

## **JUSTICE, HUMAN RIGHTS AND ETHICS ISSUES IN SCIENCE AND TECHNOLOGY POLICY**

**P. B. Thompson**

*Department of Philosophy, Purdue University, USA*

**Keywords:** justice, human rights, ethics, philosophy, utilitarianism, consequentialism, communitarianism, policy analysis, biotechnology, technical change, agricultural technology, development

### **Contents**

1. Introduction
  2. Ethics and Justice
  3. Ethics, Justice and Policy
    - 3.1 Consequentialism
    - 3.2 Kantian or Rights-based Ethics
    - 3.3 Communitarianism and Virtue Ethics
  4. Social Justice and Technical Change
    - 4.1 Technical Change as a Violation of Individual Rights
    - 4.2 Technical Change and Procedural Justice
  5. Social Justice and the Problem of Risk
  6. Conclusion
- Glossary  
Bibliography  
Biographical Sketch

### **Summary**

Ethics involves the comparative evaluation of alternative approaches to understanding how justice applies to policies and human activity. Social sciences approaches to policy analysis have tended to favor consequentialist approaches, but rights-based ethics suggests that the primary test for science and technology policies should be to examine whether they are consistent with and whether they tend to further the realization of human rights. Communitarianism challenges both consequentialist and rights-based thinking by suggesting that the key to justice lies in the way that science and technology encourage or discourage virtuous conduct. At the most basic level, social justice for science and technology policy involves an assessment of whether science, technology and the policies that govern them are compatible with basic principles articulated in each of these three approaches.

Policy changes are generally subjected to explicit evaluation and justification in terms of at least one of these three approaches in ethics. However, technical changes can introduce sweeping patterns of social change that escape this pattern of deliberation and review. Thus one key problem is simply that technical change escapes the procedures for ethical deliberation and review that are a standard part of policy formation and performance assessment. Risk issues provide a particularly cogent example of the way that alternative approaches to social justice can produce divergent assessments of

science and technology. Consequentialist ethics seeks an optimal balance of social risk and social benefit while rights-based approaches examine whether persons exposed to risk have had an opportunity to give or withhold consent. The example of agricultural biotechnology is discussed to illustrate this problem in the ethics of science and technology policy.

## **1. Introduction**

As forms of human practice and activity, science and technology can be subjected to ethical evaluation, justification and critique. Ethics might be understood as a public evaluation or dialog relating to science and technology. Alternately, a scientist or engineer might understand ethics as an introspective, subjective and personal meditation on purposes. Some topics, such as use of animals or issues of integrity in scientific research, are specific to the practices of science and technology themselves. Others relate to the integration of science and technology into society. Some interpretations of the Christian doctrine of original sin or the Jewish golem myth imply that science and technology are intrinsically or pervasively unethical. Here, science and technology are portrayed as expressions of impiety or of attempting to do what human beings were never intended to do.

Policy of any sort generally involves guidelines, procedures, decision rules or criteria that specify what should be done in a given domain of application. As such, policy is inherently normative. Policies either implicitly contain or explicitly state norms and value judgments; hence the justification, evaluation or critique of policy is also a potential domain for ethics. As such, policy for science and technology has a dual connection with ethics that permits multiple interpretations and strategies for discussing ethical issues.

Science and technology policymakers encounter situations in which many of these ways to link ethics with science and technology might become relevant, but here the emphasis will be on questions of justice. Human rights represent a particularly important and influential way of making an ethical evaluation or critique, especially with respect to matters of justice. But other approaches to justice can be used, and such approaches are often implicit in the decision making that guides science and technology policy. The tendency to utilize forms of ethical justification or decision making that neglect human rights is often the key issue when a given application of science or technology is criticized on grounds of social justice.

