

Sustainable development in theory and in practice: What role for development finance institutions?

Pierre Jacquet and Valérie Reboud¹

The 11th Pacific Science Inter-Congress
Papeete, 2-6 March 2009

Efforts by scientists, civil society and some politicians to sound the alarm on the threats of global warming, climate change, biodiversity damages, endemics and, more broadly, all environmental issues, seem to have resulted in an increasingly shared consensus about the need for action. Yet, such action has been particularly slow in coming and has not so far resulted in any “environmental New Deal”. Sustainable development policies that have been implemented appear to be a drop in the bucket when compared to the risks and their probability to occur.

Should politics be blamed for this distance between perception and policies? Ultimately, yes. On many grounds, sustainable development *is* politics. But all actors shape politics so that the blame could be equally distributed. Furthermore, distributing the blame will not advance the cause. Our goal in this short paper is to highlight both the complex nature of sustainable development and the challenges of decision making, before turning to North-South aspects and to a possible role for development finance institutions. In a first section, we document some of the conceptual issues that decision making in the broad field of sustainable development is confronted with. In a second section, we review the techniques and instruments available to the economist. Thirdly, we discuss the role of economists. In the last section, we highlight the role that development finance institutions can play as incentive changers and promoters of international collective action.

1. Sustainable development: a complex concept

The 1987 Brundtland Commission proposed a definition of sustainable development that was both simple and intuitive, as a “development that meets the needs of the present without compromising the ability of future generations to meet their own needs”. Yet, such definition proved hardly operational: how to define the need of the current generation? Those of forthcoming generations? How to assess the “capacity” to satisfy needs? Any generation being made of a large number of very diverse individuals who all have their own subjective preferences, this definition immediately highlighted social as well as political compromises and dimensions. Hence, it led to the famous triangle of sustainable development as a joint process between economic, environmental and social concerns. This is why sustainable development is ultimately about politics more than science, because it calls for intermediating a large number of different interests so that collective action is possible.

¹ French Development Agency (AFD). Both authors write from a strictly personal point of view, even though their perspective is clearly that of a bilateral development and finance institution.

The Brundtland definition, which was also adopted by the EU Commission, points to a number of fundamental dimensions or dilemmas of the “sustainable development” concept. In this paper, we briefly pick five issues: time, uncertainty, biases, collective action, and complexity.

1.1. Time

Global Warming illustrates that all the changes policy decisions can influence lie in a very long run. The point is to decide now, while the effects of such decision will materialize years, decades or even centuries later. Should we care for future generations and how? If intergenerational equity is largely assumed, the time perspective does not seem to be at stake in public debates. Should we care for our grand-children, the generation coming in 200 years generation or even 300 years? And should we value in the same way the welfare of our children or of people that will be born in 200 years? Or, to put it differently, to the extent that we care for future generations, do we really see the future in 400 years more distant than the one in 200 years to the point that we would care less for the first than for the second? At some point in the future, we might want to stop discounting further (see for example the comet example, in 1.2 below).

To address such questions and conduct cost-benefit analyses across time, economists are used to discounting the future. There are two broad reasons² why a given increase in income should be discounted when it takes place in the future as compared to the present. First, human beings are known for being impatient, which gives a higher subjective value to the increase if it happens today. Pure time preference also reflects the fact that we are finite-lived individuals and that it is natural to expect that we care more for ourselves than for our successors, even if we do care. Second, societies become richer over time, and under the assumption of decreasing marginal utilities, the same increase in income will produce less additional utility in the future because we shall start from a richer base.³

There is an interesting distinction to establish between individual discount rates and social discount rates. While the use of the methodology of the discount rate is a powerful tool to assess, for example, future benefits against current costs, results ultimately come down to actual figures. For example, with a discount rate of 1.5% a year, 100 dollars available in 100 years would be worth \$ 22.5 today. With a discount rate of 6%, however, these same \$100 one hundred years from now would be worth today less than 30 cents. Policy recommendations about acting for preserving the future are therefore bound to be highly sensitive to the actual choice of the discount rate. This is why the Stern Review (Stern, 2007) has opened a deep controversy (See Nordhaus’s (2007) famous critic), highlighting the fact

² For a useful summary and discussion, see Summers and Zeckhauser (2008).

