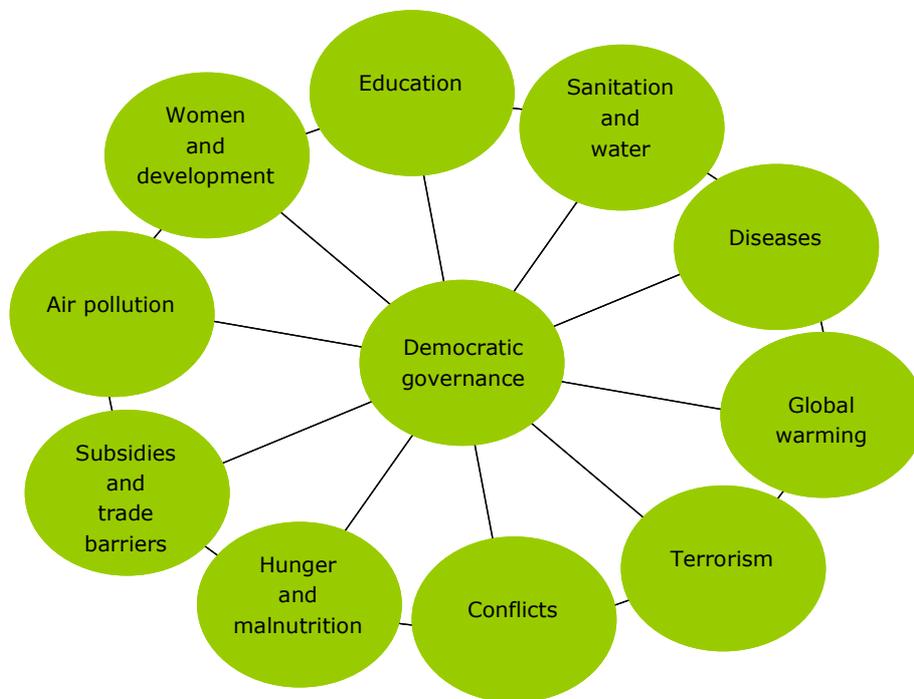


The Copenhagen Circle of Solutions

- a review of Copenhagen Consensus 2008 and a recommendation



Written for **DanChurchAid**

by Christian Friis Bach

May 28th 2008

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Danish Summary: Rangorden eller cirkel

Målet med Copenhagen Consensus 2008 er at evaluere mere end 50 løsninger og lave en liste med prioriteringer til alle der arbejder med at løse verdens største problemer. Ideen er at etablere en ramme, hvor problemer og løsninger prioriteres ud fra økonomiske og videnskabelige analyser.

Denne rapport er en gennemgang af den proces. Eller for at være mere præcis: Det er en gennemgang af den grundlæggende ide med at prioritere ud fra benefit/cost beregningerne i de 10 analyser, der er blevet skrevet. Rapporten stiller ikke spørgsmålstejn ved det væld af information som analyserne frembringer. De er alle solide og giver, ud fra et økonomisk perspektiv, opdateret og grundig information om de forskellige udfordringer. Den information er vældigt vigtig, ikke mindst da der er overvældende dokumentation for at det kan betale sig at investere i løsningen af verdens vigtigste problemer. Det kan virkelig betale sig at investere i fattige mennesker i fattige lande. Stort set alle benefit/cost beregningerne viser, at vi skal investere i løsningerne. Og at vi skal gøre det nu. Det budskab er i sig selv nok til at berettigg hele Copenhagen Consensus.

Denne rapport forsøger dog, ved en kritisk gennemgang af alle analyserne, at forholde sig til om vi, på baggrund af beregningerne, kan prioritere løsningerne på tværs af de 10 udfordringer og dermed give politikere og beslutningstager et solidt grundlag for deres prioriteringsproces. Hertil er svaret nej.

Copenhagen Consensus prioriteringen

Der er en række grunde til, at det ikke giver mening at sammenligne beregninger og løsninger på tværs af de forskellige udfordringer.

For det første er løsningsforslagene meget forskellige. De spænder lige fra en handelsaftale i Verdenshandelsorganisationen til kampagner for at fremme amning af spædbørn; fra en ændring i USA's udenrigspolitik til mikrofinans til kvinder; fra en indsats mod terrorisme i stil med krigen i Afghanistan og over til brønde i landsbyer i Afrika. Det er vist unødvendigt at sige, at de løsninger har vidt forskellige virkning, og derfor er meget vanskelige, hvis ikke umulige, at sammenligne.

Derudover giver de enkelte analyser kun udvalgte, og i nogle tilfælde meget begrænsede, løsninger på udfordringerne. Vi ses ikke det fulde billede af hverken udfordringer eller løsninger. Centrale udfordringer er udeladt, f.eks. at investere i demokrati, landbrugsudvikling eller infrastruktur. Centrale løsninger bliver aldrig analyseret. For eksempel er den eneste tilpasning i klima-analysen malaria net og behandlinger til børn for at undgå dehydrering. Den nødvendige tilpasning til flere og stærkere tørker, oversvømmelser og orkaner er ikke

inkluderet. Det anerkendes i analyse af sult og underernæring, at de løsninger, der regnes på, kun kan fjerne omkring $\frac{1}{4}$ eller $\frac{1}{3}$ af den samlede underernæring. Resten kræver reduktioner i fattigdom og sårbarhed. Vi ser ikke det fulde billede i analyserne.

For det andet, kan benefit/cost analyser kun sammenlignes på tværs af de forskellige udfordringer, hvis de fanger og inddrager alle omkostninger og fordele. Det gør de ikke. De er ikke engang tæt på. Der er betydelige eksternaliteter, der ikke inddrages i beregningerne. Analysen af luftforurening værdisætter ikke effekterne på global opvarmning eller skaderne på landbruget, økosystemerne eller infrastrukturen. Analysen af terrorisme forsøger ikke at værdisætte frygten og rædslen, som ellers er centrale parametre i terrorisme, men inddrager kun de beskedne tab i bruttonationalindkomst og i dødelighed. Hvis en rangordning overfor andre, og meget anderledes, problemer og løsninger skal give mening, bør alle omkostninger og fordele indregnes og forskellene på tværs af analyser og lande skal være sammenlignelige. Det er de ikke.

En tredje vigtig forudsætning for at sammenligne på tværs, er at metoderne er de samme. Det er de heller ikke. Copenhagen Consensus har forsøgt at udstikke en række simple retningslinier for beregningerne, men selv ikke de retningslinier bliver fulgt i alle analyser. Der bliver brugt forskellige værdier for et menneskeliv. De fleste analyser bruger de to anbefalede værdier på US\$ 1000/5000 for et "handicap justeret livs-år" (DALY), men analysen om vand og sanitet bruger 10 gange så højere værdier. Sygdoms-analysen vælger at sige, at et tabt livs-år for børn under 5 kun tæller halvt så meget som for individer over 5 år. Det er etisk diskutabelt, og påvirker selvfølgelig vurderingen af sygdomme som malaria der i særlig høj grad fører til dødsfald blandt de mindste børn. Der bliver brugt forskellige diskonteringsfaktorer, og det kan påvirke resultaterne markant. De fleste analyser bruger 3% og 6%, men analysen om global opvarmning bruger 5% (faldende til 4%). Analysen af subsidier og handelsbarrierer bruger en markant anderledes analyseramme (en generel ligevægtsmodel) end alle andre analyser, og finder benefit/cost værdier på over 1000!

Udover forskellene i metoder er der meget store etiske og metodiske problemer i analyserne. Det gælder, som allerede påpeget, ikke mindst når det gælder værdien af et menneskeliv. Her skriver flere forfattere, at der i bedste fald er tale om en "tommelfingerregel", uden nogen nærmere analyse af de positive eller negative eksternaliteter ved de enkelte løsninger.

Estimaterne af udgifter og fordele ved de enkelte løsninger er meget usikre. Konflikt-analysen anerkender, at ændringer i beregninger og metoder meget nemt kunne fordoble, tredoble ja endda 32-doble benefit/cost resultatet. Analysen af kvinder og udvikling konkluderer, at det, i de underlæggende studier, stort set aldrig er tydeligt, hvilke udgifter der er indregnet, om det er faste eller variable udgifter og om eksisterende infrastruktur og personale er med i

beregninger. Livsforlængende ARV-behandling til HIV/AIDS patienter kræver en solid infrastruktur med sundhedsklinikker, systemer og personale. De omkostninger er ikke inkluderet i beregningerne.

At sammenligne på tværs af de forskellige udfordringer på det grundlag, er som at sammenligne solskinsvejre og æblekage.