## **2. Ethics and Justice**

Broadly speaking, ethics comprises standards, values, and conceptualizations of human purpose that are applied in making judgments about what humans ought to do in certain situations. Ethical norms are variously understood as implicit in cultural forms, as grounded in human psychology or as a real component of the world that is discovered by human reason. Common morality consists of ethical norms and standards of judgment as they are practiced in daily life. Philosophical ethics is an attempt to systematize ethical judgments and to theorize general problems in ethical practice including justification, practical decision-making and the attribution of ethical praise

and blame. Major points of dispute in philosophical ethics often reflect areas of vagueness, ambiguity and lack of agreement in common morality.

Most philosophical work on ethics recognizes a distinction between norms and principles that articulate or regulate the practices and culture of a particular way of life and those that are thought to be so fundamental that they command universal observance and respect from everyone. The distinction is vital to theories of liberal democracy, which demand that individuals and groups must be at liberty to pursue distinct and sometimes competing life plans. Different religions, for example, might require specific practices or observances as components of the life of faith, and practitioners of a faith may feel that they are morally obligated to observe these practices. But while people in living democracies believe that the duty to practice a religious observance is peculiar to members of a particular faith, they also believe that everyone has a duty to refrain from physical violence against the person and property of others. They thus make an implicit distinction between the morality of religious observance and the universal morality that prohibits violence against others.

Unfortunately, the terminology that is used to make this distinction is not standard. In German social theory and the philosophy of Jürgen Habermas, culturally or religiously contingent goods are characterized as *ethical* values, and the term *morality* is used to indicate universal norms. In this article terminology associated with John Rawls and Anglo-American political philosophy will be used. Those principles that are fundamental to social order and that demand universal respect are called *principles of justice*, while the specific values that support a particular way of life will be referred to as *conceptions of the good*. In the tradition of Anglo-American philosophy the term ‘ethics’ is used comprehensively to circumscribe both. Applying this terminology, we say that religious tolerance is a principle of justice in liberal democracies, while the norms and observances of diverse religious faiths must be understood as conceptions of the good.

Conceptions of the good need not be grounded on religious foundations. Indeed, one can construe a life based on unfettered pursuit of scientific knowledge as a conception of the good life. Unfettered scientific inquiry thus could become a conception of the good whose pursuit is protected by principles of justice. In the tradition of Western law and philosophy, justice is frequently characterized in terms of recognizing and securing human rights, so one might characterize academic freedom or religious liberty as a right. This pattern of linking justice and human rights was subjected to a great deal of criticism in the waning years of the 20<sup>th</sup> century. As such, any discussion of justice and human rights must cover some competing approaches to justice.

### **3. Ethics, Justice and Policy**

Some of the competing approaches to justice fall naturally out of an analysis of alternative performance standards for evaluating policies of all sorts, science and technology policy being no exception. Perhaps the most straightforward approach to the evaluation of science and technology policies is to predict or measure their effect on human health, wealth, and quality of life, as well as impact on key parameters of environmental quality. The impact of specific technologies such as drugs and public

works projects is routinely assessed, and the approach can be extended to general forms of technology and to scientific research. A very simple analytic framework for performance evaluation interprets policy as consisting of two elements: the fixed *situation*, which includes physical constraints (including natural resources, geography and basic chemistry and biology) plus cultural or constitutional constraints that must be regarded as invariable (including human nature), and the policy *structure*, which consists of the rules, regulations, funding mechanisms and customs that constitute the policy itself. Together, the situation and structure determine an opportunity set for all affected parties. This will induce *conduct*: affected parties will engage in behavior consistent with their own goals and preferences as dictated by their opportunities. Finally, the conduct of affected parties will produce an *outcome* or end state, which consists of impacts on health, wealth and other parameters of interest (see Figure 1). Arrows represent implied forms of social causality.