³ Hence, the discount rate is generally written as $\rho = \delta + g \cdot \eta$ (see for example Summers and Zeckhauser, 2008), where δ represents pure time preference, g is the rate of growth of per capita income, and η is minus the elasticity of marginal utility with respect to consumption. The argument that future generations will be richer lends itself to interesting discussions. For example, Summers and Zeckhauser note the view that providing richer generations in the future with a less tarnished planet at a clear cost today could also be seen as “redistribution in the wrong direction” (p.9).

that the choice of long-run discount rates substantially affects policy judgments regarding climate change⁴.

Ultimately, the choice of the discount rate owes little to technical arguments or scientific reasoning. It calls for ethical and normative approaches, notably about considerations of intergenerational equity. Sound economics does not absolve policy makers from hard social choices. It simply provides a useful toolbox to derive the decision making consequences of such social choices. Choosing a social discount rate requires political will and vision, but also the capacity to build a domestic social consensus behind the choice. This discussion also highlights the need to distinguish between positive and normative standpoints. Stern (2007) may be ethically and politically right in arguing that the chosen social discount rate should be 1.4%. Yet, the fact is probably that it currently is not, and there is a need to highlight the set of policies that might bring it down over time to such a level.

1.2. Uncertainty

Uncertainty sheds doubts on the validity of the discounting approach. Summers and Zeckhauser (2008) illustrate this through the example of two giant comets, A and B, expected to cruising near the Earth in the coming decade and to return in a far future, respectively in 100 years and 400 years, with some probability of hitting the earth and wiping out all life. More specifically, astronomers predict that comet A has one chance in 100 of hitting the earth 100 years from now, while Comet B has one chance over 10 to do so, 400 years from now. The government could use a single-missile weapon to stir one of the comets definitively off course when it cruises by in the next decade and is thus under reach. Should the government target comet A or comet B? Intuitively, it would make more sense to target comet B. Yet any realistic discount rate (even close to 1%) would lead decision makers to target Comet A.

Decision making under uncertainty is a very lively area for academic research, especially when taking into account the possibility that progress in scientific knowledge would reduce uncertainty over time (see for example the interesting discussion in Gollier and Treich, 2003). The theory of *option value* has shed light on how to assess the need for action today. Waiting before choosing what action to undertake has value, because the chances are that a later decision might be more informed. If the consequences of today's decision are irreversible, it thus makes sense to postpone such decision. This approach, however, should be interpreted with caution. For example, not acting today against climate change is a decision that could lead to irreversible damage to the climate, as documented today by scientists. In that case, it is the decision not to act that needs to be postponed, meaning that action should take place today. The rule of thumb is that one should choose the course of flexible action that keeps most options open, thus avoiding irreversible outcomes. In the area of climate change, two opposing views coexist: (1) the higher the uncertainty, the higher the risk of irreversible damage, the more urgent it is to act early to keep the worst scenarios at bay, and the higher the risks of inaction; (2) the higher the uncertainty, the greater the value of waiting for improved knowledge and for technical change, so that the nature and degree of necessary actions appear more clearly.

⁴ On the basis of the formula in note 3, Nicholas Stern chose a pure rate of time preference of 0.1% and considered that $g=1.3\%$, and $\eta = 1$, leading to a discount rate of 1.4%. Others, such as Weitzman (2007) argued that a discount rate of 6% was more appropriate.

Moreover, it would also be interesting to research the determinants of scientific progress. In Gollier and Treich (2003), for example, the progress in scientific knowledge seems to be uniform across sectors and exogenous. One could also think of it as endogenous and depending on efforts made in specific areas and on incentives provided by policy-makers. This raises the possibility that, if decision makers do not care about acting today to mitigate climate change, scientific and technical knowledge about how to best mitigate it could be much slower in materializing. This remark sheds some doubts on the views of those who claim that, as was always the case in earlier periods, technical progress will ultimately present our societies with the needed solution, so that we don't need to act today to prevent damages that will happen in the future.

The prevalence of uncertainty in all major dimensions of sustainable development (geographical impact of climate change, precise role of ecosystems, etc...) finally suggests that a first component of all sustainable development strategies should be to invest much more in research and dissemination. This discussion also suggests – and this is the author's prejudice - that acting now is the best strategy to preserve our future options. Furthermore, acting now will also create incentives to innovate, so that, at least, the expected innovation to deal with climate change mitigation and adaptation, will be incentive compatible.

