Practical ethics in search of a toolbox:
Ethics of science and technology at the crossroads

Matthias Kaiser
The National Committee for Research Ethics in Science and Technology (NENT)
Box 522 Sentrum, N-0105 Oslo, Norway
www.etikkom.no
Matthias.Kaiser@etikkom.no

Say you have a moral dilemma and are sincerely uncertain what to do. One of the things you might do is to ask a good friend for ethical advice. How do you know the advice you get is a good advice? Well, you might ask yourself a number of questions along the lines of: How well does this friend know me? How well does this friend understand the problem I face? How experienced is she in addressing moral dilemmas? How much do I trust her judgement? Can this friend provide reasons for the advice that seem convincing to me? In the end it is your personal choice and sole moral responsibility what you do, but if your friend takes the question put to her seriously she might admit some moral co-responsibility in helping you to find the morally best response. Advising on ethical issues is in itself a moral action.

What happens if we change the perspective from the individual to a public body or a governmental institution? Obviously, moral dilemmas and ethical uncertainty may arise as well. Examples of this ethical uncertainty by public decision-makers can be found e.g. in the debate about biotechnology and gm-food. The problem is that ethical advice is not that easy to come by, not because of a lack of people willing to provide it, but because the standards for what constitutes a good advice for public decision-making are in themselves problematic. In the public arena there simply is no equivalent to the good friend and trusted and skilled morally competent person. A public body or governmental institution may carry moral responsibility for its decisions, but in modern democracies it is by its mandate and institutional basis accountable to the public at large. Advice on ethical issues for public bodies needs a quality assurance that anchor the advice firmly both within the values of pluralist societies and within a high level of argumentative backing. In other words, ethical advice to public bodies appeals not only to the moral integrity and co-responsibility of the advisor, but also to the set of standards whereby the advice is generated and eventually evaluated.

In this brief and summary paper I make the claim that the important turn to ethics that one has experienced in the realm of science and technology during the 1990's (and partially earlier) now brings about a need to develop a toolbox for practical ethics that makes ethical advice amenable to quality assurance and democratic transparency. I believe many ethicists have as yet only partially recognised the need to put their own activity on much firmer grounds that answer the needs of a modern and deliberative democracy. Much needs to be done to develop such a toolbox if ethics of science and technology is not to come out of the debate as a mere smokescreen or a passing fashion of terms.

Let us briefly examine the possibilities that the advisor will want to consider.
First, the advisor may take recourse to existing ethical theories and academic traditions of discourse. Obviously, a variety of choices offers itself. There are those that adhere to the utilitarian traditions of various kinds, but there are also others who adhere to more deontological traditions (e.g. of a Kantian kind) or others who defend some sort of contractarianism or versions of virtue ethics. Whatever one chooses, the definite advantage of such an approach is that it will – if followed competently - provide a thorough and coherent level of argumentation. Spelling out reasons for the advice and embedding in it a larger ethical framework or theory opens the advice for rational critique. Those that disagree may criticize it by showing which of the presuppositions they deem as problematic and contested. In other words, ethical advice based on academic ethical theories answers to ideals of

modern society and modern social institutions (as e.g. expressed by Max Weber). But in the end there are serious problems that face any such approach, whatever the theoretical foundation may be. For instance, all these theories are in some sense controversial, and it does not seem a good starting point to use controversial theories to solve controversial societal problems. Each theory will have areas where the implications of the theory seem to contradict the moral intuitions of a great number of people. Another difficulty is that these theories do not in any straightforward sense of the term have direct applications in those areas that are debated. In ethics, there is no "applied ethics" in the same sense as, say, in applied mechanics. In order for these theories to be useful in practice one has to spell out particular interpretative contexts and specifications that do not have the same appeal to generality as the more fundamental principles. Providing these contexts has the ring of being ad hoc, at least to those who are sceptical to the theoretical starting point. Also the context will typically leave out many considerations that others deem ethically relevant. In sum, I think the thrust of the objections to this approach is that it does not live up to the recognition of value diversity and essential pluralism in modern democracies. In the background lurks the objection of implicit paternalism, or the suspicion that ethics is used as a smokescreen to hide underlying powerful sector -interests.

