

Wicked Problems in Public Policy

"The concept of wicked problems has become very commonly used, and abused, in contemporary studies of public policy. While expressing some appropriate skepticism about the concept, Brian Head uses the idea to analyse the numerous difficult problems facing governments in the 21st century. He demonstrates ways in which governments can, and should, address these pressing problems, which makes this essential reading for both scholars and practitioners."

—B. Guy Peters, Maurice Falk Professor of American Government, University of Pittsburgh, inaugural president of the International Association for Public Policy

"With scholarship that combines deep conceptual knowledge with practitioner insights, Brian Head unpacks some of the most pressing and complex policy challenges we all face. Rich with empirical detail, this book looks set to become the definitive work on wicked issues and what to do about them."

-Claire A. Dunlop, Professor of Politics, University of Exeter, UK

"This book provides a concise introduction to the concept and management of 'wicked' problems: the kind of poorly-structured, intractable policy problems with unknown solutions with which policy-makers, unfortunately, must engage on a frequent basis. It discusses the concept from its origins to its development, refinement and use in more recent works, and sets out seven strategies by which governments historically have attempted to deal with such problems. These strategies are then applied to many difficult examples in the contemporary world such as environmental sustainability and climate change, improving social wellbeing and equity, the rise of digital technology, and COVID-19, among others. The discussion is crisp and clear and the lessons derived from the cases equally clear, convincing, and useful to practitioners and academics alike."

—Michael Howlett, Burnaby Mountain Professor and Canada Research Chair, Simon Fraser University, Canada

Brian W. Head

Wicked Problems in Public Policy

Understanding and Responding to Complex Challenges



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Introduction

The democratic context of policymaking is central to this book. It is about policy debates and stakeholders in democracies. And while all countries share some important common challenges in problem-solving and effective governance, this book has little to say directly about policymaking in authoritarian political systems and militarised autocracies.

In democracies, most of the 'big' issues of modern life—social, economic, environmental, technological—are likely to be controversial. The big issues are indeed very real—they shape our lived worlds. Many of these issues seem messy and intractable. And in most cases, there are no 'correct' and comprehensive answers. Everyone has an opinion about some aspects of the problem, and about what needs to be done.

This explains why commentaries on the big complex issues often come not from scholarly experts but from engaged practitioners—such as politicians, journalists, media celebrities, lobbyists, advocates, inventors, think tank analysts, planners and service delivery managers. They provide a range of insights, and simplifications, to make sense of these complexities.

The big issues are framed, debated and managed by politicians and other powerful stakeholders. These practitioners do the key work of interpreting and deciding. They offer narratives about the nature of the problem and options for tackling the problem. They highlight their preferred normative stance (economic growth? social equity? ecological health? social stability?). Some are attracted to technological innovation to tackle key parts of the problem. Others want better social regulation and

funding. The practitioners and stakeholders often disagree about what can or should be done. This is the everyday politics of wicked problems.

These practitioners generally have few connections with the world of scholarly research. What, then, could be the contribution of research and analysis about wicked policy problems? Indeed, why write a book? This book is more about offering an approach to analysis and reflection rather than offering a set of policy solutions.

Social scientists are not in the same business as political ideologues. Good social science research does not promote ready-made solutions and magical cures. Although good social science research inevitably embodies social values (such as the value of reducing avoidable harms), it is primarily focused on explaining past patterns and mapping future possibilities for improvement. In democratic systems, government ministers enjoy majority support in the legislature, and are formally accountable for determining the key choices in public policy. Ministers may receive advice from several sources, although they usually rely on narrow circles of trusted political advisors. Government agencies generally respect the need to gather and analyse a wide range of evidence, and they attempt to incorporate relevant expertise into their advisory and evaluative systems. This may include findings from academic and corporate research. Good research can also improve the quality of public debate and stimulate new thinking about feasible options. But the systematic and nuanced contributions of scientists, historians and policy scholars are often crowded out in public debate by the more strident views of media commentators and partisan advocates.

Universities have recently found it necessary to re-affirm that they support 'research relevance and impact'. However, in practice, there is still relatively little incentive in the university sector to research the 'big' issues and to engage deeply with non-academic stakeholders. University scholars are mainly rewarded for excellence in narrow technical research. In general, specialised projects that promise commercial benefits are more likely to attract funding. Performance evaluation systems within universities thus tend to celebrate research specialisation, which is reinforced by much of the data about research revenue, commercial linkages, and related scientific publications.

By contrast, my own professional background has spanned several sectors—universities, government, not-for-profit, and consulting—and enabled me to work on complex and wicked problems throughout my professional career. My approach to public policy has highlighted the

need to strengthen links between practitioners and researchers, promote collaborative networks, and focus on complex interconnected issues. The desired outcome is to develop and refine evidence-informed policy ideas that might contribute to new policy thinking and better governance. Arguing the case for policy improvement is always challenging, and requires continuous engagement with practitioners and stakeholders, and indeed with dissenters who promote different agendas. This is tough work, especially in a world swirling with ideological slogans, political myths, nostalgic remedies and panaceas.

This book on *Wicked Problems in Public Policy* was a long time in the making. The list of issues worthy of discussion has continued to multiply. Every policy problem could be potentially relevant to the theme of policy complexity and contestation. Over recent decades I have examined many policy case studies, with the welcome assistance of a host of colleagues and co-authors. I have also undertaken thematic analyses exploring the pros and cons of collaboration, the value and limits of community engagement, and the positive contributions of social research expertise for evidence-informed policy programs. The book attempts to provide a conceptual lens for thinking about all these large themes. It refers to many policy examples, but a short book unfortunately had no space for many detailed cases.

The recent pandemic crisis caused extensive long-term disruptions in every sector. This crisis reinforced our appreciation of the delicate balance in policymaking between public trust, democratic legitimacy, effective programs, and the (ambivalent) roles of expert knowledge. These recent experiences will doubtless prove instructive for scholars and practitioners seeking to understand and respond to wicked problems.

My thanks to numerous colleagues and friends in many countries who have helped me clarify these ideas over many years. I also acknowledge the support of substantial research funding from several sources, but especially from grant DP140101532 of the Australian Research Council.

This book is dedicated to John Alford, with whom I began discussing wicked problems at an international conference in 2007. We subsequently convened panels at several conferences and co-authored some papers which contributed to reconsidering the research agenda for wicked problems. I am very grateful to a host of local and international scholars who have greatly enhanced my understanding. In 2013 my commitment to this field of research was reinforced by participating in a major conference

organised in Berkeley (the home base of Rittel and Webber) to celebrate and explore the significance of their 1973 classic article. Subsequent workshops and conferences in Singapore, Hong Kong, Montreal, Edinburgh and Wageningen also deepened my appreciation of different ways to assess the relative success (and failure) of policies addressing complex issues, and to understand the value of diverse forms of knowledge in the policy process. In writing this book I have inevitably drawn on ideas in previously published papers; but I have tried to develop a fresh argument about contested policy problems and their political resolution. While the long delays in completing this book may have disappointed some friends and colleagues, the extended opportunities for discussion with researchers and policy practitioners have helped me navigate the inherent difficulties of understanding complex and contested policy matters.