1.3. Biases

Size and relative scarcity may introduce other biases. For example, should we address the prevention of a potential disaster differently if it affects the life of 10 people or of 10,000 people? This brings back to the old philosophical question of choosing between sacrificing one person to make 10 others safe. The economics of risk has long dealt with such dilemmas, which also relate to the impact of specific events on public opinions. For example, plane crashes are highly visible and dramatic events. Yet, they lead to much less casualties than the flow of daily car accidents. Car drivers, however, are seldom individually aware of the risks they take.

Size also introduces the possibility that discount rates may vary across different populations. Summers and Zeckhauser (2008) thus suggest that fast growing populations may care more about the future than less prosperous ethnic groups. In other words, if I believe that the future will belong to others, why should I care today about such a future?

Relative scarcity also introduces interesting dilemmas. Lots of sustainable development policies aim to preserve rare and rich ecosystems or hotspots or endemic species. But is it rational to concentrate all the efforts on exceptional biodiversity rather than on the more current one? The answer also depends from the number of inhabitants concerned by the services the ecosystem (outstanding or not) provides. There is one more trade-off to make between the scarcity of some species and the number of the recipients of the preservation program.

Finally, the limitations of the human mind and energies also introduce biases. At each point in time, our time, understanding and energy are limited so that we tend to focus on the most urgent (or perceived to be urgent) matter. It is interesting to note that the degree of scientific communication on climate change, for example, has been much greater than on the loss of biodiversity, even though scientists have also tried to alert public opinions and policy-makers to the very serious impact of the current loss of biodiversity. Part of it actually also relates to

climate change, but it would probably be inappropriate to focus all policies on climate change mitigation, thus implicitly choosing to postpone action on the protection of biodiversity even though irreversible developments of further losses of species will happen. This points to a fourth characteristic of sustainable development, namely its fundamental complexity.

1.4. Complexity / trade-offs

All that was written above applies equally to almost each dimension of sustainable development, for example climate change, or the loss of biodiversity, or local pollution, or the introduction of modified genes in food, for example. Yet, sustainable development is not about a collection of separate issues. It refers to the need to tackle all of them simultaneously. However, we have no technology available to organize simultaneous action in all of these fields. Furthermore, our “budget constraint”, in terms both of financial and time resources, compels choice rather than authorizes universal action. Such choice will take place in the absence of an appropriate metric to ground it. For example, how should I know whether it makes more sense to allocate scarce resources, say, to increasing spending on education, or to fighting the loss of biodiversity? If my actions preserve biodiversity at the expense of something else (such as the livelihoods of peasants in the vicinity), am I closer to sustainable development than before? How should I compare monetary wealth, for example, against natural wealth, the beauty of a landscape or the quality of the atmosphere and of the environment?

On each of these questions, there is no single “truth”, and there will be a necessary compromise between contradictory objectives and interest groups representing various actors: scientists, households, industries, policy-makers, NGOs, etc. This is the reason why sustainable development is not uniquely or even primarily a scientific concept, even though science plays a key role in helping understand the issues. There is no single list of good practices or prescriptions validated by the seal of scientific certainty. It is foremost a political and social process aiming at each point in time to reach a consensus necessary to engage collective action and to shape collective preferences.

1.5. Collective action

Finally, sustainable development points to difficult local and global governance problems. Results of individual actions depend on others’ actions as well, leading to well-known prisoners’ dilemma situations: no single actor has any incentive to act first, especially when action is costly and all will prefer to wait for others to act. One of the role of public policies is to unlock such prisoners’ dilemmas and promote actions through exhortations, leadership, taxes and regulations.

The problem of collective action, however, knows no political boundary. Sustainable development has emerged as a true international collective action problem and has in particular become a North-South issue, with difficult dimensions of responsibility, equity and effectiveness. Climate change provides a telling example. Industrial countries have been largely responsible for the constitution of the stock of green-house gases (GHG) in the atmosphere, by initiating growth processes that did not care about GHG emissions. Yet, fast growing developing countries will be in the future the main contributors to the growth of further emissions. Developing countries are therefore part of any solution, even though they

could argue that they played no part in the emergence of the problem. As demonstrated by difficult international negotiations, this leads to tense discussions on how to share the burden of international collective action.

2. Economists and Rational choice theory

Economics is based on the concepts of preferences and choices, and rational choice theory throws a bridge over the two analytical concepts. Can rational choice theory respond to the dilemmas and/or paradoxes listed above? Unfortunately, it is now well documented that it emerges as little else than a dead end.

