

# WHAT IS WRONG ABOUT "COPENHAGEN CONSENSUS" ?

(From [www.Lomborg-errors.dk](http://www.Lomborg-errors.dk), written by Kåre Fog, 2006)

## The conference

The international conference, "The Copenhagen Consensus" (1), was held in Copenhagen in 2004. It was organised and led by Bjørn Lomborg and co-sponsored by The Economist. A number of "leading economists" discussed the 10 greatest problems facing humanity today. They were given a hypothetical sum of 50 billion dollars and were asked to invest this money in such a way that a maximum benefit was obtained. The 10 issues were:

- climate change
- infectious diseases, especially AIDS
- conflicts and weapons proliferation
- financial instability, including currency speculation
- poor education
- poor sanitation
- poor government leadership and corruption
- population growth
- subsidies and trade barriers
- hunger and malnutrition

During the conference, the scientists resigned from dealing with three issues, viz. conflicts, financial instability, and poor education. For the remaining seven issues, a catalogue of possible measures was made, and the panel of economists chose how to allocate the sum of 50 billion dollars among these measures. The prevention and treatment of HIV/AIDS was given top priority and was to receive more than half of the total sum. Considerable sums would also be invested in alleviating micronutrient deficiencies and fighting malaria. Taken together, these health related issues would receive practically all 50 billion dollars. In addition, the experts recommended a total liberalisation of world trade, which would cost very little.

On the other hand, four of the proposed measures were classified as "bad" investments. Three of these four dealt with the prevention of climate change, viz. the Kyoto protocol and two proposals for tax on CO<sub>2</sub>.

Altogether, the recommendation was that society should invest in the health sector, and should not invest in combating climate change.

## What was wrong about the conference? The main criticism

"In the conference, the panel agreed with Lomborg that the costs of doing anything about climate change exceed the benefits. And if you think something has a benefit to cost ratio less than one, isn't it fair enough to speak out against it?"

This question has been put in the debate that followed the conference. It is a wrongly based question, firstly because two of the three climate projects were in fact deemed to have higher benefits than costs, but, more importantly, because it ignores the fact that the assessment was subjective, not objective. Although the issues were treated in such a way that fighting climate change received bottom priority, they might also have been treated in such a way that the climate issue had received top priority. And this could happen even if the experts agreed upon the precise size of the costs and the benefits (which, of course, they do not).

The point is that we are comparing costs of prevention to be met in the near future with possible damages or benefits in the far future. There is a long lapse of time from when the money is spent on the avoidance of damage, till the time when this damage is actually avoided. And the point is: What return on the invested capital do we expect during

the intervening time? If we are satisfied with an annual return of 0 or 1 %, then the investment would be considered successful. But if we demand 5 or 10 %, then it would be called unsuccessful. And the Copenhagen Consensus conference chose to demand 5 %. The choice of this - or of any other interest rate - is to some extent subjective, and therefore the results are also subjective. Furthermore, it is simply wrong to demand 5 % on such long time scales, because material wealth in the world cannot grow at a similar high rate. On such long time scales, you cannot expect the return on investments to be more than 1 to 2 %, and with these more modest rates of interest, fighting climate change would turn out to be sensible. The changes in benefit/cost ratio caused by changes in the rate of interest are not just modest; they are dramatic. So with another rate of interest, the priorities might also have been dramatically different.

What is profitable, therefore, depends on the rate of interest, and when the choice of rate is subjective, then what is found to be profitable is equally subjective. The conference was free to choose, and it chose values that would ensure that short-term projects with a fast return on capital would win.

This, then, is what was basically wrong about "Copenhagen Consensus". The results are presented as objective calculations, but are actually subjective.

There are also other serious flaws. For instance, you get the impression that you have to choose between spending money either on health and nutrition in the Third World, or on fighting climate change; you cannot do both, you have to prioritise. But this is not so.

First, the sum of money earmarked for the imaginary investment was ridiculously small in relation to the needs, in relation to what is spent on other purposes (military, agricultural subsidies) and in relation to the purported benefits from removing trade barriers.