The structure of the book is straightforward. Chapter 1 provides a brief background about public policy analysis, especially the central importance of how issues are 'framed' or portrayed in policy debates. Divergent frames or perceptions generate conflict about the nature of the policy problems and about how to address them. Competing views are shaped not only by evidence-based expertise but also by ideologies, economic interests, political identities and institutional legacies.

Chapter 2 notes that complex problems are abundant, but that some problems are made even more intractable by differences in the values, economic interests and cultural viewpoints of participants. This *divergence* underpins the realm of wicked problems, as first sketched in Rittel and Webber's classic 1973 article. After a slow start, the terminology of 'wicked' problems became increasingly popular from the 1990s onward, and was diffused across a wide variety of economic, social, environmental and technological policy issues. In summarising this conceptual framework, I critically reconsider the orthodox classification of problems as being either simple, complex or wicked. This chapter explores the factors that help us explain the different degrees of difficulty or intractability that arise in various policy fields and institutional contexts. The chapter also notes some robust criticisms of how the term wicked problems has been applied and supports the case for greater precision.

Chapter 3 examines the options and strategies used by democratic governments in managing policy conflicts and in responding to complex and contested issues. Wicked problems are managed politically. I outline seven approaches that have actually been used by diverse political leaders in managing and responding to wicked problems. In practice, leaders

may choose to avoid or deflect the difficult issues, or they may decide to impose their own strong interventions. They may choose to take relatively familiar pathways, or alternatively, they may seek new approaches—to build partnerships, manage conflicts, tackle knowledge uncertainties and invest in preventative approaches.

Chapter 4 examines the complex social crises and natural disasters that form the context for how policy actors understand and manage wicked problems. The complexity dimension of wicked problems is often emphasised in the policy literature, and complexity is central for understanding the 'governability' of crises and challenges. The chapter distinguishes between different types of crisis—ranging from acute and urgent, on the one hand, to slow and creeping, on the other hand. The impacts of crisis may be abrupt and immediately tangible, or may reflect the cumulative effects of multiple gradual changes that reach critical thresholds. It is difficult to assess the risks and urgency of an emerging crisis under conditions of great uncertainty. The chapter argues that, rather than 'solving' the problem in a definitive way, policy responses may settle on 'coping' strategies to mitigate and stabilise the problems. This chapter includes a brief study of the COVID-19 pandemic.

In the final chapters, these concepts and frameworks are further developed and applied in two major policy fields—sustainability policies and social policies. The case examples are brief and illustrative vignettes rather than comprehensive guides to the problems under discussion. Chapter 5 considers selected major issues in climate response policy, environmental sustainability and related environmental issues. Similarly, Chapter 6 applies the concepts and frameworks to selected areas of social policy, including inequality, homelessness and drugs policy. Taken together, Chapters 5 and 6 provide case examples for further reflection on broader questions of policy analysis, such as the appropriate criteria for judging policy success, the role of expertise (in its various forms), and the continuing debates between those who seek rapid and transformative change, and those who promote steady incremental improvements through long-term prevention policies.

Finally, Chapter 7 offers some brief concluding remarks on policy innovation and the contemporary politics of populism and opinion-based policy ideas, which frame so many debates about wicked policy issues in the age of digital media. Given the pluralisation of the public sphere, it remains inherently difficult to negotiate 'effective and acceptable' policy responses. The search for more innovative approaches has become

6 INTRODUCTION

widespread in recent years, although evidence-informed policymaking remains difficult to achieve. Political leaders who can achieve better outcomes while maintaining broad stakeholder support are relatively rare. Policy success is seldom complete or enduring—it is more likely to be provisional and qualified and iterative. Even successful programs require adaptive management and regular review. And many stakeholders will remain disgruntled, and feel overlooked and resentful, perhaps persuaded that their interests and identities were more secure in earlier times.

This book reflects both my strong interest in policy improvement and my scepticism about simplistic partisan solutions. The book is often conceptual in tone, but this is necessary for providing a lens to understand complex and contested issues.



CHAPTER 1

Debates in Public Policy—Problem Framing, Knowledge and Interests

Abstract There are different types of public policy problems. In democratic political systems, policy problems arise in very diverse political and institutional contexts. These influence how the problems are debated and resolved. Policy decision-making is structured through organisational processes that reflect historical institutional arrangements. Complex policy problems often involve conflicting interests and divergent perceptions among various stakeholder groups. Disagreements about problems and policies arise from many factors, including material interests, sociocultural values and political (dis)trust. The framing of problems and solutions is expressed in different ways, through the language of economic benefits, ideological outlooks, group values and political loyalties. Leaders of political, economic and social organisations argue for the priority of some issues over others, depending on their judgements about threats, rewards and opportunities. Leaders typically offer simplified and persuasive narratives about problems and solutions, in order to attract wide support for their preferred approach. Evidence and expertise are mobilised selectively by policy actors to influence the perceived credibility of their own favoured policy options. However, rigorous evidence is not privileged in everyday politics—policy debates are structured through the interplay of many forms of knowledge, values, emotions and interests. Expertise can assist in managing complex problems but never determines the outcomes.

Keywords Policy framing \cdot Policy agendas \cdot Policy debates \cdot Simple and complex problems \cdot Expertise \cdot Gun violence \cdot Road congestion \cdot Refugees

Introduction to Problem Framing

This chapter provides a brief background about public policy in democratic political systems, and especially the central importance of how policy problems are 'framed' by various actors in policy debates. This background sets the scene for the main discussion (in Chapter 2) of the 'wicked problems' framework. It also provides a foundation for later analysis (in Chapter 3) of policy instruments for achieving policy goals and the institutional capacities required for successfully tackling complex problems.

Disagreements arise among stakeholders about the nature of policy problems and how to address them. These divergent viewpoints are shaped by different assumptions, values, and interests. These differences of perspective have major impacts on policy decision-making and implementation, because the way a problem is defined or interpreted tends to correlate with particular remedial actions to address the identified problem.

The fundamental proposition in this chapter is that divergent 'framing' of policy problems generates conflict about the nature of these problems and about how to address them. Competing policy perspectives and viewpoints are inevitable. These differences are often entrenched or resistant to change, owing to their complex anchoring in values, interests, emotions and ideological assumptions. Such perspectives about the nature of the issue, and about actions to be taken, are not derived from the 'agreed facts' about an issue – they are more likely to be influenced by a combination of ideological orientations, economic interests, political identities, professional or managerial assumptions, and past institutional legacies (Edelman, 1988; Majone, 1989; Head, 2010a; Cairney, 2016). The role of 'evidence-informed' analysis and expertise can be important, but is only part of the policy process (Head, 2016).

