.who.int/features/factfiles/climate_change/facts/en/index.html
- ⁴¹ Confalonieri, U., B. Menne, R. Akhtar, K.L. Ebi, M. Hauengue, R.S. Kovats, B. Revich and A. Woodward, 2007: Human health. Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 391-431.
- ⁴² Wheeler, T. and von Braun, J., Climate Change Impacts on Global Food Security, *Science*, 2 August 2013: Vol. 341 no. 6145, pp. 508-513 Press release: <http://www.reading.ac.uk/news-and-events/releases/PR522495.aspx>
- ⁴³ FAO Statistical Year Book 2012, World Food and Agriculture. Part 1 The setting
- ⁴⁴ State of the Ocean - international programme <http://www.stateoftheocean.org/>
- ⁴⁵ FAO Statistical Year Book 2012, World Food and Agriculture. Part 4 page 300
- ⁴⁶ IAASTD – International Assessment of Agricultural Knowledge, Science and Technology for Development (IAASTD). 2008. Global Report.
- ⁴⁷ Wheeler, T. and von Braun, J., Climate Change Impacts on Global Food Security, *Science*, 2 August 2013: Vol. 341 no. 6145, pp. 508-513
- ⁴⁸ Climate Change: A Humanitarian Challenge for the 21st Century, World Food Programme (<http://home.wfp.org/stellent/groups/public/documents/newsroom/wfp212408.pdf>)
- ⁴⁹ Wheeler, T. and von Braun, J., Climate Change Impacts on Global Food Security, *Science*, 2 August 2013: Vol. 341 no. 6145, pp. 508-513
- ⁵⁰ Gerald C. Nelson, Mark W. Rosegrant, Jawoo Koo, Richard Robertson, Timothy Sulser, Tingju Zhu, Claudia Ringler, Siwa Msangi, Amanda Palazzo, Miroslav Batka, Marilia Magalhaes, Rowena Valmonte-Santos, Mandy Ewing, and David Lee, *Climate Change Impact on Agriculture and Costs of Adaptation*, International Food Policy Research Institute, Washington, D.C., Updated October 2009
- ⁵¹ FAO (2013) http://www.fao.org/ag/againfo/resources/en/publications/tackling_climate_change/index.htm and <http://www.fao.org/news/story/en/item/197608/icode/>
- ⁵² http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/3_fao_revised.pdf
- ⁵³ Bates, B.C., Z.W. Kundzewicz, S. Wu and J.P. Palutikof, Eds., 2008: Climate Change and Water. Technical Paper of the Intergovernmental Panel on Climate Change, IPCC Secretariat, Geneva, 210 pp.

-
- ⁵⁴ Alavian, Vahid; Qaddumi, Halla Maher; Dickson, Eric; Diez, Sylvia Michele; Danilenko, Alexander V.; Hirji, Rafik Fatehali; Puz, Gabrielle; Pizarro, Carolina; Jacobsen, Michael; Blankespoor, Brian. 2009. *Water and climate change : understanding the risks and making climate-smart investment decisions*. Washington D.C. The Worldbank.
- ⁵⁵ Alavian, Vahid; Qaddumi, Halla Maher; Dickson, Eric; Diez, Sylvia Michele; Danilenko, Alexander V.; Hirji, Rafik Fatehali; Puz, Gabrielle; Pizarro, Carolina; Jacobsen, Michael; Blankespoor, Brian. 2009. *Water and climate change : understanding the risks and making climate-smart investment decisions*. Washington D.C. The Worldbank.
- ⁵⁶ WHO website - see http://www.who.int/features/factfiles/climate_change/facts/en/index.html
- ⁵⁷ FAO Statistical Year Book 2012, World Food and Agriculture. Part 4 page 302
- ⁵⁸ IPCC Fourth Assessment (2007) ipcc.ch/publications_and_data/publications_and_data_reports.shtml
- ⁵⁹ International Energy Agency, 2011.
- ⁶⁰ "No more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2 °C goal". World Energy Outlook 2012, IEA. See: <https://www.iea.org/newsroomandevents/pressreleases/2012/november/name,33015,en.html>. See also Unburnable Carbon 2013: Wasted capital and stranded assets, the Carbon Tracker and The Grantham Institute on Climate Change and the Environment (at LSE). <http://www.carbontracker.org/wastedcapital>.
- ⁶¹ Energy For All: Financing access for the poor, from The World Energy Outlook 2011, International Energy Agency, Paris, 2011.
- ⁶² Doig, A., *Sustainable Energy for all*, February 2012, Time for Climate Justice series no 7., Christian Aid
- ⁶³ International Energy Agency, IEA (2013) Webpage: <http://www.worldenergyoutlook.org/resources/energydevelopment/#d.en.8630>
- ⁶⁴ Energy For All: Financing access for the poor, from The World Energy Outlook 2011, International Energy Agency, Paris, 2011.
- ⁶⁵ See <http://energy.gov/articles/climate-change-effects-our-energy>
- ⁶⁶ Christian Aid's Low carbon Africa report
- ⁶⁷ The Energy Report – 100% renewable energy by 2050, WWF, 2011
- ⁶⁸ Doig, A., *Sustainable Energy for all*, February 2012, Time for Climate Justice series no 7., Christian Aid
- ⁶⁹ IEA 2013 see <http://www.iea.org/publications/worldenergyoutlook/resources/energysubsidies/>
- ⁷⁰ Doig, A., *Sustainable Energy for all*, February 2012, Time for Climate Justice series no 7., Christian Aid. Also CAFOD & IIED, 2013. *An approach to designing energy delivery models that works for people living in poverty*.
- ⁷¹ Poor People's Energy Outlook, Practical Action, Rugby, 2012