Second, what are called the costs of combating climate change, are not costs. They are revenues from green taxes, revenues that could be spent on health and nutrition in the Third World. That is, fighting climate change might provide us with more money for such purposes, not less.

Third, the project with top priority - fighting AIDS - is probably unduly optimistic. It presupposes that improvements in basic health service infrastructure necessary for implementing the anti-AIDS campaign are already in place, but does not include the costs of such improvements. And it presupposes the political commitment to carry it out, although this commitment seems to be absent in some regions. For instance, it emerged in December 2004 that none of the money promised by the Bush administration for the fight against AIDS had actually been spent.

Fourth, the so-called ranking of priorities was not made according to benefit/cost-ratios. For example, several projects had higher benefit/cost ratios than the AIDS-project, but were in spite of this given lower priorities.

In the following, the whole issue is treated in more detail.

### **The importance of the discount rate**

Those issues that were treated at the conference were issues involving widely different time scales. The costs of the AIDS epidemic may be met now, whereas most of the costs of climate change need only be met in 100 years' time or more.

There is no unequivocal method to evaluate what is more important, a cost now or another cost in a far future. Nevertheless, economists try to do this, by using a tool called discounting. Let us take the estimate (made with the RICE model by Nordhaus & Boyer) that the total costs of climate change up to 2100 would correspond to a one-off expenditure of 650 trillion dollars (in present-day prices). We could in principle invest a sum of money in a "climate fund". If the amount invested grows at 5 % compound interest, then it would suffice today to reserve 5 trillion dollars, because with this rate of interest, this amount will have grown to 650 trillion dollars in 2100. Economists therefore discuss

the "present value" of the costs of climate change to be defrayed in 100 years from now, and with a 5 % discount rate this present value is 5 trillion dollars.

Thus, if different future costs are all discounted to obtain a "present value", then they may be directly compared, even though the costs will arise at different times in the future. And this is the kind of comparisons that were made in the Copenhagen Consensus conference.

However, the relative importance of different expenditures defrayed at different points in time depend very much on the discount rate used in the calculations.

This is illustrated by the following example. The exact figures are not important: they are just made up to illustrate the general point. Let us imagine that the AIDS epidemic, if not combated, will necessitate the spending of 10 billion dollars in 10 years' time, and that climate change, if not combated, will necessitate the spending of 100 billion dollars in 100 years' time.

To compare the costs, we discount the 10 billion dollars with a rate of 5 % over 10 years. This gives a sum of 6.1 billion dollars to be invested today in the AIDS fund, because this will grow to 10 billion dollars in 10 years. And the sum to be invested as a climate fund today will have to be 0.74 billion dollars, because this will grow to 100 billion dollars in 100 years. The conclusion is that the AIDS epidemic will be the more costly to us, and therefore it will be wiser to fight AIDS, rather than to fight climate change. This can be illustrated as follows:

5 % disc. rate	Amount now	In 10 years	In 100 years	Priority
AIDS fund	\$6.1 bn	\$10 bn		Higher
Climate fund	\$0.74 bn		\$100 bn	

Next, we do the same comparison with a discount rate of 1 %. This time we find that we have to place 9 billion dollars in the AIDS fund, and 37 billion dollars in the climate fund. So climate change has now become the largest expenditure, and consequently, we will choose to fight climate change rather than AIDS.

1 % disc. rate	Amount now	In 10 years	In 100 years	Priority
AIDS fund	\$9 bn	\$10 bn		
Climate fund	\$37 bn		\$100 bn	Higher

So when we lower the discount rate, two things will happen. First, the present value of future costs appears larger. Second, and more importantly, the order of priority is reversed. With a 5 % discount rate, AIDS is the more important, but with a 1 % discount rate, climate change is the more important. The rate applied is subjective. In choosing the rate to apply you effectively choose the end result - and can therefore choose which issue appears to be the more important. The whole procedure becomes a trick.

This is probably the most important reason why it is not generally advisable to analyse with the aid of discounting, when issues to be compared appear at different time scales (unless one provides unequivocal reasons for choosing one particular discount rate).