In democratic systems, public policy debates are focused on the 'problems' that stakeholders claim require greater public attention. Deborah Stone argues that an issue only becomes a public policy 'problem' when

groups demand that action be taken; and when plausible stories are advanced concerning the causes and remedies for the problem (Stone, 1989, p. 299). The agenda-setting aspects of public policy debates are essentially arguments about the nature and urgency of policy problems and how to address them. Scoping the problems, proposing feasible solutions, and mobilising support for priority actions, are three important and closely related dimensions of the policy development process (Crowley et al., 2020; Kingdon, 1995; Majone, 1989). In every jurisdiction, diverse political actors, stakeholders and advocates are continually striving to place their key issues on the policy agenda for further debate and thus the consideration of decision-makers. The types of problems that attract public attention shift over time, depending on changes in leadership, changes in socio-economic conditions, changes in communication technologies, and changes in the design of policy programs and service

The modern policy analysis literature—whether in health, education, criminology or environment—emphasises the importance of problem definitions or perceptions in influencing how policy debates unfold. 'Framing' here refers to how an issue or problem is defined and presented to wider audiences, as part of the process of setting policy agendas and priorities. Problem framing is about how actors attempt to persuade other citizens and decision-makers about the nature and significance of issues under discussion (van Hulst & Yanow, 2016). It is clear that very different stories tend to emerge about the causes and severity of the problems (and therefore the preferred actions to tackle the problems). 'Framing' is about how actors' understandings of problems, contexts and responses are articulated, represented through narratives, and further shaped through interaction (Fischer, 2003, p. 144). Schön and Rein consider framing 'a way of selecting, organising, interpreting and making sense of a complex reality to provide guideposts for knowing, analysing, persuading and acting' (Schön & Rein, 1994, p. 146). Framing is also central for articulating the core values and identities that underlie social movements seeking policy change—for example, those advocating for substantive civil rights and non-discrimination on the basis of gender, religion or ethnicity (Benford & Snow, 2000). Under modern conditions in a democratic society with diverse media channels and technologies available to citizens, the fragmentation of media framings may generate 'preference-based reinforcement' (or group-think) among each of these

media audiences (Cacciatore et al., 2016) rather than generalised impacts across the mass population.

Rittel and Webber argued that problem framing had become more difficult under modern conditions of social pluralism and political communication.

By now we are all beginning to realize that one of the most intractable problems is that of defining problems (of knowing what distinguishes an observed condition from a desired condition) and of locating problems (finding where in the complex causal networks the trouble really lies). In turn, and equally intractable, is the problem of identifying the actions that might effectively narrow the gap between what-is and what-ought-to-be. (Rittel & Webber 1973, p. 159)

The dynamics of problem framing are important for many reasons, including the close connection generally found between how a problem is defined (or 'structured') by stakeholders and the preferred solutions they propose (Dery, 1984; Gusfield, 1989). Peters demonstrates that specific policy 'problems' (such as environmental pollution) emerge under specific political conditions and institutional contexts (Peters, 2005). He shows how the problems are interpreted by various actors in the light of issue histories, the balance of key participants, and their dominant ideologies and interests. The way a problem is framed by stakeholders and decision-makers is strongly correlated with their preferences for specific policy tools (e.g. market-based instruments vs state regulation).

Thus, the way problems are interpreted is closely tied to proposed solutions recommended by various government agencies, business groups and community stakeholders. To take an everyday example, poverty and economic inequality are widely seen as conditions of life in most countries. However, despite apparent agreement that poverty is a 'real' and ongoing problem, there are very different underlying narratives about the causes of poverty, the degree of urgency, and the proposed solutions. If poverty is seen as an individual-centred problem (generated by deficits in personal skills and motivation), the proposed solutions will be oriented towards encouraging individuals to take more responsibility for their unfortunate situation and challenging them to develop their work skills and their 'achievement orientation'. However, if poverty is seen as an enduring structural feature of society (generated by impersonal market forces which primarily benefit wealthy elites), the solutions proposed might be oriented

towards political action to improve employment security and the public funding of social services. In the same way, people enmeshed in long-term unemployment can be seen either as unwilling to grasp opportunities to develop new skills, or alternatively can be seen as the unfortunate victims of structural and technological change.

Debates about the nature and causes of problems provide the foundations for considering policy solutions and governance arrangements. Bacchi argues that the assumptions underlying policy arguments need to be carefully scrutinised. Policy dynamics can best be understood by 'problematising' the assumptions, interests and values underlying each viewpoint, and by identifying the likely impacts of adopting one position rather than another (Bacchi, 2009). Her critical analysis of social policy fields reveals some of the hidden interests and value assumptions embedded in mainstream social policy programs, including youth welfare, drugs policy, immigration, education and equal opportunity.

According to the policy analysis literature, policy debates always include key moments when the nature and scope of problems are intensely disputed and redefined (Dery, 1984). The contest over problem definitions and priorities evolves over time, constituting the contemporary public policy agenda. This agenda-setting process is crucial, because it shapes the selection of issues deemed worthy of attention, the manner in which they are considered, the nature of solutions regarded as feasible and supportable, and ultimately the pattern of winners and losers in various policy fields (Kingdon, 1995; Stone, 2012). Agenda-setting involves the exercise of power and influence, conducted through a contest of ideas and interests. For example, in responding to crises and emergencies, political leaders seek to influence how the media portray the nature of the challenges and how the proposed solutions are publicly defined, in order to avoid blame and to mobilise coalitions of support for particular policy outcomes (Boin et al., 2009).

In filtering out some proposed courses of action and favouring others, framing contests have real impacts on the policy process. A classic example of why problem-framing matters is to consider how the phrase 'sustainable development'—originally a policy framework critical of the status quo—became a mainstream goal endorsed across a wide spectrum. Nevertheless, goals and methods of 'sustainable development' have become interpreted in radically different ways by corporate interests (who promote business profitability and continuous economic growth) and by ecological activists (who regard protection of natural assets as paramount). Thus

the policy debate over how to interpret 'sustainable development' has been bitterly polarised between pro-growth advocates and those seeking to protect environmental values (Dovers & Hussey, 2013; Schandl & Walker, 2017).

Framing of policy problems and solutions occurs in specific contexts, necessarily linked to policy histories and the local array of political and economic stakeholders. For example, the problem of 'gun violence' has been handled in very different ways internationally. Policy diversity regarding gun control has been evident, even within the OECD group of liberal democracies. In a study of three federal countries—the USA, Canada and Australia—Newman and Head (2017b) showed how political and ideological factors led to very different outcomes. In the USA, a coalition of economic and political stakeholders have entrenched a permissive 'gun culture' that allows widespread civil access to weapons. This permissive outcome has been facilitated by an expansive reading of the Second Amendment of the US Constitution, and buttressed through intensive political lobbying by the financially powerful firearms industry. Canada and Australia have been different, despite having had strong rural lobbies advocating for the rights of hunters and sporting shooters. Regulatory controls have been more acceptable in those two countries, and in the case of Australia those controls were significantly tightened through a concerted political and legislative response to mass shootings in 1998. The Australian regulatory approach was recently influential in New Zealand, which suffered a mass shooting in a mosque in 2019 (Every-Palmer et al., 2020). Response to a tragedy can generate diverse policy pathways, dependent on the interplay between actors in various political and institutional contexts and their contest of ideas (Béland & Cox, 2011).

SIMPLE AND COMPLEX PROBLEMS

Some types of policy problems are more simple or straightforward than others. Simple problems are defined exactly or narrowly. Owing to their narrow scope, they are more likely to be managed and resolved with a high level of agreement. In short, simple policy problems tend to be defined precisely by the policy actors and stakeholders. The latter agree on the knowledge base for understanding the problem, relevant technical parameters, cost-effective options and the locus of responsibility and capacity for addressing the problem. These apparently simple policy

issues are unlikely to be overlaid with moral judgements, thus making issue-management more straightforward. The analogy with laboratory experiments is useful—much of science is focused on precise measurement of narrowly specified variables and their observable interaction.