Endelig giver det kun mening at prioritere løsningerne hvis de er uafhængige. Det er de ikke. Stort set alle analyserne understreger igen og igen at løsningerne er stærkt afhængige af andre løsninger og at de forskellige løsninger **komplementerer hinanden og skaber synergi**. Det er oplagt, at konflikter og klimaforandringer har stærke koblinger til stort set alle andre udfordringer - koblinger der ikke fanges af analyserne. Både konflikt- og klima-analysen anerkender samtidig, at de mest effektive løsninger er dem, der sætter ind overfor en lang række problemer samtidig. Uddannelses-analysen konkluderer, at den meste effektive måde at få børn i skole på, er at sikre børnene bedre ernæring og behandling af sygdomme, så de kan fortsætte deres skolegang, når de er kommet i gang. Undertrykkelsen af kvinder er en afgørende drivkraft i HIV/AIDS epidemien. At prioritere mellem de udfordringer og løsninger som om de er uafhængige svarer til at prioritere det ene ben over det andet, uden at anerkende, at man skal bruge to ben for at kunne gå.

Det er også klart fra analyserne, at der er faldende afkast af mange af investeringerne. Analysen af sult og fejlernæring konkluderer, at det er dyrere at nå ud til det sidste 30% af befolkningen, end det er at nå de første 70%. I konflikt-analysen anerkendes det, at mange interventioner viser faldende afkast, så en mindre indsats kan have højere benefit/cost rater end en fuld indsats. Investerer man derfor alle 75 milliarder dollar - det beløb forfatterne har fået stillet til rådighed - i den højest prioriterede løsning, er det derfor tydeligt, at man vil få mindre for pengene, end hvis man spreder investeringerne ud over flere løsninger. Det modsiger selve grund-ideen i Copenhagen Consensus.

Det afgørende spørgsmål er derfor, om det giver mening at prioritere mellem og rangordne meget forskellige (og begrænsede) løsningsforslag på baggrund af usikre benefit/cost beregninger, der udelader vigtige udgifter og fordele og har store metodiske problemer. Det eneste seriøse svar er nej.

Prioriteringsøvelsen i Copenhagen Consensus er derfor i bedste fald en **gimmick**. Og som sådan fungerer den glimrende. Hvis du er økonom og godt kan lide cirkus, så er Copenhagen Consensus det bedste cirkus i byen. Prioriteringsøvelsen bør derfor finde sit primære publikum i pressen og ikke blandt politikere. Det skulle også anerkendes af de deltagende økonomer.

Selv om analyserne er meget værdifulde, så er det forkert at påstå, at prioriteringsøvelsen er mere end en gimmick. Det er nemlig præcis, hvad det er.

The Copenhagen Circle

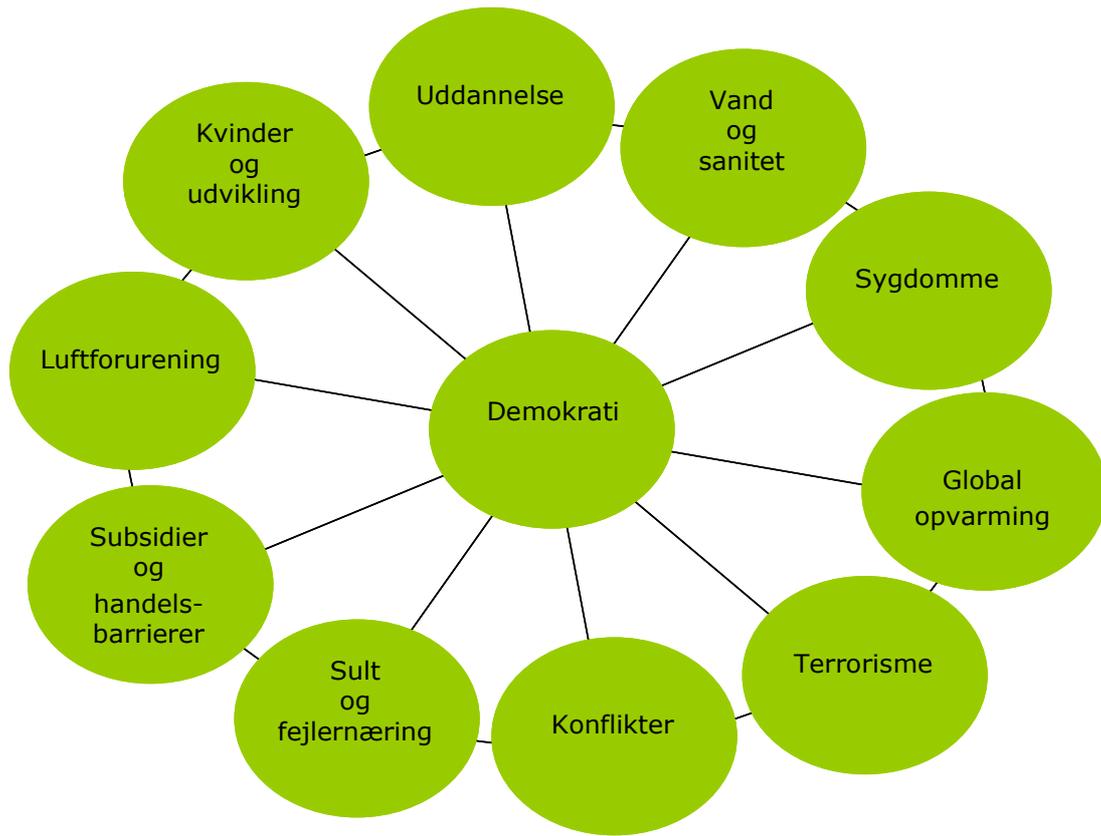
Den stærke men oplagte erkendelse fra gennemgangen af alle Copenhagen Consensus analyserne er derfor, at løsninger skal udformes i synergi og sammenhæng. I stedet for en Copenhagen Consensus prioriteringsliste har vi brug for en Copenhagen Circle of Solutions: En cirkel af løsninger, hvor koblingerne anerkendes og udforskes, og hvor vi konstant tilpasser løsningerne til en samlet strategi for bæredygtig udvikling. Der er ingen global prioriteringsliste, der kan erstatte lokale løsninger, målrettet mod de særlige forhold og som kombinerer en række tiltag i en bred tilgang for at skabe udvikling.

Den anden og klare erkendelse at prioriteringer skal skabes i en ramme, der inkluderer mange dimensioner og millioner af input. Som deltagerne på det første ungdomsforum under Copenhagen Consensus udtrykte det: Vi har ikke brugt benefit/cost analyse - vi har brugt "human benefit" analyse.

Den bedste, men stadig mangelfulde, metode til at prioritere er **demokratisk ledelse**. Sørgeligt nok behandles demokratiet kun i udkanten af få af analyserne. Og demokratiet behandles som endnu et forslag, der kan overvejes på linie med andre - hvis altså benefit/cost beregningen er høj nok. Det er måske det største problem med Copenhagen Consensus.

En prioriteringsøvelse blandt "verdens største udfordringer", der ikke seriøst diskuterer eller analyserer demokrati og demokratiudvikling er en anelse deprimerende. Demokrati og demokratisk ledelse er ikke et tilfældigt valg foran os. Blandt alle muligheder er det den bedste og eneste mulighed for en beslutningsproces og en prioriteringsproces der er retfærdig, oplyst og inklusiv. Demokrati - i den bredeste udformning - giver hvert enkelt menneske mulighed for at deltage, at kæmpe for et liv i tryghed og værdighed. Og hovedproblemet er at demokratiet i mange lande - og i verden - ikke fungerer godt nok.

Demokrati er derfor ikke blot et forslag. Det er en nødvendighed. Og det er noget, vi skal kæmpe hårdt for at opnå. Demokratiet skal være lige i midten af cirklen af løsninger: The Copenhagen Circle of Solutions.



Copenhagen Circle of Solutions

1 Summary: Review and Recommendation - From Ranking to a Circle of Solutions

The aim of Copenhagen Consensus 2008 is to assess more than 50 solutions and assemble a list of priorities for everyone involved in solving the world's biggest challenges. Copenhagen Consensus aims to establish a framework in which solutions to problems are prioritized according to efficiency based upon economic and scientific analysis of distinct subjects.

This report is a review of this process. Or to be more specific: It is a review of the basic idea of ranking problems based on the benefit/cost analysis provided in the 10 Copenhagen Challenge papers. It does not in any way question the wealth of good information and analysis provided by Copenhagen Consensus. The papers are solid pieces of analysis providing, from an economic perspective, up-to-date and in-depth information on the various challenges. This evidence is enormously important not least as it provides ample evidence that it really pays to invest in solving the world's most important problems. It really pays to invest in poor people in poor countries. Almost all benefit/cost ratios are above one signalling that we should invest in the solutions. And that we should invest now. This message comes uniformly from all Copenhagen Consensus Challenge Papers.