### **Descriptive or prescriptive discounting**

When it comes to deciding on what is a proper discount rate, the experts talk about two approaches, the descriptive and the prescriptive. These designations are somewhat misleading, because both approaches are based on empirical observations - but these are the terms that are used.

In the descriptive approach, the arguments are that society must base its decisions on the rate of return on invested capital. The opportunity to avoid environmental damage

at some time in the future should only be utilised, it is argued, if the discounted net benefit from this is at least as large as the benefit from some other investment, say in production of goods. In principle, what is done is to find the best possible allocation of sparse economic resources. Thus, the alternative investments that are compared must all be investments that benefit society as such. However, this approach may be distorted in such a way that the investment in environment is compared to financial investments, say in bonds. And if the rate of return is largest with bonds, it is claimed that money should be spent on bonds, not on the environment.

In developed countries, the rate of return on capital in financial investments is typically 4 - 6 %, and in developing countries it is often 10 - 12 % or even higher. Therefore, it is claimed that the discount rate should be placed at these levels, depending on the country.

In the prescriptive approach, the line of thought is different. We imagine that people in the future will be richer than we are now, and therefore better able to pay the costs of environmental damage. The ability to meet these costs will therefore, in a first approximation, increase at the same rate as the growth in wealth. Wealth, in turn, can be measured as the growth in purchasing power, or the growth in consumption of goods, or in some other way. If this growth rate for instance is 1 % per year, then we can use this as a discount factor. We calculate the present value of the future damage, and compare this with the present-day costs of preventing the damage. If the latter are the larger, then we pass on the bill to our descendants. If not, we should prevent the future damage by appropriate action now.

Future rates of growth are typically assumed to be the same as in the recent past. For the USA, there are various estimates. For instance, the GDP per capita (in constant prices and PPP corrected), has grown on average by 2.2 % annually from 1950 to 2000 (2). This rate overestimates the growth in per capita consumption, however. Economists argue that a better estimate is the rate of growth of total factor productivity, which was 1.3 % p.a. from 1960 to 1989 (W. D. Nordhaus), or the real treasury bill rate, which was on average 1.1 % from 1949 to 2003 (W. R. Cline). If we choose an average rate of 1.2 %, then it can be adjusted slightly upwards, because the wealth of our descendants will be composed of goods that are not all as necessary for a good life as those we use today. They should therefore, it is argued, be able to pay a relatively larger share of their wealth than we are. For this reason the appropriate rate was set at 1.5 % by W. R. Cline, in his "challenge paper" presented for the Copenhagen Consensus (3).

These rates will, of course, be different for different countries. At present, national wealth grows much faster in certain countries in eastern Europe and eastern Asia than in the western countries, and there are also some high growth rates in Latin America. To obtain estimates of expected future growth rates, Lomborg has studied the data presented by IPCC (his reference IPCC 2000b). By taking for instance the figures of the B1 scenario, which is approximately an average scenario, for the whole period 2000 to 2050, we obtain a growth rate in GDP per capita which is 1.2 % for the OECD countries, but 2.3 % for the whole world. Thus, the proper discount rate may have to be twice as large if we consider the whole world as if we consider only the rich world.

### **Which is more correct - the descriptive or the prescriptive approach?**

A main problem with the descriptive approach is that it gives a high discount rate. This will lead to absurd results in the long term. To illustrate this, consider that the present value of all real estate in Denmark is worth \$238 billion (as explained by Dubgaard in chapter 10 in *Sceptical Questions and Sustainable Answers* (4)). If this were also the value of all Danish properties in 500 years from now, we could discount 500 years back with 5 % p.a. to find its present value, which would amount to \$6, i.e. the equivalent of half a barbecued chicken with potato fritters.

In relation to climate change, a time horizon of 500 years is relevant. Surface water that has been warmed up due to recent temperature increases will sink to the ocean bottom, and rise again later, taking about 1,000 years to complete the circuit. In other words, the full effect of the temperature rise will be seen only when all up-welling of deep sea water consists of water that has already been warmed up. So, the time to obtain the full effect of the heating that happens now could well be 1,000 years.