And yet the notion that some policy problems are 'inherently simple' can be misleading, because seeing a problem as simple might be strongly influenced by the availability of widely accepted solutions to manage the problem. Consider the challenges of traffic mobility in a large city. One of the (many) identified problems for improvement might be the high incidence of collisions and related injuries on public roads; thus, the (apparently simple) policy challenge would be to reduce collisions. Several possible solutions to improve road traffic safety have had wide support, ranging from regulatory to engineering approaches. Regulatory solutions with low costs include restrictions on driver behaviour (e.g. licensing tests; ban on use of intoxicants; and specific maximum vehicle speeds designated for various locations). Other regulatory solutions, though with higher costs, include requirements for vehicles to meet safety performance standards. Infrastructure redesign provides decision-makers with other avenues for reducing the incidence of collisions and injuries. For example, the construction of dedicated walkways and bike paths can reduce the co-mingling of pedestrians, cyclists and motor vehicles.

By focusing on one specific aspect of urban transportation (e.g. high incidence of traffic accidents and injuries), policy analysis is likely to focus on various technical solutions for reducing that problem. However, if the urban transportation problem is instead characterised as 'traffic congestion' rather than road injuries, a different range of considerations emerge. Traffic systems engineers will lobby for installing coordinated traffic signalling systems with digitised traffic flow technologies. This optimises existing traffic flow, especially benefiting private drivers. On the other hand, major construction contractors will lobby for building more freeways and bridges, which aim to deliver increased road capacity and connectivity, and create significant employment on major projects. But these supply-side options can be very expensive and, even if successful in reducing congestion in the short term, may soon induce larger volumes of private traffic.

A third way of framing the key policy problems in urban transport is to emphasise the importance of access to affordable and efficient mass transit systems (provided by or heavily subsidised by government authorities). The policy problem is here framed as an historical over-reliance on private vehicles and lack of alternative transport services. On the supply-side of mass transit facilities, provision of new equipment and infrastructure for new services may be expensive and public funding may be constrained. On the demand-side, the main challenge is to provide financial incentives and service improvement incentives for commuters to switch towards mass transit. The above examples all show that a policy field such as urban transport comprises a nested series of simple and complex issues. The focus of debate shifts according to whether the 'problem' demanding attention is seen as safety, travel time or mass transit efficiency. A related series of debates will focus on who pays—e.g. whether government authorities will carry the costs of new investment or whether private citizens will contribute through a user-fee approach to accessing services and infrastructure facilities.

Within the category of complex problems, some are more intractable and controversial, and therefore much more difficult to manage successfully. These intractable problems, described by Rittel and Webber (1973) as 'wicked' problems, are likely to be ongoing and recurrent, rather than being resolvable on the basis of scientific evidence, expert plans and competent project management. Many of these 'big' problems are manifested across different levels or scales—such as institutional complexity, geographical breadth and historical evolution. At the national level, intractable and complex policy problems might include the persistence of domestic or family violence, criminal behaviour, environmental degradation, natural disaster management and effective responses to health pandemics. At the international level, the United Nations formulated 17 Sustainable Development Goals (see https://sustainabledevelopment.un. org/sdgs), all of which qualify as complex and intractable challenges at global scale, including climate change, food security, water and energy security, biodiversity protection, gender equality, and peaceful resolution of major disputes. These problems typically provoke divergent views about the nature of each problem, responsibilities for addressing the problem, and the design and funding of policy responses.

As noted previously, a common policy problem is the persistence of poverty. Its complex, contested and ubiquitous nature implies that it takes many forms and has many causes. Hence, no single policy lever can 'fix' the problem, even in those rare situations where governmental and community leaders wish to take strong action. As many analysts have noted:

Poverty is a systemic problem. It has hundreds of mutually reinforcing causes. No central authority, top-heavy investment committee, or cadre of policy makers —however brilliant — will ever be able to comprehensively address poverty's causes or fully redress its innumerable consequences. (Wood & Hamel, 2002)

Many modern policy issues have these systemic qualities. There are important interconnections across issues and across institutional processes. This high level of interdependence means that changes in one part of the system may have unpredictable effects elsewhere.

Understanding complex issues is hard work, and few leaders have an interest in investing in the required knowledge base. Leadership is about direction-setting, sense-making and selling a compelling narrative to supporters. In recent years, some of these leadership narratives have been strongly influenced by populist appeals and identity politics, which have intensified the polarisation of views about the nature of policy problems and how to address them. For example, the mass influx of refugees from the Middle East and Africa into Europe in the last two decades (Murray & Longo, 2018), the strident concerns of the Trump administration about Mexicans entering the USA, and the immigration controls debated in the Brexit plebiscite (King, 2021), have drawn attention to the polarisation of views about the nature of complex social problems and appropriate ways to resolve such problems. Mass migration movements are generally interpreted as security threats, and cultural challenges, as well as a fiscal burden for receiving countries. Alternatively, refugee and civil rights groups see the challenge as a humanitarian crisis for the victims of civil war or political persecution. Christine Boswell also points to shifts in the policy frames over time, in response to changing external contexts. Thus, in relation to policies and administrative practices in the UK for 'processing' displaced people who are seeking asylum or refugee status, she notes that refugees have at various times been positively welcomed as tragic victims of oppressive political regimes, while at other times they have been demonised as illegal immigrants who should be separated from civil society in remote locations (Boswell, 2009).

Another complex and contested problem area is global warming and climate policy responses (a matter discussed further in Chapter 4). Despite a high degree of scientific consensus about the bio-physical causes and the systemic effects of global warming, the range of stakeholder perspectives is exceptionally large. At one end of the spectrum is the conspiratorial

proposition that global warming problems are not real but have been fabricated by the enemies of economic prosperity. But even among the majority who accept that climate challenges are real, there are serious differences concerning the desirable scope and pace of policy reform. Some believe that rapid and transformative policy changes are necessary, while others support incremental policy adjustment. Some believe that global reductions in greenhouse gas emissions must be the primary goal, while others are more concerned about managing natural disasters and adapting to climate variability. Some have faith that technology will facilitate all the necessary solutions, e.g. renewable energy and drought-resistant crops; whereas others are concerned that protection of biodiversity and ecological assets must be given high priority.

It is not surprising that key concepts and their associated values (e.g. democracy, freedom, equity, social justice, equality, well-being) are often framed in different ways. There is an extensive literature on why some concepts are inherently contentious or disputed. Gallie (1956) argued that some concepts are 'essentially contested', owing to their breadth, their ambiguity and their normative implications. Value differences underlie many disputes about concepts, goals and problems—these are inherent in modern pluralistic societies and thus in democratic debates about public policy (Collier et al., 2006; Mason, 1990). These differences highlight the importance of problem 'framing' in policy debates.