This review, however, tries to address whether we, on this basis, can rank the solutions across the different challenges and thereby provide useful information for politicians and other decisions-makers in setting priorities? The answer to this question is no.

1.1 The Copenhagen Consensus Ranking of Solutions

There are several reasons why it does not make sense to compare the solutions across the different challenges.

First of all the interventions are very **different**. They range from a conclusion of a trade deal in the World Trade Organization to the promotion of breastfeeding, a change in the foreign policy of the US compared with microfinance to women; proactive measures against terrorism like the invasion of Afghanistan compared with deep boreholes in rural villages in Africa. It is without saying that these interventions have very different impact and implications and are, by nature, extremely difficult, if not impossible, to compare.

Moreover, the papers only provide information on selected, and in some cases very **limited interventions**. We do not see the full picture of neither challenges nor solutions. Key challenges are omitted e.g. investing in issues as democracy, agricultural development or infrastructure. Key solutions are, as documented in this review, never assessed. The only adaptation measure included in the paper on Global Warming is malaria bed nets and oral rehydration therapy for children in least developed countries. The necessary adaptation to

more severe droughts, floods and cyclones is not included. It is recognised in the paper on Hunger and Malnutrition that the interventions addressed can only remove a quarter to a third of under-nutrition. The rest requires reductions in poverty and vulnerability. We do not get the full picture.

Secondly, the benefit/cost ratios can only be compared across different challenges if they capture and quantify all externalities. They do not. Not even close. **Significant externalities are excluded** from the calculations. The paper on Air Pollution does not quantify effects on global warming or the damage to agriculture, ecosystems or infrastructure. The paper on Terrorism does not value costs side issues such as fear, horror and anxiety but only effects on GDP and mortality. If any ranking against totally different problems is to be meaningful the full costs and benefits must be included, and the cross-challenge and cross-country differences should be comparable. They are not.

A third important precondition for comparing across challenges is that they use the same **methodology**. They do not. The Copenhagen Consensus has tried to frame some simple guidelines for the calculations, but not even these guidelines are followed in all papers. Different papers use different values for a life - most papers use US\$1000-5000, but the paper on Water and Sanitation uses ten times those values. The paper on Diseases reduces by 50% the DALY loss associated with an under-5 death, which is not only ethically debatable but also impacts on the benefit/cost ratios of especially malaria and immunization. Different discount rates are used which can significantly influence the results. Most papers use 3% and 6%, the paper on global warming uses 5%. The paper on Subsidies and Trade Barriers uses a totally different modelling framework than the rest and finds benefit/costs ratios beyond 1000!

There are very **substantial ethical and methodological problems** when moving across the different challenges. The value assigned to a disability adjusted life year (DALY) is, as recognised by the authors, at best "a rule of thumbs" without any careful assessment of the positive or negative externalities associated with the individual intervention. The estimates for costs and benefits are very uncertain. The paper on Conflicts recognises that the externalities and methodological problems may very well double, triple or even increase the valuation of the cost of conflict by up to 32-fold. The paper on Women and Development concludes that it is hardly ever clear what items are included in the cost estimates, how much of the cost is fixed or variable and whether existing infrastructure or personnel has been included or excluded. Antiretroviral treatment for HIV/AIDS patients requires a solid infrastructure of health care personnel, systems and clinics. These costs are not included in the calculation.

Ranking on this basis is like comparing the weather with apple pie.

Finally, it only makes sense to rank the solutions if they are indeed independent solutions. They are not. Almost all papers emphasize again and again that the interventions are highly dependent on other interventions and that different interventions work in **synergy and complementarity**. It is evident that both conflicts and climate change have strong linkages to most other Copenhagen Consensus Challenges - linkages/externalities that are not captured by the study. Both papers recognise that the most effective approach is a multiple-intervention strategy. The paper on Education concludes that the most cost effective interventions are the ones focusing on malnutrition or treatable diseases to avoid that children drop out of school. Gender inequality is a significant driver of the HIV/AIDS pandemic. Ranking these interventions independently is therefore like ranking the left leg over the right one - without recognising that you can only walk if you use both legs.

It is also evident from the analysis that there are **diminishing returns**. The paper on Hunger and Malnutrition concludes that it is more costly to cover the last 30% of the population than the first 70%. The paper on Conflicts recognise that there are many types of interventions with diminishing returns so that sub-optimal interventions may have higher benefit/cost ratios. If you invest all the US\$ 75 bn - the amount to be prioritised by Copenhagen Consensus 2008 - in the top-ranking solution it is evident that you will get less impact than if you spread the investment amongst a range of different interventions. This contradicts the very ranking exercise pursued by the Copenhagen Consensus project.

The key question is therefore whether it makes sense to rank very different (and limited) solutions based on benefit/cost calculations that ignores a range of positive benefits and costs and have key methodological problems? The only serious answer is no.

The ranking exercise in Copenhagen Consensus is therefore at best a **gimmick**. As such it works brilliantly. If you are an economist and like circus, Copenhagen Consensus is the best circus in town. However, the ranking exercise should find its primary audience not amongst politicians but amongst the popular press. This should also be the position of the participating economists. While the papers and the analysis are very valuable, it is wrong to claim that the cross-challenge comparison of benefit/cost ratios is more than a gimmick, because that is exactly what it is.

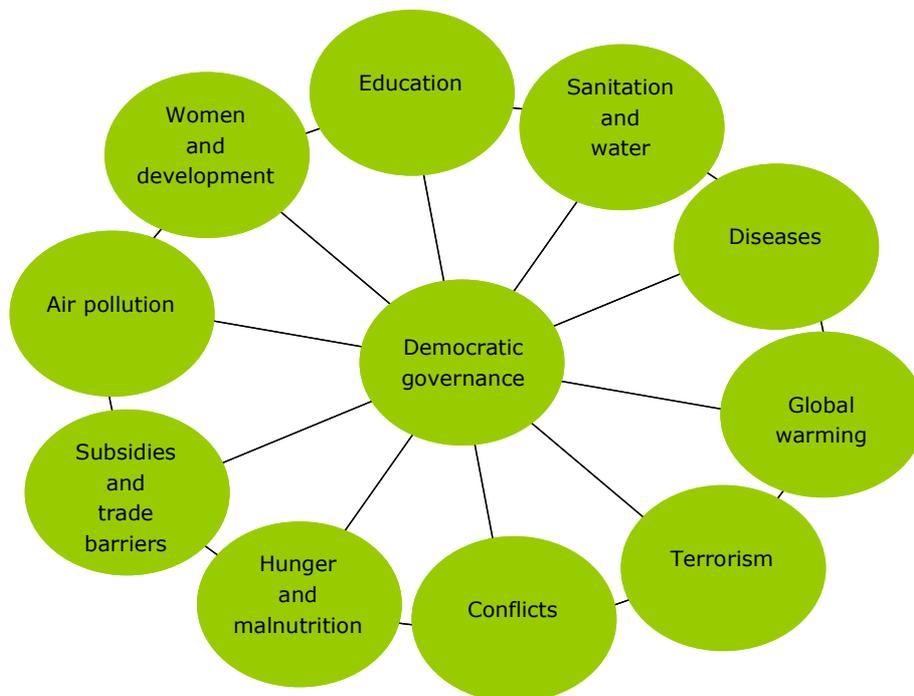
1.2 The Copenhagen Circle of Solutions

The strong but obvious insight from reviewing the Challenge Papers is therefore, that solutions must be shaped in synergy and complementarity. Instead of a Copenhagen Consensus ranking we need a Copenhagen Circle of Solutions, where the inter-linkages are recognised and explored and where we continuously fine-tune our interventions to add to the larger picture of

sustainable progress. There is no world-wide ranking list that can override the need for shaping solutions that are tailored to the specific circumstances and are using multiple interventions in a broad approach to human development.

The second strong and obvious insight is that setting priorities must be done in a setting that includes multiple dimensions and millions of inputs. As the youth forum participants at the first Copenhagen Consensus Youth Forum expressed it: We have not used cost-benefit analysis - we have used human benefit analysis.

The best proven, but still of course highly incomplete, way of setting priorities - doing "human benefit analysis" - is **democratic governance**. Sadly, democracy is treated only in the margin of a few of the papers as yet another possible solution or intervention that could be considered - if the benefit/cost ratio is high enough. This is perhaps the biggest problem with Copenhagen Consensus. A process of prioritisation of "the world's biggest challenges" that do not even seriously discuss or debate issues of democratic governance is slightly depressing. Democratic governance is not a random choice in front of us. Amongst all options it is the best and only way of ensuring decision-making processes and priorities that are as just, informed and inclusive. Democracy, in its broadest form, enables each individual to participate, to fight for a life in dignity and security. And the main problem is that the democracy does not function as it should in many countries - and in the world. Democratic governance is, therefore, not an option. It is a necessity. And it is something you must fight hard to achieve. It must be right in the middle of the Copenhagen Circle of Solutions.