Second the advisor may try to live up to the ideals of modern deliberative democracies by turning the above approach on its head and resting the advice on a truly bottom-up and participatory approach. The art of the advice then consists in bracketing the advisors' own ethical standpoint and organizing a process that reveals values and moral judgements of the people, i.e. those that are not deemed experts in ethics but hold values and convictions of importance to the societal decision in question. Obviously, there is again a variety of approaches that one may choose from. Prima facie, the most democratic one seems a survey method that charts existing values and attitudes. Apart from the impracticality of conducting large surveys on each and every issue on which one wants ethical advice, there is also the problem that a survey cannot reveal what ethicists call "considered judgements", i.e. judgements that are informed by all relevant facts and considerations. Most people will not be in a position, nor have the interest, to evaluate and weigh all ethically relevant factors of an issue. Other approaches rectify this shortcoming to some extent. Public hearings with stakeholders or other participatory approaches like critical system heuristics aim at revealing different value judgements of stakeholders. Stakeholders can by definition be assumed to have an interest in the issue at stake and thus to bring at least some kind of relevant knowledge and information to the fore. But again, in democratic societies stakeholders with some kind of direct interest may not be the only legitimate source of information on relevant moral considerations. Civic society as such may have an overriding interest because of how the issue relates to the general welfare and fundamental principles of society. Thus, one has developed approaches that capture not so much the moral judgements of stakeholders, but rather the value-based judgements of a selection of the general public. The consensus conferences developed first in Denmark are a typical example of such an approach. One of the advantages of this approach is that those issuing the recommendation are first offered the best information available on the issue, and their final statement is based on argumentative consensus within the panel. All of these approaches are oriented towards the recognition of pluralism in modern societies and seek to base their advice on how the plurality of ethical viewpoints relates to the issue at hand. All of them are also bottom-up in methodological outlook. Yet, they also face some more fundamental objections. One such objection is that recommendations based on participatory approaches are easily targeted as incoherent in the long run and lacking reference to more principal considerations, like e.g. universalism, i.e. treating ethically similar cases alike. They are vulnerable to who is consulted when, and the framing of the issue is often decisive for the outcome. From an ethical point of view, one may criticize that participatory approaches of this kind are short on rational ethical argument, short on coherence over time, but long on admissions to ethical subjectivism or relativism.

If we turn back to our initial formulation of the problem, i.e. issuing advice to a public body on ethical issues in policy formation, we may thus conclude that there is a dilemma. It appears to be one of choosing between the Scylla of relying on expert culture in ethics (thus risking to sacrifice important aspects of modern deliberative democracies) and the Charybdis of relying on the voice of the people (thus risking to sacrifice coherent rational argument to some extent). Obviously, the public body that seeks advice wants both considerations to be taken into account.

My claim is that in spite of many years with practical ethics, and in spite of some years with debates about the ethics of science and technology in particular, we have not yet managed to answer this challenge satisfactorily. Let us consider two related developments in particular.