Knowledge and Expertise for Policy Improvement

The role of expertise in policymaking, and its potential to overcome major differences among stakeholder perspectives, has been much discussed. The rational-optimist approach to valuing the role of expertise has emphasised the potential contribution of rigorous research-based knowledge in the policy sciences. Given the proven reliability of technical knowledge in tackling engineering and medical problems, advocates of evidence-based policymaking have anticipated that a similar approach could be successfully adapted for problem-solving in the social and economic policy sciences (Rivlin, 1971). This rational-optimist view suggests that reliable knowledge about human behaviour and institutions can improve our collective understanding of complex social problems, clarify the likely effectiveness of potential interventions and thus reduce stakeholder disagreements and achieve better policy outcomes. Indeed, there are many examples of substantial incorporation of rigorous evidence

into decision-making processes, and with measurable benefits for social policy program (Boaz et al., 2019; Head, 2010a, 2016; Haskins & Margolis, 2014; Nutley et al., 2007). There have been many attempts to institutionalise closer links between evidence-producers and decision-makers. In some government agencies and legislative assemblies, processes have been established to enhance interaction between decision-makers, service delivery managers, technical experts and social researchers. Institutional venues that have been established to consider expert advice (from researchers, stakeholders and practitioners) include ad-hoc public inquiries on complex or controversial topics; together with more enduring advisory committees that provide regular advice on technical issues (Owens, 2012; Crowley & Head, 2017b). Since the 1980s there have been major investments in building more systematic information systems and drawing upon expert knowledge to advance the 'problem-solving' approach to policy improvement.

However, the policymaking process is highly political, and the full range of expertise can easily be overlooked or ignored. The dynamics of each policy field are different. Processes and outcomes are shaped by many factors—the power of stakeholder networks, the embedded preferences of decision-makers, the extent of media scrutiny, the confidentiality of information and the specific ways in which varieties of expertise are accessed. For example, during the COVID-19 pandemic which confronted every country in 2020-2021, the 'problem' faced by policy-makers—how to control a dangerous infectious disease—was ostensibly similar. However, the responses of government leaders, and their reliance on expert advice, varied widely internationally, with some demonstrating reckless indifference (Baldwin, 2021, p. 3). Important forms of expert information and advice accessed by leaders ranged from medical advice about methods for controlling and treating the disease, testing and monitoring systems, information about vulnerable social groups, procurement and transportation of vital supplies and various scenarios concerning the economic effects of restricted social mobility. The reliability of available information and the coherence of expert advice varied greatly. This variability was partly due to data quality issues—linked to previous investment in information systems—and partly due to political judgements about the urgency of the public health challenge and the contentious trade-off between preserving lives and protecting economic livelihoods. Different stakeholder groups harnessed their concerns to different elements of this sweeping policy agenda. In the liberal-democratic countries (but not in centralist-authoritarian countries), this debate about public health and economic recovery was played out in the glare of media attention and competing agendas about the public interest.

By contrast, in matters of foreign policy or defence policy, the secretive processes and lack of public debate can sometimes lead to rapid decisions guided as much by emotion and loyalty as by evidence. One well-known example is the process by which the US and UK governments were drawn into military action against Iraq in 2003. Subsequent analyses of the US and UK decision-making have demonstrated the key role of political advisers and intelligence services in filtering information about critical issues such as the existence of weapons of mass destruction (WMD). Moreover, having commenced a strategy of military occupation, and found no evidence of WMD, the policy goals were adapted in accordance with evolving interpretations of the strategic and operational context of governance in Iraq (Jamieson, 2007; Thomas, 2017).

CONCLUDING COMMENTS

The central importance of policy framing and reframing is widely understood by policy practitioners themselves. Leaders, advocates and managers in each policy field understand the vital importance of persuasive narratives, whether for initiating or resisting policy reform. Policy narratives may refer to 'the facts' or the 'realities' of the situation, but they are fundamentally anchored in appeals to certain values and identities (Mols, 2012). Among the 'tools of government', persuasion is seen as the most economical and cost-effective (Bell et al., 2010).

For policy analysts and scholars, understanding how policy 'problems' are conceptualised, prioritised and contested provides a solid platform for understanding the dynamics of policy debate, decision-making and policy change. This insight applies at all levels, from the micro and local levels through to the macro and international levels. The way in which policy problems are defined and scoped is central to political and ideological debates (Dery, 1984; Gusfield, 1989; Hoppe, 2010; Peters, 2005). Gathering or mobilising relevant evidence in a selective way to support a preferred policy stance is also important but is a secondary consideration for many practitioners.

The definition of a policy problem—its nature, scope and causation—is not self-evident; indeed, research about 'problem framing' has highlighted the need for de-mystification of political rhetoric and partisan

claims. The analysis of problem framing is essentially about problematising how policy problems are defined, debated and acted upon (Bacchi, 2009; Fischer, 2003; Schön & Rein, 1994). The analysis of how policy actors frame problems allows scholars to gain a closer understanding of the effects produced by different ways of framing policy issues, and understanding whose interests underlie particular framings. By interrogating or questioning the common-sense meanings and values that are embedded in claims about policy problems and solutions, it is possible for analysts and scholars to clarify and reveal the underlying interests, ideological positions and cultural assumptions. These insights are fundamental for understanding the 'wicked problems' analysis offered by Rittel and Webber (1973).

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CHAPTER 2

The Rise of 'Wicked Problems'—Uncertainty, Complexity and Divergence

Abstract Rittel and Webber argued that scientific and technocratic approaches for tackling the difficult issues of social policy and urban planning were bound to be inadequate. A 'scientific' approach to understanding the nature of these problems necessarily overlooks the significance of different stakeholder perspectives in the framing or constituting of social problems. Recognising these differences is thus crucial for developing acceptable solutions to the policy challenges. Science and engineering approaches produce reliable knowledge but are appropriate only for technical issues where the key variables are measurable, and optimal solutions can be agreed. These are the 'tame' or 'benign' problems, with clear boundaries and agreed solutions. By contrast, modern social problems are 'wicked' problems, because stakeholders disagree about the nature of these problems, about possible solutions, and about the values or principles that should guide improvements. Hence, policies addressing social problems can never be optimal in the engineering sense, but robust policies could incorporate insights from stakeholder engagement. With the growing popularity of 'wicked' terminology, recent scholarly analysts have worried it has become a catchword rather than a critical concept. They have also wished to reconsider the stark contrast between 'tame' and 'wicked' problems, calling for refinement of the 'either/or' dichotomy. And other writers have raised epistemological issues about the respective contributions of scientific, political and stakeholder knowledge for understanding and resolving difficult issues.

Keywords Policy controversies \cdot Tame problems \cdot Wicked problems \cdot Scientific methods \cdot Rational problem-solving \cdot Stakeholder engagement

INTRODUCTION

Horst Rittel and Mel Webber's paper 'Dilemmas in a general theory of planning' (1973) introduced the core concept of 'wicked problems' to a wide audience of academics and practitioners. This chapter considers the development of their concept, in the context of the 1960s and 1970s literature on policy and planning. The later sections note the subsequent debates about the enduring legacy of the concepts championed by Rittel and Webber, the influence of their approach on policy analysis and policy governance, and some recent criticisms and perceived limitations of their framework. More nuanced approaches to understanding and managing intractable issues are emerging.