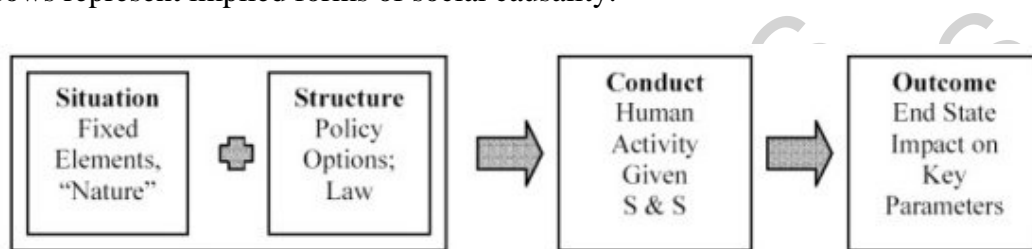


Figure 1. A simple framework for policy analysis

Most forms of economic policy analysis fit this framework, with the economic model expressing key elements of situation and structure, standard neo-classical assumptions of rational optimization by individuals and firms determining the conduct of affected parties, and outcomes being expressed in terms of costs, benefits or other expected value measures. Alternative social science theories can be used to model situation and structure and to predict behavior of affected parties, and outcomes may be expressed in demographic or other units, as well as costs and benefits. Social causality is, of course, complex. Most analysts who deploy models that conform to this framework presume that causality is iterative, and that outcomes of one iteration affect the situation or structure in subsequent iterations. Hence the framework does not suggest a static or ‘one pass through’ representation of policy and its outcomes.

Despite the complexity with which the Figure 1 framework would be augmented in any actual analysis of policy, this simplified picture provides a tidy entrée to the role of ethics in evaluating policy performance. The ‘ethics of policy analysis’ is the comparative assessment of different ways to frame and interpret the performance of a given policy proposal. There are three broad approaches: consequentialist, human rights (or rights-based) and communitarian (or virtue-based) ethics.

### 3.1 Consequentialism

Many policy analysts simply assume that the performance of policy is a function of its outcomes, as represented above. Here, the role of ethics is to provide a theory of value that allows one to interpret whether the end state produced by a given policy justifies the adoption of the policy, or demands an alternative. *Consequentialism* states that all

human actions (including policies) should be justified solely in terms of effects on the welfare of individuals. The most common form of consequentialism is *utilitarianism*, after the 18<sup>th</sup> and 19<sup>th</sup> century social movement most prominently associated with Jeremy Bentham and John Stuart Mill.

Utilitarianism stipulates that the evaluation of consequences must be:

- (a) comprehensive: it must include all effects on all affected parties;
- (b) additive: beneficial and harmful effects can be summed;
- (c) comparative: it should weigh the consequences from alternative courses of action;
- (d) optimizing: the appropriate course of action is the one that produces ‘the greatest good for the greatest number’.

A complete specification of these four parameters can become quite complex.

Utilitarian ethics corresponds closely to procedures such as cost-benefit analysis and probabilistic risk analysis, though these analytic tools are not in themselves prescriptive. It is also historically and conceptually tied to welfare economics, and many of the theoretical problems there become problems for utilitarian ethics. For example, Arrow’s Theorem states that it is impossible to aggregate the value of effects on individuals into a unique and consistent social welfare function. Furthermore, it has proved difficult to assign values to public goods or to environmental amenities that are not traded in markets. Both problems have plagued the attempt to evaluate broad social and ecological impacts of technological systems such as biotechnology, computers or nuclear power. What is more, unlike most economists, philosophical utilitarians since Bentham have argued that any being capable of feeling satisfaction or suffering should be included among affected parties. Hence utilitarians have been at the forefront of those who criticize the use of animals in scientific research.

Activities such as violence against person and property are so pervasively harmful that it makes sense to prohibit them altogether. Thus, for a consequentialist, principles of justice are simply rules and norms that tend to produce better consequences in every instance where they might apply. Conceptions of the good reflect individual preferences that vary from one person to another. Rights are legal and customary principles (e.g. they are not *moral* principles) that are justified only if they tend to promote good consequences.