So on a time scale that is certainly relevant (500 years), descriptive discounting means that even the existence of all real estate in a developed nation with more than 5 million inhabitants simply does not matter at all. Such an absurd result demonstrates that the method does not work on such time scales.

The point is that our wealth, for example our ability to afford to build dikes along sea shores to avoid flooding, increases by only 1 to 2 % per year. So the increase of 5 % per year is an increase in "shadow prices" that are irrelevant in the real, material world.

How come, then, that investors today are able to obtain rates of return on capital that vastly exceed the rate of increase in wealth? How do we explain the gap between the rate of return on capital and the consumer discount rate?

We can find a sort of explanation if we focus on the rate of re-investment. Consider a typical investor who earns 5 % in return on his capital each year. On average, he will re-invest only 1 % out of these 5. He will pay nearly 2 % in tax, and the remaining 2 % will go on consumption. As tax may be considered "public consumption", he will altogether use 4 % on consumption. This money does not disappear - it returns into the general circulation of money - but on the other hand, it does not contribute to the growth of the economy. Only that which is re-invested contributes to general growth, and therefore we see a rate of growth in the general wealth of about 1 %.

If we earmark money for an "AIDS fund", which is to be used within 10 years, then it might be fair to expect a yield of 5 % (out of which, tax will have to be paid). But if we earmark money for a "climate fund", which is to be used in 100 years' time, then during all that time the accumulating amount will not be reduced by spending for tax or consumption. It is therefore unlikely that it could sustain a yield of 5 % for so long. The amount would be so large that the bank would hardly be able to pay it out when the time came. On the other hand, this would surely be possible if the rate of interest were only 1 %, because that would correspond to the increase in wealth in society in general.

In general we cannot expect that the usual rates of return on capital - say 5 % - can be sustained for more than about 30 years. No investments are available that extend for longer. If we have to save money for longer periods, such as in life insurances, we can obtain less than 2 % rate of interest. In the guidelines for preparing economic analysis issued by the American Environmental Protection Agency (EPA) (5), it is recommended that intra-generational discounting use a discount rate of 2 to 3 %, which is reckoned to be the market interest rate after tax. But for the inter-generational discounting (i.e. over time spans of more than one human generation) they recommend a discount rate of only 0.5 %.

It should be added that there are certain situations where the discount rate should probably be set at zero. This is the case when utilising slow-growing organisms such as broad-leaved trees for timber production, or products from large whales. The stocks of such organisms grow at most by a few percent per year, and after allowing for the costs of capture, felling etc., they may even yield less than 1 % per year. Here, a totally different way of thinking is required. We can consider the stock of trees or whales as some sort of "principal", where it is economically sound to harvest the interest, but where we should abstain from touching the principal.

In summary, the descriptive approach to discounting is relevant only on time scales of under 30 years. On longer time scales - as in the case of climate changes - this approach is definitely wrong, and should not be used.

### **Uncertainty of future growth rates**

At least since the Second World War, the yearly rate of growth in the economies of the western developed countries has been fairly constant, and one could reasonably assume that this will continue. However, in some countries where the standard of living lags behind that of the west we are now seeing very high growth rates - most notably in China, but also in other countries of east and south Asia . It is likely that growth rates in these countries will remain high only as long as there is an obvious scope for growth. When their standard of living some time in the future approaches that of the western countries, (or when resource and environmental constraints prevent it from ever doing so) we may expect the rate of growth to slow down. This has already happened quite markedly in Japan. The present rate of growth in the total world economy will therefore probably not continue. This in turn means that, if we discount with time horizons as distant as 100 years, we cannot base the discount rate solely on present high growth rates.

Another reason for reducing the discount rate is the uncertainty about the future. This may be illustrated by the principles followed by life insurance companies. The company is obliged to pay a certain sum to its customer at a certain time in the distant future. Here, it is not enough to be 50 % sure that the amount will actually be available. The company must be, say, 90 or 95 % sure. So if the most likely rate of return on that time scale is 2 %, then the company will have to make an "uncertainty deduction", which has the same effect as yielding a rate of return that is somewhat lower than 2 %. Due to this principle, the larger the uncertainty about the future, the lower must be the discount rate.