Why are things so complex? Because the questions of choice, time preference and uncertainty are maybe the more complicated problems for an economist to solve. Yet, sustainable development combines all three, and more. It is useful to draw from the work of the analytical philosopher Jean-Pierre Dupuy on understanding disasters, and to discuss two problems that help understand why “*the* right decision” is so difficult to take in the field of sustainable development.

2.1. Sunk cost fallacies

The first class of problems is the so called “sunk cost fallacy”. Imagine you have invested in a costly machine because you expected the future demand to grow. This event does not occur: your expectation was wrong. What should you do: make the machine operate anyway or throw it away? Rational Choice Theory expects you not to take the cost of the investment into account to make your current choice: the investment cost is over, it is a sunk cost and you cannot do anything now on your past choice. Therefore you should take your decision as if the machine had been given to you and thus only compare the costs and benefits of making the machine operate or not. Most of us do not reason that way: if the machine bought was costly, we want to recoup the costs and we are thus looking forward to maintain the internal consistency of our choice. By making the machine operate, we are trying to “change the past” (that is to change the causal consequence as if the better past event had occurred).

This question of the sunk cost fallacy is, to our mind, central for understanding why it is so difficult for politicians or even for civil society to aspire to a sustainable development that would forcefully require changing most of our production designs, most of our consumption habits... Even if rationality advocates for a renunciation of our production models conceived without thinking about heretofore unexpected climate change, we would like to go on with it and recoup the sunk costs.

2.2. Causality vs. probabilistic dependency

The second class of problems policy-makers are facing to take decisions echoes to the well-known problem in econometrics between causality and correlation. One of the problem, for example, in the case of climate change is due to the impossibility to predict without approximation the effects of greenhouse gases on global warming. Anthropogenic activity has

consequences on global warming but is not the only factor involved in this phenomenon. Is there a relation of causality or a probabilistic dependency only? The choice of reducing or not greenhouse gases will depend on how we answer this question. If there is only a probabilistic dependency, it can be rational not to reduce GHG emissions.

In front of different possible actions, only the causal consequences of my action and their desirability should be considered, without taking into account the desirability of the state of the world.

In order to make sustainable decisions, one needs to face the problem of establishing causal links between anthropogenic pollutions, own evolutions of nature and environmental degradations.

The economist can hardly be helpful on these points, only statisticians, biologists and physicists can be. But the economist can influence the way alternatives of choice are perceived or made out. In other words, if rational choice theory does not help solving the problem, by highlighting the limits of rationality it makes people aware of their limits to conceive the issue. An accurate understanding of the problem is dependent on how the problem is set out.

Influencing decisions through the way the questions are framed (the “framing effect”) is a well-known posture by every scientist who runs questionnaire surveys. Roughly speaking, this tactical trick relates to the sensitivity people have regarding the way alternatives are set out. For example, the way questions are formulated will influence the way people will answer them. While the economist had no specific role to play in advancing positive knowledge, he or she can call on various instruments in terms of advocacy. Again, Nick Stern did a pioneering and outstanding job with his review on climate change. However, the choice of parameters that ground his approach is not for the economist alone to determine.

3. Can economists help? Using the old economic toolbox to reformulate the alternatives of the choice set

In recent years, economists have been asked to help reformulating the alternatives of the sustainability debate. The Stern Review on climate change or The ongoing Economics of Ecosystems and Biodiversity (TEEB) Report have tried or are trying to do so: giving prices to climate change or biodiversity in order to provide costs of inaction and benefits of action in an easy way that speaks to finance ministers, namely by formulating and comparing monetary costs and benefits⁵. Roughly speaking, the argument is as follows: it is not because nature has no market (and thus no price) that it has no value. Environmental economics is then seen as a discipline that helps correct such market failures.

Beyond questions of methods, all these attempts are grounded on the same old toolbox: economic calculation. It can be more or less refined, but all these evaluations are aiming at creating a common benchmark of monetary values that can easily be compared and therefore can document the ranking of scenarios, courses of action and priorities.

⁵ Rather than comparing costs of public expenses, extinction of birds species, CO₂ emissions without any common comparative scale.

3.1. Environmental Economics

Nonetheless, huge progresses have been made. The very first step of this field work of “environmental economics” is based on welfare economics and consists mainly in Cost-Benefits Analysis. It leads to estimating the “Total Economic Value” (TEV) of an environmental good, according to its instrumental and intrinsic values (see Appendix 2).