The typical response to re-occurring ethical issues related to the policy work of a public body or governmental institution is to appoint an ethics committee of some sort. This is the institutionalisation of ethics. In the context of issues relating to developments in science and technology, the European countries have indeed witnessed a significant increase in the number of regional, national or trans-national ethics committees during the last 10-15 years. Some of them are specific to certain fields, like the bioethics committees in the life-sciences, while others are more generic dealing with the sciences in general and turning their attention to a variety of issues. Their composition often reflects some of the same considerations that we described above. In some countries these committees are restricted to scientific experts, in others they also include ethicists and other specialists that professionally deal with the range of issues that the committee has to confront. In some countries, like e.g. the Scandinavian countries, these experts are typically supplemented by members of the general public. Whatever their composition, they face the fundamental problem of democratic legitimacy and rationality. Normally one expects a certain degree of independence and transparency of such a committee. This, in combination with the fact that they are appointed to provide ethical advice, provides at least some justification for the recommendations they issue. Yet this is merely restricted to the formal level of their operations. This still leaves the more substantial level of how they reach their outcome basically untouched. Accordingly one finds great differences between countries how these committees work. Some of them can perhaps be described as striving to reach some ideal of discourse ethics (in the Habermasian sense) based on the deliberations in the committee. Some seek explicitly expert advice from ethicists that provides a coherent string of arguments. Others again seek to initiate public discourse by means of some of the participatory measures described above. And perhaps the majority of them do not have a clear philosophy that provides guidelines for their operations, or even a clear conception of what an ethical issue or a moral judgement is and what it demands. In this sense, from the perspective of the advice seeking public body the resulting recommendation may seem to come out of a black box. Quality assurance of the advice seems thus to be limited and to be mainly restricted to the assumed trust that the committee operates according to its task. Typically, even if the public body may trust the committee to operate professionally, the public may not share this view. They may simply open the issue again, and not be impressed by the fact that a committee has come to a conclusion on the matter. The underlying problem is really that there exists no consensus on what a competent dealing with an ethical issue by an ethics committee demands in terms of method.

There is another area where we have some experience with practical ethics. This field is medical research ethics. Arguably within medicine and medical research important ethical problems are now by and large handled rather competently. This is due to a combination of factors. First ethics committees are established on several levels and integrated into the workings of medical research. Second, guidelines such as the Helsinki Declaration, provide a checklist of issues that are to be dealt with by those that issue ethical advice. These guidelines are also supported by a majority of actors. Third, practical approaches are spelled

out that essentially side-step the controversies of ethical theory and provide for a variety of broad considerations to be taken into consideration that together seem to cover major ethical intuitions. This is basically the principlism that was first propagated by Beauchamp and Childress. These factors together seem to work rather well for ethical issues that involve medical research vis a vis patient considerations. For more complex issues however, like e.g. xenotransplantation where also overarching societal issues like risks of infections matter, this framework seems to meet some limitations.

My conclusion from this brief summary of the state of the art in practical ethics is that we need to develop a toolbox for practical ethics that works for addressing ethical issues related to science and technology in general. The major function of such a toolbox would be to make possible some kind of quality assurance of the ethical advice and to make ethical advice amenable to democratic transparency and ideals of deliberative democracy.

I want to make it clear that I do not nourish any hopes of developing a kind of decision algorithm that would solve any practical problems in ethics. To my mind, ethics will always rest on some process of judgement and weighing that cannot be delegated to impersonal procedures or strict logic. But this is not what the term "tool" implies. A tool in general is always a means to an end, but typically we may apply different tools to the same ends or the same tools to different ends. Tools become useful only in the hands of the skilful and experienced user. The effectiveness of any tool is always dependent on the skills and judgement of the practitioner. Thus tools become an integral part of human practice, forming assets for skilful practice and quality work. A well-equipped toolbox and skilful, well-trained personnel are hallmarks of professional services. Quality assurance of a practice typically implies assessment of the tools brought to the task and the skills of the personnel performing it. Good tool design always depends on good theoretical understanding of structural features of the issues and tasks to which they may be applied.

Ethical tools would structure the basic considerations that need to be taken into consideration and they would relate these considerations to the specific facts and the social context that pertain in regard to the issue. This would be done in methodical and transparent fashion so that criticism may be directed to each step in the method (e.g. for not being sophisticated enough). Yet, an ethical tool will not relieve us of having to make a final judgement. Once our judgement is preceded by the application of an ethical tool, however, others will have the possibility to check whether disagreement is based on a criticism of our incompetent use of the tool or merely restricted to disagreement with our judgement.