### **Some other reservations**

Discounting requires that all benefits be expressed quantitatively. This does not necessarily mean that they be expressed in terms of money, but in practice they are expressed just so. This means for instance that human lives have to be converted into sums of money. Such analyses have been carried out by putting a monetary value on each human life lost equal to two years' income of the person concerned. This means that a life-year lost in Africa is worth only 1.4 % of a life year lost in USA. In many situations, this is ethically unacceptable, and we will have to refrain from expressing values in economic terms.

Likewise, there may be situations where we do not accept that the life of other organisms is expressed in economic terms. For instance, we may find it unacceptable that a particular species is exterminated, even if this may pay off economically, because we assign a value to the existence of that species that is independent of its economic value.

If we use discounting of money sums to find the optimal path of development, then we will maximise the amount of money in the world, and only that. We will probably not maximise the sum of all human happiness. Two examples will illustrate this:

First, human happiness depends not only on the average situation, but also on the predictability of the situation. If for instance certain very destructive weather extremes - droughts, floods, hurricanes - appear at irregular, unpredictable intervals, then there will be a high level of general uncertainty. This will increase the level of worry and unhappiness.

Second, if climatic zones are shifted, it may become necessary to transfer large human populations from one region to another, or from one country to another. In economic terms, such transfers may be quite feasible. But the social costs may be very high, for instance if people in the recipient country do not accept the newcomers.

On these and many other grounds, we should not accept that all the problems of the world are solved only with respect to optimisation of the economy.

### **Policies for climate mitigation**

In his "challenge paper" at the Copenhagen Consensus (3), W. R. Cline describes optimal rates of carbon taxation with different discount rates. Under one set of assumptions, for instance, he finds that the optimal reduction in CO<sub>2</sub> emissions in the middle of the twenty first century will be a 45 % "cutback" with a discount rate of 0, 20 % cutback with a discount rate of 1.5 %, 6 % cutback with a discount rate of 3 %, and 4 % cutback with a discount rate of 4.5 %. Clearly, a high discount rate means that it only very small reductions in CO<sub>2</sub> emissions will pay.

In the same paper, he describes three possible policies, i.e. strategies for coping with CO<sub>2</sub> emissions:

- a) The Kyoto protocol, where emissions are cut only in the developed countries
- b) Optimal carbon tax, a policy where emissions are taxed in all countries, but where revenues are kept within each country.
- c) A so-called value-at-risk approach, which aims to avoid 'maximum' damage.

Cline finds that the Kyoto protocol, where rises in emissions in The Third World are not reduced, will have little effect on future warming. Therefore, for the rich countries, the benefits will not outweigh the costs. But for the two other policies, he finds, benefits may outweigh costs (measured in constant prices) on a time scale of 300 years. This is so for discount rates from zero up to a level of 1.5 %, even though the computer model does not allow for technological adaptation to non-carbon energy sources. But with rates of 3 % or 4.5 %, the conclusion is reversed - costs outweigh benefits.

In the computer model that Cline has used in his paper for Copenhagen Consensus, the abatement costs, when expressed as percentage of GWP (gross world product, i.e. the GDP of the whole world) are as follows: A 10 % cut in emissions in the year 2045 would cost 0.03 % of GWP. A 30 % cut would cost 0.32 % of GWP, and a 50 % cut would cost 0.97 %. A 75 % cut would be expensive - it would cost 2.3 % of GWP. It should be noted, however, that these "costs" could be tax revenues which do not disappear out of the economy.

### **What discounting means for the climate issue**

The most negative effects of climate change will appear in a very distant future, and our evaluation of the costs is therefore heavily dependent on which discount rate is applied. As we have seen, the choice of either a low or a high discount rate may reverse the order of priority of competing projects.

Some of the attempts to evaluate the costs and benefits of abating climate change use a time horizon of 300 years, i.e. up to the year 2300. With complicated computer models, attempts are made to find the best way of applying carbon taxes ("green" taxes aiming at reducing the total world output of CO<sub>2</sub>). These models find an "optimal abatement path", i.e. a time schedule for when to raise or lower carbon taxes in order to optimise economic growth and at the same time minimise damage from climate change. It should be no surprise that the answers obtained depend heavily on what discount rate is fed into the model.