The Copenhagen Circle of Solutions

In the following chapters the Copenhagen Challenge Papers are reviewed, followed by concluding remarks.

2 Air pollution

The paper on Air pollution deals with four limited **interventions**: Improved stove technology and fuel substitution to limit in-door pollution; low and ultra-low sulfur diesel for urban road vehicles; diesel vehicle particulate control technology and inspection and maintenance program for diesel vehicles.

The paper thus excludes a wide range of **other interventions** such as electrification schemes; information campaigns; ventilation, kitchen design to limit indoor pollution and standards and regulations; engine modification, promotion of new technology; traffic management, restrictions on traffic, urban planning, investments in public transport

For the discussed interventions there are significant positive **externalities** that are not quantified and valued. Effects on deforestation of fuel wood and/or charcoal promotion; time saving and the effects on women's development; fuel costs savings and effects on growth and income; broader environmental impacts including effect on global warming; damage from air pollution to agriculture, ecosystems or infrastructure and finally the interactions with other health and nutrition problems. Death rates from acute lower respiratory infections are for instance reported to be 4-8 times greater for moderately to severely underweight children than for children of normal weight.

There are a number of ethical and **methodological problems**. The value placed on a disability adjusted life year is the standard values prescribed by the Copenhagen Consensus Project and not the - often significantly higher - values found when using "statistical life" values. The costs and benefits are very uncertain and as shown under the externalities there are significant issues that are not quantified and included.

The study finds the highest benefit/cost ratios for improved cooking stoves in Africa and much of Asia, while the benefit/cost ratios for vehicle particulate control are greater than one only when DALYs are valued at US\$5,000. The main reason for this is that the older age groups are the main beneficiaries of urban air pollution control, while children benefit substantially from indoor air pollution control.

It is recognised that estimation of benefits of reducing indoor air pollution to improve child health would be best done in a multiple risk framework assessing several interventions and their synergy and complementarity.

Table overview - Air Pollution

Interventions assessed
Improved stove technology and fuel substitution (1.7/37:1)
Low and ultra-low sulfur diesel for urban road vehicles (0.2/2.5:1)
Diesel vehicle particulate control technology (0.2/3.3:1)
Inspection and maintenance program for diesel vehicles (0.5/2.5:1)
Other relevant interventions not assessed (examples)
Electrification schemes
Charcoal promotion
Information campaigns
Ventilation, kitchen design
Standards and regulations
Engine modification, new technology
Traffic management or restrictions
Urban planning, investments in public transport
Externalities not included (examples)
Effects on deforestation
Time savings and effects on women's development
Fuel costs savings and effects on household income and growth
Broader environmental impacts including effect on global warming
Damage from air pollution to agriculture, ecosystems or infrastructure
Interactions with other health and nutrition problems
Methodological problems (examples)
Interventions only address part of the problem
The value of a disability adjusted life year debatable (US\$ 1000 and US\$ 5000)
Uncertain and crude estimates of costs and benefits

3 Subsidies and trade barriers

The paper on subsidies and trade deals with three **interventions**: Concluding the Doha Development Agenda in the World Trade Organisation; establishing a Free Trade Area of the Americas and freeing up international movement of workers.

The paper thus excludes a number of **other possible interventions** such as free market access for all Least Developed Countries including services (a scenario that is, however, discussed), regional integration scenarios between developing countries alone or more thematic issues such as easing international restrictions on intellectual property rights.

For the discussed interventions there are significant **externalities** that are not quantified and included. The effects on the environment and poverty are judged to be either negligible or positive but are not quantified. The effects on issues like corruption and conflict are also not quantified nor judged to be significant (and if so then positive). The discussion on malnutrition and hunger simply advocates the use of genetically modified organisms, without recognising that further trade reform may increase food prices even more.

There are a wide range of **methodological problems** in using (still crude) computable general equilibrium models to assess international reforms. Key parameters and elasticities are crudely estimated. Aggregation matters. Protection estimates do not fully capture preferential treatment, standards/regulations nor issues as anti-dumping measures, rules of origin, safeguard clauses - issues that are known to have substantial influence on the trading prospects of developing countries. Dynamic effects are rudimentarily captured.

A range of the methodological problems are mentioned but no proper sensitivity analysis is made of the critical assumptions or parameters. It is well known that changing model assumptions, elasticities, aggregation, and baseline can significantly change the results. The study ignores a number of the very recent studies that have found much more modest, and for some developing countries even negative, impacts of global trade reforms.

The study finds benefit/costs ratios for the trade scenarios between 690/900 (high discount rate) and up to 2700/3100 (low discount rate). For migration the benefit/costs ratios are between 100 and 840. The most important thing to notice is perhaps that these effects are found in a modelling framework and approach that differs significantly from the one used in most other Copenhagen Consensus papers.

Table overview - Subsidies and Trade Barriers

Interventions assessed
Doha Development Agenda in the World Trade Organisation (269-1121:1)
A Free Trade Area of the Americas
Freeing up international movement of workers (45-336:1)
Other relevant interventions not assessed (examples)
Free market access for all Least Developed Countries incl. services (briefly touched upon)
Regional integration between developing countries only
Easing international restrictions on intellectual property rights
Substantial aid for trade scenarios (using aid to build trade capacity of poor countries)
Externalities not included/quantified (examples)
Environmental effects of additional trade and investments (assumed to be zero)
Effects on distribution and poverty, inequality, hunger (assumed to be positive)
Effects on conflicts (judged to be positive)
Loss of tax revenue and implications for government spending (judged to be marginal)
Methodological problems (examples)
The modelling framework (CGE model) is (still) crude and aggregate
CGE models offer a simplistic treatment of firms and households
Critical model parameters crudely estimated (elasticities, distortions, technology, quality)
Dynamic effects of trade included in a very crude fashion (and not in migration scenario)
Estimates of distortions do not capture fully preferential treatment or service distortions
Non-tariff barriers as standards and regulations not included
Issues as rules of origin, anti-dumping and safeguards not included
Does not fully capture constraints as education, health, infrastructure
Estimates of adjustments costs (for both trade and migration) are very crude
Effects of the necessary complementary macroeconomic reforms not addressed

4 Hunger and Malnutrition

The paper on hunger and malnutrition deals with four limited **interventions**: distribution of micronutrients, anthelmintics (deworming), breastfeeding promotion and nutritional education. As it is recognised in the paper the interventions addressed can only remove a quarter to a third of undernutrition. The rest requires reductions in poverty and vulnerability. The paper thus excludes a wide range of **other interventions** with clearly documented positive results on hunger and malnutrition - from investments in agricultural development to strengthening women's rights.

For the four discussed interventions there are significant positive **externalities** that are not included in the calculations. It is known, but not quantified in the paper, that improvements in nutrition have positive impacts on educational achievements, labour productivity and health interventions. These positive externalities differ across interventions. This is not included. A few negative externalities of the interventions are not quantified either. For instance in a population with high rates of malaria iron supplementation of young children is associated with increased hospital admissions and mortality.

There are a wide range of ethical and **methodological problems**. The calculations use standard dollar values of DALYs (disability adjusted life years) equal to 1000US\$/year (judged to be the right range in low income countries) and 5000US\$/year (middle income countries). These estimates are, as recognised by the authors, at best "rule of thumbs" without any careful assessment of the positive or negative externalities associated with the individual intervention. All lives are weighted equally. If saving a life of a one-year old is weighted higher than saving the life of a 59 year old - which from a narrow economic point of view would be appropriate - then the ranking and policy advice would change. This is recognised in the paper.

Discounting raises key methodological problems as well. As the time profile of costs and benefits differs the choice of discount rate will influence results significantly. Interventions that save lives today would be preferred to interventions that for instance improve the cognitive development and yields positive results later.

It is also emphasized that the cost estimates are at best very crude. For instance the interventions requires infrastructure such as a well-functioning primary health care system. The costs and benefits of these systems are not included in what is labelled "ballpark estimates of annual costs". It is recognised that costs and benefits differ substantially in different countries and within countries. It is more costly to cover the last 30% of the population than the first 70%. There may be increasing returns to scale for some interventions, but there are also, beyond an uncertain threshold, diminishing returns to scale for all interventions.