As a start, the various services provided by the ecosystem under study have to be established and listed; these services can then be estimated thanks to different techniques (see the table below inspired from Spurgeon et al. 2004).

CATEGORY OF TECHNIQUE	NAME OF TECHNIQUE
MARKET-PRICE BASED	Market values
	Change in productivity
	Damage costs avoided
	Substitute/surrogate prices
	Defensive or preventative expenditure
	Expected values
COST-BASED	Replacement cost
REVEALED PREFERENCE/SURROGATE MARKET ⁶	Travel cost method
	Hedonic price
STATED PREFERENCE/CONSTRUED MARKET APPROACH ⁷	Contingent valuation
	Choice experiments
TRANSFER OF VALUES	Benefit (value) transfer

This kind of approach belongs to the “first-generation economic valuation approaches” according to Spurgeon (2006). His focus was coral reef (and coral management) but he noted that: “Comprehensive first-generation neoclassical welfare-based economics approaches encompassing the concept of TEV are still only just becoming relatively mainstream and accepted by decision-makers. However, over the past decade or so, growing concern from a number of academics and think-tanks has arisen, highlighting the fact that neoclassical welfare economics is failing us when it comes to more sustainable and equitable decisions regarding use of the planet’s valuable resources. [...] Consequently, a potential second-generation economics-based approach to valuing coral reefs has arisen, although it does not yet appear to have been fully applied. It can best be described as an approach that draws upon and fully integrates a far wider mix of indicators of ‘value’, as advocated to an extent by ecological economists.” (Spurgeon, 2006, p. 375). (see table below).

⁶ Uses market-based information to infer a non-marketed value

⁷ Questionnaire surveys to ask people’s direct willingness to pay

APPROACH	OBJECTIVE	METHODS USED
Welfare economics	To guide the optimum allocation of scarce resources between competing uses for the maximization of human welfare	<ul style="list-style-type: none"> - environmental valuation techniques - Benefit (value) transfers - Total economic value - Cost-benefit analysis
Economic impact analysis	To assess the contribution to, and/or the effect on, local regional and national economies (e.g. in terms of expenditures and jobs)	<ul style="list-style-type: none"> - input-output models - expenditure surveys - value transfers - multiplier effect
Socio-economic analysis	To understand and quantify the social, cultural, economic and political aspects of individuals, organizations and communities	Qualitative and quantitative: <ul style="list-style-type: none"> - focus groups - surveys - interviews - visualisation techniques - stakeholder analysis
Financial analysis	To determine the financial viability and sustainability of enterprises and organizations, by focusing on transaction/market-based costs and benefits	<ul style="list-style-type: none"> - budget forecasts - profit and loss accounts - cash flow analysis - balance sheets - business plans
Other non-monetary 'value'-based approaches	To highlight the relative importance of biodiversity and other natural and man-made assets and features	Environmental and Social Impact Assessments <ul style="list-style-type: none"> - sustainability indicators - index of captured ecosystem value - multi-criteria analysis scoring and weighting techniques - energy-based approaches

According to Spurgeon, second-generation studies thus combine welfare values with socioeconomic impacts and can integrate other environmental indicators (e.g. extent of ecosystem services, social, cultural, educational, health and research values). Nonetheless, if such studies are necessary to make environmental aspects heard, they seem to be still non sufficient to propose guides for decision and operate trade-offs.

3.2. New appraisal of the “wealth of nations”: attempts at valuing sustainable development

As a matter of fact, a lot of work has been made to aggregate the different dimensions of sustainability. Roughly speaking, these works can be subdivided in two distinct categories: indicators of sustainable development (e.g. ecological footprint, Happy Planet Index) and “enriched” or “refined” national accountability (e.g. Genuine Progress Indicator, Green National Product, genuine saving). These indicators usually claim to be new appraisals of wealth and/or welfare but, to our mind, because they have no proper theoretical foundations (that is no theory of welfare for the former and no theory of growth for the latter), they fail in that project. However, these indicators or accountability remain very useful to help improving the management of natural resources, on the one hand and to create a dialogue, on the other hand.