The concept of 'wicked problems' has now entered the mainstream lexicon of policy discussion. However it took many years to achieve such widespread attention. The term 'wicked problems' did not feature in 1973 in either the title or the key words listed in their paper. Indeed, the term itself was not closely analysed or widely cited for more than two decades. After a slow start, the term gradually became more widely known, perhaps driven by emerging concerns with complex, interconnected and contested problems such as social equity and environmental sustainability. The phrase also had to overcome a common mis-perception that 'wicked' problems must be about ethical choices and moral values, whereas in actuality they were about unruly and intractable problems:

As you will see, we are calling them 'wicked' not because these properties are themselves ethically deplorable. We use the term 'wicked' in a meaning akin to that of 'malignant' (in contrast to 'benign') or 'vicious' (like a circle) or 'tricky' (like a leprechaun) or 'aggressive' (like a lion, in contrast to the docility of a lamb). We do not mean to personify these properties of social systems by implying malicious intent. (Rittel & Webber, 1973, p. 160)

Thirty years later the article was gradually being cited at an accelerating pace, achieving over 100 annual citations (Scopus metrics) for the first

time in 2008; and this growth pattern has continued with well over 500 annual citations in recent years. It became the most highly cited paper in *Policy Sciences*, and by 2021 had achieved over 7000 citations in academic journals (Scopus) and over 17,000 citations in the broader database of Google Scholar. The terminology has attracted a wide cross-disciplinary uptake spanning a broad range of social sciences, especially in environment and sustainability, systems and design, public policy, social policy and urban planning (citations in http://citations.springer.com/item?doi=10.1007/BF01405730&years=). Some critics thought it had become a fashionable or faddish concept, but devoid of precise meaning. Perhaps 'wicked' must inevitably lose its lustre, as often occurs in the 'hype cycle' of optimism and disillusion identified in the literature on innovation (Fenn & Raskino, 2008)?

The origins of this 1973 paper, and its links to the academic debates of the late 1960s, have been sketched in several reflections published by the colleagues and students of Rittel and Webber. It is clear that Horst Rittel (1930–1990) was the principal architect of the 'wicked problem' conceptualisation (Churchman, 1967; Crowley & Head, 2017a; Protzen & Harris, 2010). A professor of design studies at the Institute of Urban and Regional Development, University of California, Berkeley, Rittel had arrived in the USA in 1963 from a career in Germany, and he maintained close affiliations with Stuttgart and other German universities. While teaching design and architecture, he also had broader interests in planning, engineering and policymaking. As a 'design planner' and team leader, he intuitively linked the fields of design and politics, using methods that drew attention to the politics of design and the processes of political argumentation needed to manage wicked problems (Rith & Dubberly, 2007).

Rittel first proposed the notion of wicked problems in a public seminar in 1967, describing wicked problems as 'that class of social system problems which are ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing' (Churchman, 1967, B-141). He presented these ideas to students and colleagues in various courses and seminar presentations, including a key paper to the Panel on Policy Sciences at the American Association for the Advancement of Sciences (AAAS) in December 1969, and again in Norway in 1971. He published an important paper in German on planning crises, design methods and wicked problems in 1972 (Rittel,

1972), soon to be followed by the classic co-authored paper in *Policy Sciences* (Rittel & Webber, 1973). Melvin M. Webber (1920–2006) was a fellow professor at the University of California, Berkeley. Mel Webber had participated in the 1967 seminar, and contributed to the 1969 AAAS conference paper. According to Skaburskis, Webber spent years trying to nudge Rittel into publishing the wicked problems paper in a US journal, leading eventually to finalising the classic article in 1973 (Skaburskis, 2008, p. 277). For a list of Rittel's writings, see Rith et al. (2007).

Webber had independently concluded that rationality was a comforting myth of scholars and practitioners in the planning profession. As he wrote in two later papers:

The attractiveness of the idea of scientific planning has been hard to resist, for it has held out the promise of right answers, of revealing what we should want, and of saying what we need to do. It seduces with the prospect of certainty, and thus with the prospect of relief from the discomforts of ambiguity and of having to decide things in the face of conflicting evidence and competing wants. (Webber, 1978, p. 152)

The classical model of rational planning is fundamentally flawed. It assumes widespread consensus on goals, causal theory sufficiently developed as to permit prediction, and effective instrumental knowledge. None of these conditions pertains...[Central planning should constrain itself]... to constituting the rules for deciding and to promoting open debate. (Webber, 1983, p. 89)

In the late 1950s and early 1960s Rittel had initially joined in developing and refining the orthodox rational approach to design and planning methods utilising a rigorous, scientific, systems-based approach. However, by the late 1960s, he had shifted towards a 'second generation' design approach based on social networks, communication and feedback processes (Protzen & Harris, 2010; Rith & Dubberly, 2007). The turbulent US socio-political context of the early 1970s caused many commentators to reflect on the fundamental contradiction between the achievements of technological systems (where rationality, order and control had allowed NASA to put a man on the moon) and the evident social complexities and policy chaos of the USA in the face of relentless social challenges (Nelson, 1974; Wildavsky, 1973). These dilemmas and paradoxes informed the knowledge framework for wicked problems analysis.

The seminar at which Rittel proposed the notion of wicked problems was organised by systems theorist West Churchman (1967), who at that time was exploring ways to transfer any 'lessons' from space technology program management into the contrasting 'world of urban problems' (Skaburskis, 2008, p. 277). Rittel had listed ten differences between scientific and social problems in his 1967 seminar. With minor adjustments these formed the framework for the complex definition of wicked problems in 'Dilemmas in a general theory of planning'. The *Abstract* of the 1973 article announces their core arguments:

The search for scientific bases for confronting problems of social policy is bound to fail, because of the nature of these problems. They are 'wicked' problems, whereas science has developed to deal with 'tame' problems. Policy problems cannot be definitively described. Moreover, in a pluralistic society there is nothing like the undisputable public good; there is no objective definition of equity; policies that respond to social problems cannot be meaningfully correct or false; and it makes no sense to talk about 'optimal solutions' to social problems unless severe qualifications are imposed first. Even worse, there are no 'solutions' in the sense of definitive and objective answers. (Rittel & Webber, 1973, p. 155)

Rittel and Webber became well known for developing these distinctions between significant social problems—especially 'wicked' problems characterised by differences in values and perspectives—and more technical problems (typified by contemporary challenges in engineering, operations research and computational science). Whereas wicked problems could only be advanced through stakeholder engagement, technical problems ('tame' or 'benign' problems) could in most cases be solved by relying on existing forms of knowledge such as the operating logics of engineering and computation. Although Rittel and Webber made contributions to a richer form of systems theory, by emphasising social complexity and social interconnections, their primary intellectual legacy rested upon their characterisation of wicked problems as confounding the rational approach to problem-solving and social improvement.