Table overview - Hunger and Malnutrition

Interventions assessed
Micronutrient interventions (vitamin A, iron, zinc, folate, biofortification) (4-50:1)
Anthelminths (deworming) (3-60:1)
Breastfeeding promotion - baby-friendly hospitals
Nutritional education at the community level (12,5:1)
Other relevant interventions not assessed (examples)
Increased access to income generation
Investing in agricultural development
Primary education - especially of girls
Strengthening women's rights and influence
Improved access to primary health care
Reducing climate induced vulnerability (droughts, floods, cyclones)
Democracy and improved human rights
Reducing conflicts
Externalities not included (examples)
Improved learning in school
Higher labour productivity
Reduced vulnerability to HIV/AIDS, malaria and other diseases
Methodological problems (examples)
Interventions only address 1/4-1/3 of under-nutrition problems
Conversion of saved life years to dollar values use very crude estimates
Differential weighting of lives at different ages will change rankings and results
Benefiting children's cognitive development is less attractive due to discounting
Investments in infrastructure to allow interventions not included
Substantially different costs and benefits in low and middle-income countries.
More costly to cover the last 30% of the population than the first 70%

5 Conflicts

The paper on Conflicts deals with four **interventions**: Increased aid in post-conflict situations; imposing limits on the military spending of post-conflict governments; expanding peacekeeping forces and guaranteeing security from “over-the-horizon”, as has been seen with France towards the Francophone countries and Britain in Sierra Leone. The study only focuses on civil wars and coups and does not therefore include cross-border conflicts.

The paper thus excludes a wide range of **other interventions**: diplomatic efforts to negotiate peace; dismantling trade barriers to create interdependence and security; engaging in much more massive aid programmes (as the Marshall help to Europe) to ensure peace; military options as pre-emptive total invasions of countries and/or large-scale military investments and protective measures in countries at risk.

For the discussed interventions there are significant positive **externalities** that are not included. The costs estimates only included GDP losses (for the country experiencing the civil war and its neighbours) during the civil war and in the recovery phase and the direct loss due to loss of life and disability-adjusted life years. It does not take into account that conflict makes almost all other interventions impossible. When at war it is impossible to give anti-retroviral medicine to people affected with HIV/AIDS; the children do not go to school etc. Therefore, a number of long-term impacts of war - or positive spill-over effects of peace - are not included. The horror and fear experienced by people facing war are not valued. Also international spill-over effects in terms of disease, crime and terrorism are not quantified and included. Issues with such devastating impacts on children and women and the potential interaction between climate change, refugee flows and conflict are not dealt with. It is evident that conflicts have strong linkages to most other Copenhagen Consensus Challenges - linkages/externalities that are not captured by the study.

There are a wide range of ethical and **methodological problems**. The paper itself acknowledges that, contrary to the conventional wisdom often seen, income losses for the poorest people are much more serious than income losses for richer people. This implies that an intervention in Southern China should be valued less than an intervention in Congo. However, with standard measures of a lifetime it is often opposite (as the value of a life is often calculated from potential income losses). The paper also concludes that the externalities and methodological problems may very well double, triple or even increase the valuation of the cost of conflict by up to 32-fold. Indeed, the uncertainties are very large.

The intervention with the highest benefit/cost ratio is peace-keeping troops (10,7-53,7), but the study emphasises that the most effective intervention would probably be a combination of

post-conflict aid, an external military peacekeeping or an “over-the-horizon” guarantee, a commitment by the government to cut military spending and a system of verification. The interventions complement each other and as such it makes little sense to rank them up against each other.

Table overview – Conflicts	
Interventions assessed	
Increased aid in post-conflict situations (2.7:1)	
Imposing limits on the military spending of post-conflict governments (3.3:1)	
Expanding peacekeeping forces (10.7-12.6:1)	
Guaranteeing security from “over-the-horizon” (3.6-4.2:1)	
Other relevant interventions not assessed (examples)	
Diplomatic efforts to negotiate peace	
Dismantling trade barriers to create interdependence and security	
Massive aid programmes (as the Marshall help to Europe) to ensure peace	
Pre-emptive total invasions of countries	
Large-scale military investments and protective measures in countries at risk	
Stabilisation of and transparency with regard to revenues from natural resources	
Externalities not included (examples)	
Effects on war on other interventions such as education and health.	
Existence value of societies and groups	
Fear, horror and revulsion of war	
International spill-over effects - crime, disease, terrorism - not captured	
Resources diverted due to increased military spending	
Negative effects of peace-keeping forces (HIV/AIDS, crime, high housing prices)	
Peace has an intrinsic value	
Methodological problems (examples)	
Uncertainties in estimates of both costs and benefits	
Income losses for the poorest part of the population should be weighted higher	
Discounting (3% and 6%) may hide long-term persistent costs of conflicts	
Economic costs beyond the country and its neighbours not included.	
Post-conflict aid does not include broader benefits (education, health etc.)	

6 Terrorism

The paper on Terrorism deals with five very different **interventions**: Business as usual - continuing current efforts; greater international cooperation especially on policy and surveyance; increased proactive measures along the lines of the invasion of Afghanistan; augmented defensive measures increasing homeland security; more sensitive foreign policies on the part of a prime-target nation, specifically more foreign aid and a different distribution of foreign aid.

The paper thus excludes **other interventions** for instance a long-term strengthened commitment for development, economic stability, promoting human rights and democracy and a specific effort to solve the Palestinian/Israeli conflict.

For the discussed interventions there are significant **externalities** that are not included. On the costs side issues as fear, horror, anxiety amongst a much broader part of the population and possible behavioural changes are not included (this is not recognised in the paper, but is discussed in the paper on Conflict). It is not recognised that some countermeasures may actually (in the short run at least) lead to increased terrorism. And it is not included that a number of the interventions will have significant benefits beyond curbing terrorism. Increased international policy cooperation will not only affect terrorism but (hopefully) also other international crimes as narcotics trade and trafficking, but these benefits are not quantified. The intervention in Afghanistan and more development aid will (hopefully) have additional benefits within development, democracy, human rights etc. that are not quantified and included in the calculation. Finally, the risk of chemical, biological, radiological or nuclear attacks are not included and quantified up against the costs of counter measures.

There is a wide range of ethical and **methodological problems**. No real and effective solution exists to the problem of terrorism and as such all interventions are partial and subject to large uncertainties. There is no true counterfactual (what would have happened without countermeasures). The costs of counterterrorism measures (size, attribution) are crude. Moreover, as stated above many of the interventions have positive (or in some cases negative) externalities that may be far larger than the effects on terrorism but these are not included. This leads to low benefit/cost ratios.

The paper ends by concluding that measures that increased proactive measures or augmented defensive measures have very low benefit/cost measures, while responses that lead to a stronger international cooperation (police/surveyance) have benefit/cost ratios that may be as high as 5-15. Changes in foreign policies have modest benefit/cost ratios but here again large externalities are not included.

Table overview - Terrorism

Interventions assessed
Business as usual (0.04-0.097:1)
Greater international cooperation (5.3-15.5:1)
Increased proactive measures (0.077-0.123:1)
Augmented Defensive Measures (0.287:1)
More sensitive foreign policies on the part of a prime-target nation (>1:1)
Other relevant interventions not assessed (examples)
Long term expanded attempts to reduce economic instability and poverty
Solving the Palestinian/Israeli conflict
Supporting and promoting human rights and democracy
Externalities not included (examples)
Fear, horror, anxiety and related behavioural changes not included
Some counter measures can increase terrorism (e.g. war in Iraq)
International policy cooperation will have other positive benefits apart from less terrorism
Interventions as war in Afghanistan has benefits/costs beyond less terrorism
Risk of chemical, biological, radiological or nuclear attack
Links between terrorism and conflict
Methodological problems (examples)
No real and effective solution exists
No true counterfactual (what would have happened without countermeasures)
Crude estimates of costs of counterterrorism measures (size, attribution)
The price of a life/disability adjusted life year disputed (uses range of estimates)
Several of the interventions have significant externalities that are not included

7 Global warming

The paper on global warming deals with four **interventions** - business as usual, mitigation only, mitigation with research and development and finally mitigation with research/development and a modest adaptation scenario. The interventions are all framed within the Copenhagen Consensus framework (using US\$ 75 bn over four years), however, it is assumed that any realistic policy choice within climate change will be prolonged beyond 4 years, so implicitly the analysis use a net present value budget of US\$ 800 bn. This makes the calculations difficult to compare with the other challenges.