As an illustration, let us consider genuine savings calculation, as initiated at the World Bank by Kirk Hamilton (World Bank, 2006). The idea is to define a nation’s wealth by its stock of capital, which is made of physical, human, natural and social/institutional capital. Several methods of valuation are applied to each category, and lead to measuring the global capital stock of a country. The next step consists in monitoring how such total capital stock evolves over time, by redefining the notion of “net savings” through incorporating net changes in forms of capital other than physical capital. A measure of net or gross “genuine savings” can thus be introduced. Such approaches can be contested: they are not based on proper theoretical foundations and the results are highly sensitive to quantitative assumptions and calculation methods. Yet, they inform decision making on growth policies in a useful way by pointing to growth factors, such as natural capital, that tended to be thoroughly neglected in typical neoclassical growth models. They also indicate the importance of each natural resource within the natural capital stock itself in order to make trade-offs between the different renewable or not renewable resources of the country. As an example, the World Bank and the French Development Agency, together with the *Ecole des Mines de Paris*, have estimated the genuine rate of savings (GNS) for Mozambique in 2006. Their study finds a GNS of -14% of GDP under current growth conditions. This figure should not be taken literally, but it does suggest that the pattern of growth needs to dramatically evolve to provide for sustainable development in the future. The calculation of the GNS should not be interpreted as measuring any “true” wealth, but as a useful instrument to promote and sustain dialogue and inform choices among various stakeholders (ministries, academics, NGOs, households, industries...).

4. What role for development finance institutions?

Development finance cannot ignore sustainable development issues, because they have already fundamentally altered the way one thinks about development. Some⁸ have already started to “internalize” some of the externalities. While, for example, they used to have distinct environmental divisions, a recent tendency has been to merge these with infrastructures and energy, for example. This is also a movement that took place within some governments.⁹

Three dimensions deserve attention.

⁸ For example, the World Bank, or the French Development Agency (AFD)

⁹ In France, for example, there is now one single big ministry on ecology, energy, sustainable development and spatial planning (MEEDDAT ou Ministère de l’écologie, de l’énergie, du développement durable et de l’aménagement du territoire).

4.1. Documenting win-win situations

A first approach to sustainable development consists in identifying all short-term win-win options: For example, some actions to mitigate climate change will entail no net short-term cost but will on the contrary unleash net cost savings that can be reaped today. Examples obviously include improvements in energy efficiency (generating savings in the cost of energy per unit of output or consumption), in production, in housing, in urban planning and organization.

Other actions may include a better understanding of the contribution of ecosystems to neighbouring populations' livelihoods, or in another area the search for new techniques, as for example, in agriculture, no-tillage or minimum tillage techniques that not only protect the soils and save on carbon emissions but also in many instances increase yields¹⁰. The AFD has accumulated a rich experience of no-tillage agricultural techniques in a number of developing countries, and they appear as a very promising approach to current challenges faced by many farmers.

Yet, even though they may produce net benefits, these diverse actions may not take place spontaneously, by lack of knowledge, or since they may require financial and technology transfers as well as capacity building, which points to a clear role for development assistance. Some of them will need to be based on new technologies and ongoing R&D efforts at developing new techniques. Most, however, are likely to be based on existing technologies and will require more cost-conscious behaviours that call for capacity building and support at least as much as on additional finance.

The role of a development agency, there, is to provide seed money to introduce and test innovative approaches, to finance the research and development aspects that are indispensable to understand these new approaches, their impact, and their effective and efficient implementation and to disseminate results for possible scaling-up. Insofar as no-tillage is concerned, the role of the AFD has also been to connect developing countries' farmers with an innovation that was first launched in Brazil (where 60% of all cropland area is cultivated in this way). This provides a telling example of triangular and South-South cooperation.

4.2. Development Finance Institutions as Catalysts

Other sustainable development actions will produce longer-term benefits but will also entail short-term economic, social and political costs. They are of course much more difficult to undertake and will not take place spontaneously. They need to be driven by local collective

¹⁰ See notably Goddart, T., Zoebish, M.A, Gan, Y.T., Ellis, W., Watson, A., Sombatpanit, S. (eds) 2008. *No-Till Farming Systems*, Special publication No. 3, World Association of Soil and Water Conservation, Bangkok. The AFD has accumulated a rich experience of no-tillage agricultural techniques in a number of developing countries.

action, and require a shift of mindsets as well as new public policies that change incentives (through taxation, regulation and persuasion). This will require political vision and proper incentives from the global scene (e.g. successful post-Kyoto negotiations, a renewed framework for multilateral action and world governance, and, of course, appropriate North-South financial and technology transfers). This is truly a matter for collective action, since individual efforts at any country level will only be fruitful if and when combined with the efforts of others.