Indeed, it turns out that the optimal strategies for abating climate change are profitable with low discount rates, but not with high discount rates. With an optimal carbon tax to regulate CO<sub>2</sub> emissions, assessed over a time span of 300 years, the benefits of such a tax outweigh the costs as long as the discount rate is 1.5 % or less. With discount rates of 3 % or 4.5 %, on the other hand, costs are larger than benefits.

It is crucial, therefore, to decide on the correct discount rate. That decision is not simple. Opinions differ, but the reader, having been presented with the arguments here, may be willing to accept the following statement: although there are arguments for setting a relatively high discount rate - say 5 % or more - when dealing with issues on a short time scale, the use of such a high rate cannot be justified when considering time scales of over 30 years. If the present rate of economic growth in the rich part of the world

continues, then one could argue for a long-term discount rate of 1 to 1.5 % for these countries. As the present rate of economic growth is higher in the developing countries than in the rich part of the world, there will be a scope for a somewhat higher rate - about twice the above values - in the medium term. But there are reasons to believe that in the long term (a hundred years or more), economic growth in the world as a whole may be expected to slow down, and on such long time scales, a proper discount rate for the whole world should probably be as low as 1 to 1.5 %, or even lower.

Thus, when discount rates are set at a proper level - up to 1.5% - it pays to combat climate change. But when discount rates are set higher, it doesn't. In any case, as the choice of discount rate above or below 1.5 % is in practice subjective, everyone is free to decide whether or not to pay to combat climate change.

Where we are dealing with climate issues, with time horizons of several hundred years, it is fair to say that a discount rate as high as 5% is simply wrong. As we have seen, the use of a 5% rate over such time scales produces absurd results - for instance, by giving all real estate in Denmark in 500 years from now a present value of about \$6. No wonder that calculations using this discount rate demonstrate that it is not worthwhile to combat climate change. Why should we discuss eventual negative effects of climate change in Denmark, when it does not pay to preserve the nation at all? A method of calculation that yields such absurd results is obviously not workable.

The point is, however, that the panel of economists at Copenhagen Consensus used just this rate - 5% - as the discount rate. By doing this they could be sure to "demonstrate" that combating climate change could never pay. The conclusion was decided in advance.

### **The choice of experts**

The set-up of Copenhagen Consensus was that each of a number of experts - among them W. R. Cline - would plead for a certain global project. After one round of critique and defense, the matter would be settled by a panel of experts. The composition of this panel was therefore crucial. On this subject, commentator John Quiggin writes (6):

"With four Nobel prize winners, it was certainly an eminent body. But the members weren't notable for a focus on the problems of Third World economic development. They included experimentalist Vernon Smith, econometrician James Heckman (who later withdrew), and economic historians Robert Fogel and Douglass North.

Fogel has done important research on population and nutrition, but the other Nobel prizewinners, and most other members of the panel, were not experts in the main fields under discussion. As Jeffrey Sachs (who headed the Commission on Macroeconomics and Health) observed, the timeline was far too short for the panel to gain requisite expertise, lasting only a few months in total; the background papers circulated for a few weeks, and in the final discussions, the panel had 5 days to review 32 proposals.

The point can be sharpened by looking at some of the Nobel prizewinners who would have seemed like obvious choices for such a panel, including Kenneth Arrow, Joseph Stiglitz, Robert Solow and Amartya Sen, all of whom have made extensive contributions to the debate on economic growth and development.

Comparing the two lists, the omissions are, broadly speaking, towards the left of the economics profession and those who have commented on climate change have supported policy initiatives such as Kyoto. Conversely, the members of the Copenhagen panel were generally towards the right and, to the extent that they had stated views, to be opponents of Kyoto. Indeed, Lomborg's argument that spending to mitigate climate change would be better directed to aid projects was first put forward by Thomas Schelling, one of the Copenhagen panellists.