With a total investment of US\$ 18 bn per year interventions are therefore also very modest in nature. The only adaptation measures included are malaria bed nets and oral rehydration therapy for children in least developed countries. The analysis ignores substantial adaptation challenges within droughts, floods, cyclones and hunger. The analysis does, however, from the very beginning recognise that ignoring climate change would ameliorate many of the other Copenhagen Consensus challenges - expending efforts on these challenges simply to stay in place. Unmitigated climate change would for instance produce significant yield reductions in Africa and most of Southern Asia with possible devastating results. It is clear that the different challenges must be seen as interlinked and mutually dependent - a point which counter-argues the very premise of Copenhagen Consensus, namely to rank and prioritise challenges and solutions as if they were independent.

There are significant positive **externalities** that are not included. Most notably accumulation of different climate related stress factors and possible interactions between the various impacts - e.g. hunger may increase vulnerability to disease, disease will impact on productivity and school learning.

There are a range of **methodological problems**. The discount rate (5% declining to 4%) is debatable, it differs from the rates used in the other Challenge Papers, and no sensitivity analysis is made.

The paper ends by favouring a pro-active alternative combining both straight mitigation efforts, enhanced investments in research and development, carbon sequestration and expanded adaptation. And it concludes that, including only current uncertainties about climate change, will easily raise the true benefit/cost ratio of this approach above 5. Importantly, this is achieved with "standard" discount rates - not imposing very low discount rates to place higher values on benefits in the distant future as seen in some climate studies. Importantly also, these values are achieved with a very modest intervention respecting the budget constraint imposed by the Copenhagen Consensus project.

It is therefore recognised that there is a clear need for both mitigation and adaptation. Neither can stand alone. A one-sided focus on research and development alone will in the long run not reduce CO₂ emissions.

It is also important to note that the triple-intervention scenario is more beneficial than the sum of the three individual interventions - mitigation, research and development and adaptation - taken alone. Thus, they act in synergy and support each other.

Finally, it is worth noting that if uncertainties are taken into account mitigation alone can become highly beneficial. In the - potentially likely - high damage scenario mitigation alone will have a benefit-cost ratio of nearly 7 - beyond the ratios found in other Copenhagen Consensus Challenges.

Table overview - Global Warming	
Interventions assessed	
Business as usual - inaction	
Mitigation only (annual) mitigation up to US\$ 18 bn. (0.9-6.9:1)	
Mitigation + R&D immediately (2.1:1)	
Mitigation + R&D + adaptation for specific health impacts (2.7-5:1)	
Other relevant interventions not assessed (examples)	
Adaptation towards a broader set of challenges - droughts, floods, cyclones, hunger	
Mitigation efforts that can keep temperature below the critical 2 degree increase	
Mitigation in non-Annex B countries	
Geo-engineering	
Externalities not included (examples)	
Accumulation of multiple climate stresses	
Interactions between climate related costs, e.g. health impacts may impair schooling	
Methodological problems (examples)	
Policy choices are assumed to be prolonged beyond 4 yrs - total expense US\$ 800 bn	
Discount rate (5% declining to 4%) is debatable - no sensitivity analysis made	
Uncertainties are by definition very difficult to foresee and incorporate	
Uses a significantly different value of a life than other Challenge papers	

8 Diseases

The paper on Diseases deals with seven **interventions**: appropriate case finding and treatment of tuberculosis; acute management of heart attacks with low-cost drugs; prevention and artemisinin combination therapies (ACT) against malaria; expanded immunization coverage against childhood diseases; tobacco taxations to prevent cancer and heart disease; antiretroviral therapy (ARV) and prevention against HIV; and surgical capacity at the district hospital to provide assistance in case of injury and difficult childbirth.

The paper thus excludes a wide range of **other interventions** against diseases as diarrhea, pneumonia and worm infections (see paper on hunger and malnutrition), and it excludes other types of interventions with proven high impact against diseases such as primary education (benefit/cost ratio estimated at 4-20 but not one of the solutions).

For the discussed interventions there are significant positive **externalities** that are not captured in the calculations which operate with a standard US\$ 1000 value per DALY (with US\$ 5000 calculated as well). Cross-border transmissions and effects are not captured and positive effects of improved health on education and learning are not fully valued. Strong linkages between nutrition and diseases are not internalised, for instance links between malnutrition and the effect of HIV/AIDS treatment or links between breastfeeding and micronutrients and disease impacts on children under 5. The standard value pr. DALY does not fully capture differential impacts on broader issues as poverty, productivity, savings and fertility.

Finally, there are important interactions and complementarities between different treatments. For instance the key correlation between HIV/AIDS and tuberculosis or links between prevention and treatment strategies within HIV/AIDS.

There are a wide range of other ethical and **methodological problems**. The value of a life raises several issues and the paper differs from earlier studies in reducing by 50% the DALY loss associated with an under-5 death (which impacts the benefit/cost ratios of especially malaria and immunization).

The study does not capture the costs of the broader health infrastructure and capacity. The provision of ARV treatment for HIV/AIDS patients, for instance, requires a solid infrastructure of health care personnel, systems and clinics. The benefit/costs ratios do not capture these broader but related investments in manpower and institutions, and may therefore in their policy implications lead to exactly the problem identified in many countries: High funding for specific and limited interventions (e.g. HIV/AIDS) but severe problems in building and equipping the general health system with basic tools, equipment and capacity.

The paper concludes that the intervention with the highest benefit/cost ratio is treatment of tuberculosis, followed by acute management of heart attacks. Low on the list is ARV and prevention against HIV/AIDS and surgical capacity at the district hospital.

Table overview – Diseases	
Interventions assessed	
Tuberculosis	: appropriate case finding and treatment (30:1)
Heart attacks	: Acute management with low-cost drugs (25:1)
Malaria	: prevention and ACT treatment package (20:1)
Child hood diseases	: expanded immunization coverage (20:1)
Cancer, heart disease, other	: tobacco taxations (20:1)
HIV	: combination prevention (12:1)
Injury, difficult childbirth, other	: surgical capacity at the district hospital (10:1)
Other relevant interventions not assessed (examples)	
Hundreds of diseases - even significant challenges as diabetes, diarrhea and pneumonia	
Primary education (benefit/cost ratio estimated at 4-20 but not one of the solutions)	
Nutrition related health interventions: Breastfeeding, micronutrients, helminth	
Externalities not included (examples)	
Cross-border transmissions	
Positive effects of improved health on education and learning	
Linkages to nutrition	
Effects on poverty, productivity and savings	
Effects on fertility	
Interactions and complementarities between different treatments (e.g. HIV/AIDS and TB)	
Methodological problems (examples)	
The disability adjusted life years for a typical under-5 death debatable (cut by 50%)	
The value of a disability adjusted life year is debatable (set at US\$ 1000 or 5000)	
Costs of building health system capacity not (fully) included	
Crude estimates of interventions like tobacco control programmes etc.	

9 Water and sanitation

The paper on Water and Sanitation deals with four very different **interventions**: deep boreholes and public hand pumps to improve rural water supply in Africa; campaigns to achieve open defecation-free communities in South Asia; biosand Filters for “Point-of-use” Household Water Treatment; and finally the establishment of large multipurpose dams in Africa.

The paper thus excludes a wide range of **other interventions** such as for instance treadle pumps to provide irrigation - an intervention that has provided significant results in South Asia; water harvesting and conservation techniques, which have been used in both Asia and in some African countries; tree planting to avoid erosion and increase rainfall; sewage treatment in cities to avoid pollution and multi-stakeholder water management initiatives for rivers and lakes, as seen for instance in the Mekong delta.

For the discussed interventions there are significant positive **externalities** that are not quantified and included. Benefits to the industrial and public sector are not counted; the paper only quantifies the impact on diarrhoea so community-wide health and environmental benefits are not captured and effects on other diseases (worms, SARS, cholera etc.) not included. The study only quantifies loss of DALYs and not pain and suffering from water-borne diseases. Broader aspects such as implications of improved water and sanitation on women’s rights or effects on conflict, trade, growth are not quantified.

There are a wide range of ethical and **methodological problems**. The value of a statistical life differs from other studies; it is recognised that the estimates of costs and benefits are highly uncertain and differ significantly from place to place. Many investments in water and sanitation are highly capital intensive but lasts for decades, which implies that they are disadvantaged by high discount rates; the future benefit streams from water and sanitation will increase with economic growth.

The paper ends by concluding that all four of the specific interventions, although benefit/cost ratios are fairly low, hold considerable promise for improving the economic livelihoods and health conditions of hundreds of millions of people. But the success of each intervention will depend on the specific context in which it is implemented and as such no sectoral-level analysis can replace rigorous, project-level economic analysis.