DILEMMAS IN A GENERAL THEORY OF PLANNING

Rittel and Webber rejected the suitability of rational-systems (data analysis) approaches to policy development, arguing instead that all the professions concerned with social analysis and planning should focus on

understanding the aspirations and values of the people rather than developing expert-led comprehensive plans. A reconsideration of the fundamentals of policy and planning theory and practice had been prompted in the 1960s and 1970s by widespread sources of social dissent—especially the many protest movements that radically disrupted America and Europe. In criticising the rational planning approach, Rittel and Webber argued that:

the classical paradigm of science and engineering - the paradigm that has underlain modern professionalism - is not applicable to the problems of open societal systems..... The kinds of problems that planners deal with – societal problems – are inherently different from the problems that scientists and perhaps some classes of engineers deal with. Planning problems are inherently wicked. (Rittel & Webber, 1973, p. 160)

While rational-systems theory had been useful as an analytic approach in the 1950s and 1960s, it was clear to Rittel and Webber that analysis should be broadened to account for diverse 'systemic networks' that are 'interacting, open' and 'interconnected' (1973, pp. 156-159). They argued that social problems cannot be successfully addressed by following a traditional computational-engineering approach which assumes that social problems can be defined, dissected and solved as if they were 'tame' and 'benign'. Wicked problems, which include 'nearly all public policy issues' (1973, p. 160), are indeed the opposite of being precise and manageable. They are 'ill-defined' and 'malignant'. They cannot be definitively 'solved'. Instead, they are dependent on 'elusive political judgment for resolution...over and over again' (1973, p. 160). Furthermore, social upheavals reflect the politicisation of numerous 'subpublics' that pursue 'a diversity of goals' inspired by different 'valuative bases', thereby representing a shift away from a unitary conception of the 'American way of life' towards 'numerous ways of life that are also American' (1973, pp. 156, 167-168).

They summed up the distinctive features of wicked problems in ten propositions (see Box).

Wicked Problems Defined

Proposition 1. There is no definitive formulation of a wicked problem.

Proposition 2. Wicked problems have no stopping rule.

Proposition 3. Solutions to wicked problems are not true-or-false, but good-or-bad.

Proposition 4. There is no immediate and no ultimate test of a solution to a wicked problem.

Proposition 5. Every solution to a wicked problem is a 'one-shot operation'; because there is no opportunity to learn by trial-and-error, every attempt counts significantly.

Proposition 6. Wicked problems do not have an enumerable (or exhaustively desirable) set of potential solutions, nor is there a well-described set of permissible operations that may be incorporated into the plan.

Proposition 7. Every wicked problem is essentially unique.

Proposition 8. Every wicked problem can be considered to be a symptom of another problem.

Proposition 9. The existence of a discrepancy representing a wicked problem can be explained in numerous ways. The choice of explanation determines the nature of the problem's resolution.

Proposition 10. The planner has no right to be wrong.

(Rittel & Webber, 1973, pp. 161–167).

This framework has much to say about the deficiencies of the orthodox 'scientific' approach of previous generations and has less to say about alternative methods for addressing wicked problems. They identified the 'dilemmas' and paradoxes of scientific social planning but they had few recommendations about alternative ways to manage and reconcile social complexities and political diversity. It is clear, however, that the fundamental principle is to recognise plural perspectives and to work with this pluralism rather than suppress it. Pluralism is seen as an inherent feature of modern societies, and as a positive feature to be celebrated (Webber, 1978, 1983; Rittel & Webber, 1973) rather than an inconvenience to be suppressed through technocracy and scientistic decision-making.

In rejecting 'rational' expert planning, they emphasised the need to support processes 'fostering...multiplicities of potential outcomes compatible with the wants of plural publics' (Webber, 1983, p. 89). Fischer adds that since the 1960s the technocratic version of social planning and policy analysis, which sought to imitate the physical sciences, had become more oriented to 'the principles of prediction and control

of behavior rather than the values of human dignity, critical reflection, and democratic participation' (Fischer, 1990, p. 345). Schön argued that the distinction between means and ends is fundamental for understanding these different orientations. Decision-making is quite different when values and objectives are in dispute. Schön noted that 'technical rationality' assumes there is agreement on clear goals and ends. In that case, decision-making can treat the problem as an 'instrumental' choice about methods or means to achieve the agreed ends.

But when ends are confusing or conflicting, there is as yet no 'problem' to solve. A conflict of ends cannot be resolved by the use of techniques derived from applied research. (Schön, 1983, p. 41)

As understood by the students and colleagues of Rittel and Webber, the process of 'argumentation' they advocated came to be seen as the main method for managing wicked problems (Rith & Dubberly, 2007, p. 73). Having rejected the more technocratic versions of planning and policymaking, the alternative was stakeholder engagement and dialogue. In short, policy argumentation, through inclusive and trustworthy processes of democratic debate and stakeholder dialogue, seemed the most appropriate way to overcome unproductive dissension and to improve policy outcomes. Webber (1983) argued that 'decentralised' decision-making that is 'pluralistic and responsive' is more likely to produce 'acceptable outcomes' and to permit adaptations to change (Webber, 1983, p. 99). This approach was consistent with the frameworks developed through the 1980s and 1990s by the advocates of participatory policymaking and planning, civic engagement and conflict resolution (e.g. Forester, 1993; Fischer, 1993; Schön & Rein, 1994; Innes, 1995; Healey, 1997, part 3; Conklin, 2006; Innes & Booher, 2010). In recent years, with the development of more sophisticated artificial intelligence systems, planning practitioners have begun experimenting with techniques which can combine participatory discussion of scenarios with digital learning system techniques, thus integrating the benefits of stakeholder inclusion and information science (Geertman & Stilwell, 2020).

THE DIFFUSION OF THE CONCEPT

Recent research on policy framing and agenda-setting has confirmed there is a wide spectrum of policy challenges. At one end, some relatively straightforward issues can be defined and understood with reasonable clarity, and can be resolved with a reasonable level of agreement. Much of

the literature of the late 1960s and early 1970s took computational logic as a yardstick for judging whether problems were well-specified (Simon, 1973). Under those criteria, some problems were seen as 'ill-structured'. Rittel and Webber, and many other authors, rejected this simple logic-based and rule-based approach to problem structuring in order to focus on the human dimension of entangled and ambiguous problems.

The proposition that some policy problems can be seen as relatively straightforward ('tame'), while others can be seen as inherently intractable ('wicked'), proved to be very attractive. Many authors concerned to tackle tough problems developed similar conceptions, but often used such synonyms as 'unstructured' or 'contested' or 'unruly' or 'fuzzy' problems. Many took up the challenge of analysing problems whose features and connections were 'messy' or 'turbulent' (Ackoff, 1974; Ansell et al., 2016; Horn & Weber, 2007; Mason & Mitroff, 1981; Ney, 2009; Roe, 2013). Gradually, the language of 'wicked' problems accelerated markedly, as shown by the massive increase in citations of Rittel and Webber's paper. Fischer (1993), one of the first analysts to apply the wicked problem concept, arguing that 'wicked' or 'intractable' problems 'seem only to respond to increased doses of participation' (p. 172). Fischer aligned wicked problems with 'recalcitrant', 'undisciplined', 'uncontrollable' and 'unmanageable' problems (p. 175), and he suggested that collaborative inquiry involving both citizens and experts could hold the key to resolving contemporary policy problems.