The same lack of balance was evident in the selection of 'opponents'. For Robert Cline's paper on climate change, Lomborg picked vigorous opponents of Kyoto, Robert Mendelsohn and Alan Manne, and the result was an acrimonious debate. "

### **Costs or revenue?**

Whenever Lomborg discusses the combating of climate change, he claims that the Kyoto protocol will cost society 150 billion dollars per year. And he adds that just half of this amount would suffice to meet all great challenges in the developing world - clean drinking water, sanitation, health care and education. So he gives the impression that combating climate change is not only inefficient - it also prevents the spending of money on other projects which really matter.

This, however, is a piece of misinformation. The amount of 150 billion dollars per year is the revenue of carbon taxes set high enough to cut CO<sub>2</sub> emissions in the rich countries to the desired level. The figure results from calculations where it is assumed that this revenue is then recycled into the economy in a "lump-sum fashion" whereby general reductions of all taxes e.g. on industries or private households are reduced with corresponding amounts. In other words, the money does not disappear - it is recycled back into the economy, and is therefore not a cost. On average, households and industry will still have the same amount of money available, but the money will be redistributed away from those households and industry sectors that have a high output of CO<sub>2</sub>.

An interesting possibility is that the revenue could also be used to "meet all great challenges in the developing world". As stated by Lomborg, the sum is so large that even half of it would suffice to meet all challenges. This would be a double dividend - we would reduce climate change and at the same time meet all the great challenges in the developing world. So Lomborg's main point - that we have to set priorities - is false. It is false that there is a conflict between mitigating climate change and helping the Third World.

As stated by W. R. Cline in his reply paper for the Copenhagen Consensus (7): "When it comes to dilemmas for choosing between the environment and today's poor, moreover, it seems to me the debate has missed a key consideration. A carbon tax would raise revenue, and the lack of revenue is a key obstacle to achieving many social goals. Global revenue from my optimal carbon tax . . . would raise \$1.1 trillion. That can buy a lot of schooling and medicine. So rather than coming at the expense of social spending, in practice it is quite possible that carbon abatement could facilitate social spending. Because of revenue realities, action in the climate change part of the Copenhagen Consensus agenda can perhaps more realistically be seen as complementary to, and enabling of, action in the other issue areas, rather than competitive with them."

### **The efforts against AIDS**

Having studied the issue that received bottom priority, we may also take a look at the issue that received top priority - viz. fighting AIDS. This issue was expounded by the challenge paper on communicable diseases by Anne Mills and Sam Shillcutt. They presented an extensive overview of what benefit/cost ratios could be obtained by various measures against AIDS. An overall package for HIV prevention that has been published in the Lancet by Stover et al. (8) was adopted without modifications. It contains such elements as school-based AIDS education, outreach for professional sex workers, distribution of condoms, mass media campaigns, and treatment for sexually transmitted infections. The full cost of scaling-up this programme and sustaining it until 2010 will be \$27 bn, and the price for each infection averted will be about \$1,000. These figures, published in 2002, were adopted without modification in the Copenhagen Consensus report. The overall HIV prevention package is predicted to yield a benefit/cost ratio of more than 40. It presupposes political commitment and improved infrastructure, but there is no certainty if these conditions will be met.

In the basic assessment of the costs and benefits, a 3 % discount rate was used. But because of the short time span, changes in discount rate mattered little.

In the calculation of benefits, income for surviving persons was converted to purchasing power parity (PPP), which tends to increase the benefits. In all other issues in Copenhagen Consensus, income was not converted. Therefore, the analyses are not strictly comparable.

This assessment therefore seems to be slightly biased. Improved infrastructure is presupposed, but the costs for this are not included; and the discount rate is relatively low compared with the case of climate change.

### **Illogical ranking**

When the results of the conference are presented, we get the impression that they are ranked according to benefit/cost ratios, with the highest ratios leading to the highest priorities. But this impression is false.

The expert panel did not bother to present the corresponding benefit/cost ratios in the priority list, so the reader cannot readily check the basis for setting the priorities. If one makes an review of the ratios, however, it appears that the ranking was not based on these. Instead, the ranking was subjective, based on the panel experts' own opinions on the world's problems.