Table overview - Water and Sanitation

Interventions assessed
Rural water supply in Africa: deep boreholes and public hand pumps (3.2:1)
Campaigns to achieve open defecation-free communities in South Asia (2.7:1)
Biosand Filters for "Point-of-use" Household Water Treatment (2.7:1)
Large multipurpose dams in Africa (1.8:1)
Other relevant interventions not assessed (examples)
Treadle pumps to provide irrigation
Water harvesting and conservation
Tree planting to avoid erosion
Sewage treatment in cities
Multi-stakeholder water management initiatives for rivers and lakes
Externalities not included (examples)
Benefits to industrial and public sector
Community-wide health and environmental benefits are not captured
Effects on other diseases (worms, SARS, cholera etc.) not included
Pain, suffering from water-borne diseases not included
Implications of improved water and sanitation on women's rights
Protection of aquatic ecosystems and dependent biodiversity
Broader effects on conflict, trade, growth
Methodological problems (examples)
The value of a statistical life (differs from other studies)
Estimates of costs and benefits uncertain and differ significantly from place to place
Many investments highly capital intensive - disadvantaged by high discount rates
Perceived economic benefits can differ from the actual benefits of people
Benefit streams from water and sanitation will increase with economic growth

10 Education

The paper on Education deals with three demand-side **interventions**: Improving health and nutrition to improve learning; scholarship/voucher programs to make it cheaper to attend school; and conditional cash transfers to poor families.

The paper thus excludes a wide range of **other interventions** for instance all supply-side interventions - investing in school construction, teachers, quality of teaching etc, as these are judged to be less cost-effective than the demand-side interventions.

For the discussed interventions there are significant positive **externalities** that are not captured. This includes links to fertility, health and quality of life for children. More schooling is for instance associated with later marriage and fewer teenage mothers and there is strong link between parents schooling and improved child welfare. Education improves efficiency in the society, public sector performance and increases the adoption of new technology but these effects are not quantified. Education can also be an important avenue to reducing inequalities.

There is a wide range of ethical and **methodological problems**. The quality of education is very important but is difficult to measure and quantify; the study uses uncertain estimates of lifetime earnings from the expected impact on years of schooling. The estimates of costs and benefits differ substantially depending on local circumstances. There are diminishing returns to scale of investments in education and the returns depend on a number of external factors such as for instance the degree of personal freedom. Returns to increased school supply come after a long lag and may be disadvantaged by high discount rates.

Surprisingly perhaps, it is clear from the results that the most cost effective interventions within education are the ones focusing on malnutrition or treatable diseases to avoid that children drop out of school. The best returns to education are, in other words, obtained on investments in health and nutrition. Note that it is stated in the paper on Diseases that basic education can plausibly have benefit to cost ratios as high as many health interventions - even if no benefits of education other than mortality reduction are included.

Indeed these two papers recognise that where possible, education, nutrition and health interventions should be married as the one will enforce the other. It is, for instance, cheaper to distribute health and nutrition services at the school site, and in so doing, parents are more likely to send their children to school. When the mechanism used to increase school demand involves transfers that improve the child's health and nutrition, we also improve the child's cognitive capabilities and school performance, raising the returns to the program. These strong

interlinkages and complementarities point to key problems in a ranking exercise treating them as independent interventions.

The benefit/cost ratios vary significantly - from below 10 to above 400. It is recognised that returns will vary considerably depending on the circumstances, and estimated overall benefit/cost ratios should be taken with a "considerable grain of salt".

Table overview - Education	
Interventions assessed	
Improving health and nutrition (2,3/414 :1)	
Scholarship/Voucher Programs (1,2/463 :1)	
Conditional Cash Transfers (2,4/5,1:1)	
Other relevant interventions not assessed (examples)	
Maternal education to improve child health and cognitive development	
School construction	
Investments in quality	
Investments in secondary schools and universities	
Expanding employment opportunities for women to raise the benefits from education	
Externalities not included (examples)	
Links to fertility, health and quality of life for children	
Education improves efficiency in the society and increases the adoption of new technology	
Education improves the public sector performance	
Links between education and inequality	
Methodological problems (examples)	
Quality of education important but is difficult to measure and quantify	
Uncertain estimate of lifetime earnings from the expected impact on years of schooling	
Estimates of costs and benefits differ substantially depending on local circumstances	
There are diminishing returns to scale of investments in education	
Returns to investments in education depend on the degree of personal freedom	
Returns to increased school supply come after a long lag	

11 Women and development

The paper on Women and Development deals with four **interventions**: cash transfer programs to girls/women to increase and improve girl's schooling: family planning, maternal health programs to support for women's reproductive role: microfinance to reduce women's financial vulnerability; affirmative action to strengthen women's political voice.

The paper thus excludes a wide range of **other interventions** such as for instance improving the quality of girls' education, building schools for girls, improving women's access to and control over productive resources and property rights and supporting women's self-help groups. There is very little focus on supporting gender equality issues within business initiatives or the promotion of funding and mechanisms for women's participation in civil society. To achieve gender equality it is important also to work with the power relationships between men and women. These and multiple other interventions are discussed in the paper, but not quantified or analysed.

For the discussed interventions there are significant positive **externalities** that are not captured. Improving the education of girls will have broader effects on nutrition, fertility and mortality. Contraception and family planning tools will improve the education of girls and expand work opportunities for women. Gender inequality is a significant driver of the HIV/AIDS pandemic. Microfinance schemes can also have broader effects on both schooling and multiplier effects in society as such.

There are a wide range of ethical and **methodological problems**. The value of a disability adjusted life year (DALY) is debatable. Parameters in the calculations are typically based on a few empirical studies - Grammen bank in Bangladesh and political reforms in parts of India. Women's role and influence vary heavily depending on policy, culture, tradition. Many indirect cost and benefits are not quantified. As the authors state it: It is hardly ever clear what items are included in the cost estimates, how much of the cost is fixed or variable and whether existing infrastructure or personnel has been included or excluded. Programs are also implemented with different levels of administrative efficiency. Numerous problems in the design and implementation of the programs are discussed but not captured in the crude benefit/cost ratios.

The paper concludes that the highest benefit/cost ratios are found in interventions supporting women's reproductive role while some forms of microfinance have the lowest, but still mostly above 1, benefit/cost ratios.

Table overview - Women and Development

Interventions assessed
Increase and improve girl's schooling: cash transfer programs to girls/women (3/26,1:1)
Support for women's reproductive role: family planning, maternal health (7,8/10,6:1)
Reduced women's financial vulnerability: microfinance (0,6/21,6:1)
Strengthen women's political voice: affirmative action (2/12:1)
Other relevant interventions not assessed (examples)
Improving the quality of girls' education
Removing school fees and indirect costs (books, uniforms) in general
School building (separate schools for girls)
Improving women's access to resources and property rights
Assessment of business initiatives from a gender perspective
Funding and mechanisms for women's participation in civil society
Supporting women's self-help groups
Externalities not included (examples)
Effects of schooling on nutrition, fertility and mortality
Indirect effects of contraception - improved education and work opportunities for women
Broader spill-over effects of microfinance - schooling, multiplier effects
Broader effects of strengthening women's political voice
Possible short term efficiency loss from affirmative action
Methodological problems (examples)
The value of a disability adjusted life year (DALY) debatable
Parameters in the calculations based on a few empirical studies
Women's role and influence vary heavily depending on policy, culture, tradition
Many indirect cost and benefits not quantified
Changing the role and influence of women can take generations
Opportunity costs associated with changing roles of girls and women

12 Conclusion

The conclusion from the review is that each and every paper provides a wealth of information and an impressive in-depth analysis. Reading them truly adds knowledge and insight that can and should be used for making informed decisions about investments. And the calculated benefit/cost ratios are only a minor part of this information. The papers also provide a strong and uniform conclusion: It really pays to invest in poor people in poor countries, and we should invest much more in solving the world's largest problems. This conclusion alone is enough to justify the Copenhagen Consensus project.

The review, however, also clearly shows that it does not make any sense to rank the different solutions across challenges based on the benefit/cost ratios. Unfortunately, that is exactly what the Copenhagen Consensus project does.

There are several reasons why this does not make sense. The interventions are very different in nature and only few solutions are included in the analysis. There are significant costs and benefits that are not included in the analysis - and the extent to which externalities are included differs across the challenges. There are significant methodological challenges. And finally the challenges and solutions are heavily inter-linked.

12.1 Interventions very different in nature

In total there are more than 50 different interventions within the 10 different challenges. The first major problem of the Copenhagen Consensus approach is that the interventions differ substantially. They range from a conclusion of a trade deal in the World Trade Organization to the promotion of breastfeeding, a change in the foreign policy of the US compared with microfinance to women; proactive measures against terrorism like the invasion of Afghanistan compared with deep boreholes in rural villages in Africa. It is without saying that these interventions have very different impact and implications and are, by nature, extremely difficult, if not impossible, to compare.