There is no reason, however, to believe that the task is impossible. Indeed, some encouraging policy initiatives have been launched in a number of developing countries. India has for example adopted an ambitious climate change policy. Another country, Indonesia, has also taken the lead in mainstreaming climate change as a crucial element of public policy. The French government, through the French Development Agency, has thus joined the Japanese Government in providing a substantial budget support to the Indonesian government to underwrite Indonesia's Climate Change Program. Part of such climate change programs will deal with adaptation and with mitigation actions that deliver short-term benefits, notably energy efficiency, reforestation or the fight against illegal logging. A substantial component, however, will have to be grounded in a longer term vision: promoting new growth modalities, adapting the prices of energy to generate appropriate incentives, encouraging the use of renewable sources of energy (wind, tidal, solar, geothermal, hydroelectricity...). A major policy question will have to be how to create the conditions for such renewable energies to become profitable over time. Technological progress will underline some of the longer-term co-benefits of today's actions.

The role of development agencies, in that longer-term effort, will not be limited to providing more financial resources. It will crucially be, rather, to learn how to maximize the catalytic impact of these resources, to promote technology development and dialogue, through renewed public/private partnerships, by supporting local policies through exchange, dialogue and peer pressure, and by promoting dialogue and collaborative approaches in order to solve a problem that all of us face while no-one can pretend having found "the" solution.

4.3. Development Finance Institutions as drivers of international (North/South) collective action.

As argued above, sustainable development can fundamentally be analysed as a true North-South collective action problem. Even though successful collective action is in the interest of all parties, however, it will not happen spontaneously. The presence of well identified and documented benefits (or costs of non-cooperation) will not be enough to generate it. We thus need to think harder on the conditions and incentives that will make collective action possible. This is not primarily a technical question. It hinges equally on politics, diplomacy and finance.

Multilateral and bilateral development institutions have a role to play, as potential "incentive changers" and contributors to the collective governance of globalization. They can be thought of as a "currency" of international collective action, not only in terms of finance, but also in terms of North-South dialogue and cooperation to mainstream climate change in national policies and to help identify, test and document joint initiatives to address the climate change

issue.¹¹ They can also act as bridges between the visions and interests of poor and developing countries and industrial countries.

Sustainable development thus holds the key to a profound transformation of the role of development finance institutions and of development assistance. It will always be concerned with poverty reduction and income transfers from rich to poor countries. But it extends way beyond this solidarity and redistribution imperative. It is fundamentally tied to the sustainable governance of globalization.

Conclusion

We have argued in this paper that sustainable development is a complex set of constraints and opportunities. While there are instruments to inform decisions, sustainable development policies are ultimately social and political more than technical, economic and/or scientific. They call for consensus building, locally, regionally, nationally and globally. We have also argued that the pregnancy of the sustainable development imperative also transforms the role and nature of development finance institutions toward intermediaries and catalysts rather than sheer providers of financial resources.

¹¹ For a discussion, see for example Jacquet, P., R. Pachauri and L. Tubiana (eds.) (2009), *Regards sur la Terre 2009*, Paris: Presses de Sciences-Po. An English translation (unpublished) is available under the title *A Planet for Life*.

References

Dupuy, J.-P., 1999, *Ethique et philosophie de l'action*, Ellipses.

Gollier, C. and N. Streich, 2003, « Decision-Making Under Scientific Uncertainty: the Economics of the Precautionary Principle », *The Journal of Risk and Uncertainty*, 27:1; 77-103.

Nordhaus, W. D., 2007, “A Review of the Stern Review on the Economics of Climate Change”, *Journal of Economic Literature*, 45(3), 686-702

Spurgeon, J.P., 2006, “Time for a third-generation economics-based approach to coral management”, in I.M. Côté and J. D. Reynolds (eds.), *Coral Reef Conservation*, Cambridge University Press, 362-391.

Spurgeon, J.P., G. Roxburgh, T., O’Gorman, S. et al., 2004, *Economic Valuation of Coral Reefs and Associated Habitats in American Samoa*, Jacobs Report prepared for the American Samoa Government Department of Commerce (DOC).

Stern, N., *The Economics of Climate Change – The Stern Review*, Cambridge University Press, 2007

Summers, L. H. and R. J. Zeckhauser, 2008, “Policymaking for Posterity”, NBER Working Paper Series, *Working Paper 14359*, September

World Bank (2006), *Where is the Wealth of Nations? Measuring Capital for the 21st Century*, Washington D.C.: The World Bank.