Furthermore, some of the calculations need slight corrections. When such corrections are carried out, the alternative ranking list becomes substantially different from its original version. This serves to emphasise that prioritisation is shaky - a few slight amendments, and priorities shift.

Details on the ranking and benefit/cost ratios are available in (9).

### **The scale of the effort**

In Copenhagen Consensus, the panel was asked to rank the projects in answer to the question: "What would be the best ways of advancing global welfare, and particularly the welfare of developing countries, supposing that an additional \$50 billion of resources were at governments' disposal?" The money was to be spent over 5 years.

In this context, that amount is very little, especially when compared with total military expenditure, which amounts to about 1 trillion dollars per year, of which the USA spend about 0.44 trillion dollars. Or it can be compared to the total world subsidies which are about 0.9 trillion dollars. Of these, about 0.3 trillion dollars are agricultural subsidies, whereas the rest are mainly for fisheries, energy production, and transport. Thus, the \$10 billion per year earmarked in Copenhagen Consensus represent approx. 3 % of all agricultural subsidies, or 1 % of all subsidies. Or, again, it could be compared with the purported benefits obtained if we remove all trade barriers and subsidies. These benefits, according to the Copenhagen Consensus result, are at least \$254 billion per year. This is much more than the \$10 billion per year earmarked in the conference scenario.

By setting the earmarked amount so low, the members of the panel were forced to allocate money only to projects that give an extremely high rate of return on invested capital, in a short time. With a larger amount - which would still be realistic - they would have been able to address several of the world's problems at the same time.

This is especially relevant when it comes to the challenge of climate change. In Cline's paper for the conference (3), the costs - during 300 years - of an optimal procedure to combat climate change would be \$128 trillion before discounting, or \$35 trillion after discounting at a rate of 1.5 % per year. These amounts may be smaller if society spends more on alternative energy sources, but they will still be large. In comparison, the amount that Lomborg proposes for all aspects of global welfare is \$0.05 trillion. That is only 1/700 of what is needed for climate mitigation in Cline's example. So, what good could one do with a sum sufficient to reduce climate change by 1/700th of that needed? The effect would be scarcely measurable. No wonder, therefore, that such an investment did not appear attractive in Lomborg's scenario.

It is clear that the costs caused by climate change will be huge. Even if it pays off, the spending of \$35 trillion in present value to prevent future damage may seem prohibitively large. But this expenditure is distributed over many years. Around the year 2045, the "costs" will amount to c. 1 % of the total income of the world (the GWP). Would we be willing to spend 1 % of our riches to avoid all the damage that climate change could cause - knowing that if we do not do it, even bigger costs will fall upon our descendants, and in ways over which we have no control?

### **Conclusion**

The Copenhagen Consensus conference suffers from the following flaws:

- The earmarked sum is so small that only projects which give a high rate of return on invested capital in a short time will be selected.
- In order to compare projects, a discount rate of 5 % was applied for climate mitigation, whereas the rate for AIDS prevention was 3 %. This is contrary to the principle that rates of discount should be lower for longer time spans, and that a rate as high as 5 % cannot be used on time horizons larger than about 30 years.
- The high discount rate means that projects with a long time horizon will automatically get bottom priority. Therefore it was certain from the beginning of the conference that climate mitigation would receive bottom priority.
- The selection of panel participants was biased towards economists that do not favour expenditures on combating climate change.
- The ranking was subjective, based on the panel experts' own opinions on the world's problems, and not directly on benefit/cost ratios.

The criticism concerning the discount rate had been presented to Lomborg many times before the conference. To no avail, of course.

All in all, it is evident that the whole exercise had been rigged. The conclusion was determined in advance by Lomborg. The setting of priorities was humbug.

Lomborg's sponsor and loyal supporter, The Economist, wrote in an article: ". . . This gave rise to suspicion in some quarters that the whole exercise had been rigged." (6). Experience of Lomborg, and his supporters, shows that they themselves often make great play with what we should be suspicious of. When they strongly deny what could be suspected or could be criticised, this may be taken as a sign that the suspicions are warranted. The more vehement the denial, the closer we are to the crucial point.

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