While some papers have chosen to select a few and very narrow interventions other papers have tried to move upwards and look for more generalised and sweeping reform initiatives. No paper provides a full set of solutions. The only adaptation measures included in the paper on Global Warming are malaria bed nets and oral rehydration therapy for children in least developed countries. The necessary adaptation to more severe droughts, floods and cyclones is not included. As stated in the paper on Hunger and Malnutrition the interventions addressed

can only remove a quarter to a third of undernutrition. The rest requires reductions in poverty and vulnerability.

Even with the broad based nature of many interventions there are thousands of policy choices and possible interventions that are not analysed or quantified. And there are critical challenges which are not even addressed. Examples are:

- Investing in democratic governance, although this is the key to any attempts to shape decision making processes that are just, informed and inclusive. Moreover, there are a number of key linkages between democracy and solving a range of the other challenges.
- Investing in agricultural development. This policy option is critical in a time with skyrocketing food prices and climate change and it is critical to any attempts to spur growth, employment and poverty reduction in poor countries in general and Africa in particular. This option is not analysed, included or discussed.
- Investing in infrastructure although this is believed to be key to spurring growth and development in many poor countries, not least in Africa.

These are just three of the most important omissions. Many more are mentioned in the review of the individual challenges. To signal that the Copenhagen Consensus ranking provides an overview of all challenges in front of us - or even provides politicians with the most important policy choices - is simply wrong.

12.2 Externalities not included

Most problematic is perhaps that many, not to say most, externalities are not included or quantified. This makes it impossible to compare across challenges. The examples are numerous.

The cost/benefit analysis of post-conflict aid in the paper on Conflicts does not include benefits from less terrorism. The aid-against-terrorism analysis does not include the benefits of reducing conflicts. And neither of them includes possible benefits of aid on other aspects than conflict or terrorism. None of the papers value costs side issues as fear, horror and anxiety.

The paper on Water and Sanitation only quantifies the impact on diarrhoea so community-wide health and environmental benefits are not captured and effects on other diseases (worms etc.) not included.

It is mentioned, but not quantified in the paper on Hunger and Malnutrition, that improvement in nutrition has positive impacts on educational achievements, labour productivity and health interventions. The paper on Education on the other hand finds that the highest benefit/cost ratios are found in improvements in health and nutrition - even when only measuring the

effects on educational achievements. In the paper on Diseases positive effects of improved health on education on learning are not fully valued and cross-border transmissions and effects are left out. Strong linkages between nutrition and diseases are not internalised, for instance links between malnutrition and the effect of HIV/AIDS treatment or links between breastfeeding and micronutrients and disease impacts on children. Intangible but important issues as fear, horror or pain are not included, which can have large implications in the analysis of Conflicts and Terrorism for instance.

The list of incompleteness and inconsistencies in the way various costs and benefits are tackled is almost endless. This makes it difficult to compare different solutions within the same challenge and it makes it outright impossible to compare various solutions across the various challenges. However, this is exactly what the Copenhagen Consensus project claims to do.

12.3 Methodological problems

There are a broad range of methodological problems - beyond the question of externalities. Most significant is perhaps the somewhat arbitrary value assigned to a life. Or to be more precise to a disability adjusted life year (DALY). The standard prescription from the Copenhagen Consensus project is to use two different values US\$ 1000 and US\$ 5000. These values are, as recognised by the authors, at best "a rule of thumbs" without any careful assessment of the positive or negative externalities associated with the individual intervention. Moreover, there are differences. The paper on Water and Sanitation uses the value of a statistical life instead - estimated at US\$ 10,000-50,000. The paper on Diseases reduces by 50% the DALY loss associated with an under-5 death (which impacts on the benefit/cost ratios of especially malaria and immunization). In most papers all lives are weighted equally. If saving a life of a one-year old is weighted higher than saving the life of a 59 year old - which from an economic point of view would be appropriate - then the ranking and policy advice would change. These differences - and the somewhat arbitrary value of a DALY - make cross-challenge comparisons very difficult.

The discount rates differ, although the prescription was to use 3% and 6% the paper on global warming for instance uses 5% declining to 4%.

The budget constraint differs. The paper on climate change assumes that the interventions will be prolonged beyond the first four years, so implicitly the analysis use a net present value budget of US\$ 800 bn.

The paper on Subsidies and Trade Barriers uses a modelling framework and approach that differs significantly from the one used in all other Copenhagen Consensus papers and finds benefit/costs ratios beyond 1000!

Generally, the calculations of costs and benefits are also very uncertain and totally incomparable across the challenges. The paper on Hunger and Malnutrition describes them as "ballpark estimates of annual costs" and it is recognised that costs and benefits differ substantially in different countries and within countries. The paper on Women and Development concludes that it is hardly ever clear what items are included in the cost estimates, how much of the cost is fixed or variable and whether existing infrastructure or personnel have been included or excluded. The paper on Conflicts recognises that the externalities and methodological problems may very well double, triple or even increase the valuation of the cost of conflict by up to 32-fold. These problems are reiterated in almost all papers.

In general, the benefit/costs ratios do not capture broader but related investments in manpower and institutions. Antiretroviral treatment for HIV/AIDS patients, for instance, requires a solid infrastructure of health care personnel, systems and clinics. These costs are not (fully) included in the calculation. This may therefore in their policy implications lead to exactly the problem identified in many countries: High funding for specific and limited interventions (e.g. HIV/AIDS) but severe problems in building and equipping the general health system with basic tools, equipment and capacity.

All studies mention numerous problems in the design, administration and implementation of the interventions which are not captured in the crude benefit/cost ratios.

12.4 Challenges and solutions are inter-linked

It is clear that the different challenges must be seen as interlinked and mutually dependent - a point which counter-argues the very premise of Copenhagen Consensus, namely to rank and prioritise challenges and solutions as if they were independent. It is emphasized again and again in the Challenge Papers that the solutions work in **synergy and complementarity**.

It is evident that conflicts have strong linkages to most other challenges - linkages/externalities that are not captured by the study. The analysis on global warming recognises that ignoring climate change would ameliorate many of the other Copenhagen Consensus challenges - expending efforts on these challenges simply to stay in place. And within climate change it is shown that choosing a triple-intervention strategy focussing on both mitigation, research/development and adaptation is superior to any single-intervention strategy. Thus, the solutions act in synergy and support each other. Doing

research/development without doing mitigation is more expensive than if doing both. The paper on Education concludes that the most cost effective interventions are the ones focusing on malnutrition or treatable diseases to avoid that children drop out of school. It is emphasised that where possible, education, nutrition and health interventions should be married as one will enforce the other. Gender inequality is a significant driver of the HIV/AIDS pandemic. Again these inter-linkages counteract the basic logic - ranking solutions as if they are independent - promoted by the Copenhagen Consensus approach.

Another but related point is that many solutions show **diminishing returns**. The paper on Hunger and Malnutrition concludes that it is more costly to cover the last 30% of the population than the first 70%. As recognised by the paper on Conflicts there are many types of interventions with diminishing returns so that sub-optimal interventions may have higher benefit/cost ratios. If we invest the entire budget defined by Copenhagen Consensus (US\$ 75 bn) in malaria prevention, anti-terrorism or microfinance to women we will, most likely, see lower returns from the last dollar invested than from the first one. As shown very clearly, investing in primary education without investing in health and nutrition of the children will show very fast diminishing returns. This alone counter-argues a simple ranking exercise.

The above arguments make it crystal clear that ranking solutions across challenges based on the benefit/cost ratios is just like comparing the weather with apple pie.

At best the individual interventions within each challenge can be compared and prioritised, but even these priorities will be highly dependent on local circumstances. The choice between distributing micronutrients or promoting breastfeeding will depend on local health problems, culture traditions and health systems. Prioritising across the different challenges is outright impossible.

It is also wrong to pretend that priorities can be made based on benefit/cost ratios alone. As stated in the paper on Conflicts: Cost/benefit analysis should be seen as one approach that can help to supplement the way in which decisions are made rather than being the only basis for those decisions. The Copenhagen Consensus approach attempts to make the benefit/cost ratios the only basis.

This review provides substantial evidence to why the ranking exercise in the Copenhagen Consensus project is highly debatable. If you, after reading this review, still believe that it from a scientific point of view is possible to prioritise and rank challenges and solutions based

on economic cost-benefit analysis alone then you must have eaten nails, as we say in Denmark.

This does not mean that the Copenhagen Consensus is a bad idea. It only means that the ranking exercise is at best a gimmick. The ranking exercise should find its primary audience not amongst politicians but amongst the popular press. In so far that this gimmick draws our attention to the fact that it really pays to invest in poor people in poor countries it may very well be worth the while.