-  
-  
-

TO ACCESS ALL THE 16 PAGES OF THIS CHAPTER,  
Visit: <http://www.eolss.net/Eolss-sampleAllChapter.aspx>

## Bibliography

Burkhardt J. (1992). Ethics and technical change: the case of BST, *Technology and Society*, **14**, 221–243. [This paper is perhaps the most succinct and comprehensive case study of ethical issues associated with technical change.]

Donnelly J. (1989). *Universal Human Rights in Theory and Practice*, New York: Ithaca, Cornell University Press. [Though not focused on science and technology, Donnelly's book is an excellent and highly readable overview of human rights and their application in an international setting.]

Jonas H. (1984). *The Imperative of Responsibility: In Search of Ethics for the Technological Age*. Chicago, IL, University of Chicago Press. [Though parts of Jonas's book seem dated in a post Cold War world, the early chapters still provide an important analysis of how moral evaluation needs to be reconsidered in light of advanced science and technology.]

MacIntyre A. (1981). *After Virtue*, IN: Notre Dame, Notre Dame University Press. [MacIntyre is the most important advocate of virtue theory, and a critic of the way that the social sciences are often used in policy analysis.]

Rawls J. (1974). *A Theory of Justice*, Cambridge, MA, Harvard University Press. [Rawls book is widely recognized as the seminal philosophical work on social justice of the 20<sup>th</sup> century.]

Seidman J., ed. (1989). *Jürgen Habermas' Theory of Society and Politics*, Boston, MA, Beacon Press. [Habermas is an important social theorist whose work has always stressed the centrality of science and technology policy to matters of social justice. This selection of readings from his work provides the most concise entrée into his thought.]

Shiva V. (1993). *Monocultures of the Mind: Perspectives on Biodiversity and Biotechnology*, London: Zed Books. [Shiva is a critic of biotechnology who discusses the neem tree case and the rights of the poor at length.]

Shrader-Frechette K. and L. Westra, eds. (1997). *Technology and Values*, Lanham, MA, Rowman and Littlefield. [This is a collection of seminal articles on technology, ethics and justice, as well as illustrative case studies on auto safety, computers, military technology, nuclear power, pesticides and human genome research.]

Thompson P. (1997). *Food Biotechnology in Ethical Perspective*, London: Chapman and Hall. [This book by the author of this article provides a systematic analysis of issues in ethics, justice and rights as they arise in connection with rDNA-based techniques for manipulating food crops and livestock.]

## Biographical Sketch

**Paul B. Thompson** received his Ph.D. in philosophy from the State University of New York at Stony Brook in 1980. He has since conducted research on ethical and philosophical issues associated with science and technology including studies of nuclear power, information technology and especially biotechnology. His theoretical work deals with the appropriate way to interpret and model technological risk, as well as ethical criteria for accepting and communicating risks to the broader public. Thompson is best known for his work on agriculture, and he was involved in the founding of both the Agriculture, Food and Human Values Society in 1987, and the European Society for Food Ethics (EURSAFE) in 1998. From 1981 to 1997, Thompson was on the faculties of philosophy and agricultural economics at Texas A&M University, where he was also the founding director of the Center for Biotechnology Policy and Ethics. In 1997 he assumed the Joyce and Edward E. Brewer Chair of Applied Ethics at Purdue University, where he is currently a Distinguished Professor of Philosophy. He has an adjunct appointment in animal science at Purdue, and is serving as interim Director of Purdue's Center for Food Animal Productivity and Well-being. Thompson's honors include terms as Fellow of the Agrarian Studies Program at Yale University, and the Council on Foreign Relations. He is also a permanent Fellow of the Hastings Center. Thompson has served as an advisor to the U.S. National Research Council and the Dutch Wageningen UR, and has lectured on ethical issues in science and technology policy in more than a dozen countries. He is the author or editor of seven books, including *The Ethics of Aid and Trade* (1992) and *The Agrarian Roots of Pragmatism* (2000). He enjoys blues music and simple food.