There are already some tools discussed in the literature on practical ethics. One prominent tool is e.g. the ethical matrix first developed by Ben Mepham and inspired by the principlist approach in medical research ethics. This tool has been modified by others, among others by our group at NENT in Oslo, and has been suggested in various contexts. Recently it has entered the joint recommendations of an expert consultation on gm-animals organized by the WHO and the FAO (see the chapter on ethics in: http://www.who.int/foodsafety/biotech/meetings/en/gmanimal_reportnov03_en.pdf).

Here is briefly - by way of example - how an ethical matrix works: Assume you want to assess the ethical issues of a certain genetic modification of a fish species for food production in aquaculture. The first important step is to identify all the relevant stakeholders. This is not necessarily an easy or uncontroversial part of the job. Some people may insist that e.g. the fish that is modified does not deserve to be ranked as a stakeholder along the lines of consumers and producers. They ascribe only instrumental value to the animal. However, others feel strongly that even animals or the environment (biota) should be treated with moral respect akin to ascribing some degree of inherent value to animals. Instead of deciding who is right on the issue, the ethical matrix approach implies to include as stakeholders all those with sufficiently homogenous interests and of whom many people

believe they enjoy some moral standing. It is one matter to be generous in the inclusion of stakeholder and another to assign sufficient weight to their being affected by the technology.

The next step is then to establish a set of ethical principles. Ideally, the combination of the selected principles reflects the variety in ethical theory that is known from the literature. Being too restrictive in the choice of principles may be punished by incompleteness of the ethical analysis, while a generosity at worst may complicate the picture and lead to non-obvious considerations. Personally I suggest that the combination of: welfare as elimination of negative utilities, welfare as promotion of positive utilities, dignity / autonomy, and justice as fairness works well in most settings. The reason for differentiating between negative and positive utilities - instead of only considering their aggregated net result - is purely pragmatic, not theoretically founded. Many decision makers need to see separately what the problems are to which a technology is supposed to be the remedy, and to see what the good-making qualities are that we strive for. Furthermore, if our only stakeholders were human beings, the principle of autonomy would be sufficient, but since we want to include animals and nature among stakeholders it seems more adequate to describe the general moral principle in terms of respecting dignity.

Having set up the frame of the ethical matrix, one needs now to specify what each principles means more specifically when seen from each stakeholder's own point of view. Respect for consumer autonomy means mainly to respect the consumer's right to choose between alternative and clearly labelled products. One ends with a first matrix in which all principles are specified in individual cells.

The next step is then to investigate in what way the suggested technology, e.g. the gm-fish, will affect each and every cell that is specified in the first matrix. In other words, one starts to construct a consequence matrix. For instance, having genetically modified fish in fish farms may provide adequate and stable income for small producers, may increase their dependence on large corporations, may be neutral with respect to nutritional quality, and may threaten biodiversity or secure biodiversity (always depending on the technology, e.g. whether or not one uses sterile fish).

The final step consists then in the considered judgement of what is ethically acceptable, taking all these different implications into account. Typically, the situation may be a little more complex. One may e.g. want to ascribe different weight to different cells, thus expressing the view that some harms or some benefits are more important in principle than others. One may also want to differentiate between effects that are certain and others that are merely possible. However one does this, the important point is to make sure that the ethical matrix captures precisely those considerations that people consider morally relevant relevant to an issue.

In principle the ethical matrix approach can be an exercise that a scholar pursues in isolation from actual stakeholders. In this case, the matrix merely serves the purpose of clarifying the scholars mind on an issue and providing a checklist whether all relevant considerations have been considered. But the matrix may also be used as an instrument in a participatory stakeholder process, where stakeholders themselves agree on what the ethically relevant features of an issue are. In this case, it typically helps (some) stakeholders to recognize that their perspective on an issue is not the only relevant consideration. They may recognize easier when a controversial issue may have to be solved by finding a compromise that satisfies several important interest, and when the issue is based on a fundamental conflict of different interest constellations. Advice that comes out of an ethical matrix approach, in particular when generated by a participatory approach, will be amenable to demands of transparency, democratic pluralism, and some argumentative backing (given that the principles are well chosen from a variety of ethical theories). Here is how a simplified ethical matrix may look like for this case:

Ethical matrix for gm-fish	***Welfare as eliminating negative utilities***	***Welfare as promoting positive utilities***	***Dignity / autonomy***	***Justice as fairness***
Small producers	Dependence on nature and corporations	Adequate income and work security	Freedom to adopt or not adopt	Fair treatment in trade
Consumers	Safe food	Nutritional quality	Respect for consumer choice (labelling)	General affordability of product
Treated fish	Proper animal welfare	Improved disease resistance	Behavioural freedom	Respect for natural capacities (telos)
Biota	Pollution and strain on natural resources	Increasing sustainability	Maintenance of biodiversity	No additional strain on regional natural resources

My point here is not to propagate the ethical matrix as a wonder-tool in practical ethics. This it is not. There are problems and difficulties connected to this method. However, my point is rather to make plausible the claim that tools of practical ethics can be worked out. I try to show this by pointing out that the ethical matrix is one such tool.

Other tools are suggested in the literature, but in general there is little discussion and even less empirical testing about them in the literature. In the meantime, some projects have started to pay attention to the need to developing ethical tools, e.g. the "Ethical BioTA Tools"-project funded by the EC (see: http://www.lei-meta.nl/ethicalbiotatools/). I hope that ethicists and other scholars will pay more attention to the need to develop ethical tools and that this will contribute to put ethical advice on a more firm and democratic basis.

* * * * * *

Some suggested further reading:

On the general background on ethics and new technology:

Bauer, M., Gaskell, G. (eds.) 2002: Biotechnology. The making of a global controversy Cambridge, Cambridge University Press

Beck, Ulrich (1992), Risk Society, London, Sage

Clarke, S.G. and Simpson, E. (eds.) 1989: Anti-Theory in Ethics and Moral Conservatism, Albany, State University of New York Press

Fischer, Frank (2000): Citizens, Experts, and the Environment, Durham and London, Duke University Press

Gaskell, G. et al. 1997: Europe ambivalent on biotechnology. Nature, Vol. 387, 26. June 1997

Habermas, J. 1991: Erläuterungen zur Diskursethik. Frankfurt/Main, Suhrkamp

Kettner, M. 1993, Scientific knowledge, discourse ethics, and consensus formation in the public domain, in: Winkler, E.R. and Coombs J.R. (eds.) Applied Ethics. A Reader. Blackwell. 1993

Schomberg, R. von (ed.) 1995: Contested Technology: Ethics, Risk and Public Debate, International centre for Human and Public Affairs, series B: Social Studies of Science and Technology, Tilburg, Buenos Aires

Webler, T. & Renn, O. & Wiedemann, P. (eds.) 1995, Fairness and Competence in Citizen Participation: Evaluating Models for Environmental Discourse (Technology, Risk, and Society, Vol 10), Kluwer Academic Publishers, Dordrecht

On some aspects of practical ethics:

Arras, J.D. 1991. 'Getting Down to Cases: The Revival of Casuistry in Bioethics' in Journal of Medicine and Philosohpy 16

Beauchamp, T and Childress, J. (1979, 1983, 1989, 1994, 2001) Principles of Biomedical Ethics. Oxford University Press, Oxford

Beauchamp, Tom. 1995. 'Principlism and its alleged competitors' in Kennedy Institute of Ethics Journal 1995, 5, 181-198

Carr, S. & Levidow, L. 2000, Exploring the links between science, risk, uncertainty, and ethics in regulatory controversies about genetically modified crops, Journal of Agricultural and Environmental Ethics 12: 29-39

Checkland, P. B. 1981, Systems Thinking, Systems Practice, Chichester: John Wiley & Sons

Danner Clouser, K. and Gert, B. 1990 'A Critique of Principlism' in The Journal of Medicine and Philosophy 15, 219-236

Jonsen, A.R. and Toulmin, S. 1988. The Abuse of Casuistry: A History of Moral Reasoning. Berkeley: University of California Press

Jonsen, A.R. 1991. 'Casuistry as Methodology in Clinical Ethics' in Theoretical Medicine vol. 12

Kaiser, M. & Forsberg, E.M. 2000: Assessing fisheries – Using an ethical matrix in a participatory process, Journal of Agricultural and Environmental Ethics 14, 91-200

Keenan, J.F. and Shannon, T. 1995. The Context of Casuistry. Washington DC: Georgetown University Press

Mayer, S. and Stirling, A. 2002: Finding a precautionary approach to technological developments - lessons for the evaluation of GM crops. Journal of Environmental and Agricultural Ethics 15, 57-71

Mepham T B 1996: Ethical analysis of food biotechnologies: an evaluative framework, in Food Ethics, edited by T B Mepham, Routledge, London. pp. 101-119

Mepham, T B 1996: Ethical impacts of biotechnology in dairying, in Progress in Dairy Science: edited by Phillips CJ, CAB International, Wallingford

Mepham T B, Moore C J and Crilly R E 1996: An ethical analysis of the use of xenografts in human transplant surgery. Bulletin of Medical Ethics 116, 13-18

Mepham T B 2000: Farming animals for food: towards a moral menu: Food Ethics Council, Southwell, 48pp

Mepham T B 2000: A framework for the ethical analysis of novel foods: the ethical matrix. Journal of Agricultural and Environmental Ethics 12, 165-176

Mepham T B 2000: The role of food ethics in food policy. Proceedings of the Nutrition Society 59, 609-618

Mepham T B 2001: Novel foods. In 'The Encyclopedia of Ethics of New Technologies' ed. ed. R F Chadwick, Academic Press, San Diego. pp. 299-313

Midgley, G. 2000, Systemic Intervention: Philosophy, Methodology, and Practice, New York: Kluwer/Plenum

Romm, N. 1994, Continuing tensions between soft systems methodology and critical systems heuristics, Centre for Systems Studies, University of Hull, UK, Working paper no. 5 1994

Ruyter, K. 1995. Kasuistikk som saksbasert problemløsning i medisinsk etikk. Om medisinsk assistert befruktning. Doktorgradsavhandling Det teologiske fakultet, Universitetet i Oslo

Schroeder D and Palmer C (2003) Technology assessment and the ethical matrix. Poiesis and Praxis 1, 295-307Stirling, A. 2000: 'Rethinking risk: application of a novel technique to GM crops.' Technology, Innovation & Society 18, 21-23

Stirling, A. and Mayer, S. 2002: 'Confronting Risk and Precaution: a Multi-Criteria Mapping of a GM Crop', in Michael Gletzner (ed) Developing Alternatives for Valuing Nature. Edward Elgar

Stirling, A. and Mayer, S. 2001: A novel approach to the appraisal of technological risk: a multi-criteria mapping pilot study of a genetically modified crop in the UK. Environment and Planning C Government and Policy 19, 529-555

Stirling, A. and Mayer, S. 2000: 'Precautionary approaches to the appraisal of risk: a case study of a GM crop'. International Journal of Occupational and Environmental Health 6, 342-357

Stirling, A. and Mayer, S. 2000: 'A precautionary approach to technology appraisal?: a multi-criteria mapping of genetic modification in UK agriculture'. TA-Datenbank-Nachrichten, 3, 39-50, 2000

Stirling, A. and Mayer, S. 1999: Rethinking Risk. A Pilot Multi-Criteria Mapping of a Genetically Modified Crop in Agriculture in the UK. SPRU, University of Sussex, Brighton

Ulrich, W. 1983, Critical Heuristics of Social Planning: A New Approach to Practical Philosophy, Haupt: Berne