There is now a lively scholarly debate about whether the wide diffusion of the concept of wicked problems has made it compelling and persuasive, across a broad sweep of disciplines—economic, social, health and environment. The alternative view, discussed in a later section of this chapter, is that the uncritical usage and generalisation of the concept has undermined its analytical value (Peters, 2017), and that more precise conceptual distinctions are needed. Indeed, wicked problems have been identified and described across a vast range of disciplines and policy domains (business, cybernetics, ecology, agriculture, urban design, energy, transportation, health, socio-economic sciences and political-administrative sciences). In the field of management studies, and business strategy in particular, a vast literature continues to explore how business leaders develop strategies for successfully navigating risk and uncertainty (Cunha & Cunha, 2006; Power, 2007; Raynor, 2007; Stacey, 1992). Here, the language of wicked problems has provided a way for leaders to

make sense of rapid changes, disruptive conditions and divergent perspectives, by reflecting on adaptive management scenarios, supported by good information and strong networks:

Wicked problems often crop up when organizations have to face constant change or unprecedented challenges. They occur in a social context; the greater the disagreement among stakeholders, the more wicked the problem. In fact, it is the social complexity of wicked problems as much as their technical difficulties that make them tough to manage. (Camillus, 2008, p. 100)

By the 2000s, the 'wicked' context of contemporary social problems was becoming widely acknowledged and appreciated. Constructivist interpretations on problem framing and policy strategies had become well established in the literature (e.g. Hajer & Wagenaar, 2003), paving the way for a new wave of reflective analysis that remains increasingly important today. The debate has intensified between those favouring scientific quantification and those anchored in more contextualist analysis that takes seriously the frames and narratives of stakeholders. As one of the leading critics of scientism has suggested, it is important to develop 'a social science which effectively deals with public deliberation and praxis, rather than being stranded with a social science that vainly attempts to emulate natural science' (Flyvbjerg, 2001, p. 129).

LINKING PROBLEM TYPES AND POLICY RESPONSES

How do the important differences in types of problems impact on the design challenge for developing more effective policy and governance arrangements? Scholars in the policy sciences have developed several typologies for analysing the different dynamics of various policy challenges. Most of these typologies distinguish between various policy actors, their power and resources, specific policy issues within broader policy fields, the choice of relevant policy instruments, different venues for deliberation, and so forth.

Some of this literature has emerged from a practitioner-oriented setting, rather than a technical-experts inquiry process. For example, analysis of problem situations and developing action responses is a common focus of multi-stakeholder workshops facilitated by management consultants; similarly, management education courses on strategic

problem-solving often examine case studies and scenarios which challenge practitioners to analyse the underlying issues and design appropriate responses. Two of the best known approaches were developed independently in the Harvard Kennedy School by Ronald Heifetz (1994) and by Mark Moore (1995).

Heifetz proposed that three types of problem situations need to be distinguished. (1) In situations when the nature of the problem and the nature of the solution are both agreed by relevant actors, the work of policy implementation and oversight can be left with the professional managers and relevant holders of expert knowledge. (2) In situations when the nature of the problem is widely agreed but there is uncertainty about the appropriate solution, a wider circle of stakeholders and experts need to be involved to identify effective practical actions and provisional solutions, while allowing for further revision and adaptation as collective learning increases over time. (3) Where both the nature of the problem and the appropriate policy response are uncertain, there needs to be a highly adaptive ongoing approach to clarifying uncertainties, with strong reliance on feedback and continuous discussion among stakeholders and knowledge experts to improve outcomes (Heifetz, 1994, chap. 4). On the other hand, Mark Moore developed executive education courses which encouraged public managers to consider more open and creative processes for developing policy improvement options. Such options should be developed in conjunction with stakeholders and political leaders. The capacity to create 'public value' through such developmental exercises depended on three considerations. Firstly, public managers and leaders should ensure that policy proposals are seen as 'valuable' (that is, solving a problem effectively and efficiently in the public interest). Secondly, the reform proposals need to be seen as authorised by relevant authorities and consistent with public governance standards. Thirdly, the proposals should be feasible and practicable—that is, within the implementation capacities and resources of public agencies and their partners (Moore, 1995).

When such distinctions are applied to complex and controversial problems and policy responses, these approaches can be summarised as in Table 2.1 which maps three levels of stakeholder complexity against three types of problem complexity.

Thus, rather than persist with the 10-point frame in Rittel and Webber (1973), the more recent literature reviewing wicked problems analysis suggests some broad themes for analysing the distinctive features of

Table 2.1	Typology	of problems
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	Actors willing to cooperate or avoid conflict	Multiple actors each with relevant useful knowledge	Multiple actors with conflicting values and interests
Both problem and solution known	Tame problem	Communicatively complex problem	Politically complex problem
Problem known, solution not known	Analytically complex problem	Complex problem	Wicked problem
Neither problem nor solution known	Cognitively complex problem	Wicked problem	Very wicked problem

Source adapted from Head and Alford (2008, p. 10); for a more detailed account see Alford and Head (2017, pp. 405–406)

'wickedness' or intractability, including levels of agreement about the nature of the problem and about relevant knowledge for improvement. For example, Head (2008) defined wicked problems as those issues featuring high levels of complexity, uncertainty and divergence. This acknowledges that multiple stakeholders are engaged with these issues with varied institutional roles, knowledge levels, expectations, personal interests, values and ideologies, resulting in conflicts and contradictions in preferred solutions. To the extent that robust solutions emerge from their debates, these solutions are likely to be only 'good enough', not comprehensive and enduring. Long-term monitoring and evaluation are needed to assess their impacts and improve effectiveness; while poor choices and underperformance can only exacerbate the problem (Head, 2008; see also APSC, 2007; Head & Alford, 2015; Danken et al., 2016; Lönngren & van Poeck, 2021).

Social, economic and political factors are all important in explaining why complex and contested problems are poorly formulated or misaligned. In conceptualising wicked problems as the convergence of uncertainty, complexity and value divergence, Head suggests that failures to adequately respond to wicked problems may be due to several factors, such as:

- the 'problems' are poorly identified and scoped
- the problems themselves may be constantly changing

- solutions may be addressing the symptoms instead of the underlying causes
- people may disagree so strongly that many solution-options are unworkable
- the knowledge base required for effective implementation may be weak, fragmented or contested
- some solutions may depend on achieving major shifts in attitudes and behaviours; however, such shifts may be too difficult owing to lack of incentives or points of leverage (Head, 2008, p. 106).

Arguments for a Sliding Scale—Degrees of Intractability

An important debate centres on whether the original distinction between tame and wicked problems is analytically robust. The dichotomy between tame and wicked can become exaggerated and misleading. Critics have commented that the tame/wicked conception has set up a binary choice that is dichotomous. An alternative argument, in contrast to the binary choice of wicked *or* tame problems, is that the wicked characteristics (complexity, uncertainty and value divergence) can be more-or-less intensive, and that in combination these three characteristics can produce extremely turbulent, intractable and unmanageable policy challenges. In principle, issues can be mapped in terms of low-medium-high levels of complexity, uncertainty and divergence (Head, 2008, p.103; see also Alford & Head, 2017; Newman & Head, 2017a) (and see Fig. 2.1 below).

Instead of the sharp contrast implied by the tame/wicked distinction, there is a case for making the wicked problems framework more nuanced and useful. It is more realistic to propose 'a continuum upon which all problems can be based, scientific and design alike' (Farrell & Hooker, 2013, p. 701). Taking this approach, problem analysis could be based on 'degrees' of wickedness, or 'tendencies' towards wickedness (Daviter, 2017; Head, 2008). Alford and Head (2017, p. 407) proposed a 'contingency' approach which recognises that complex problems vary in the extent of their 'wickedness'. The key dimensions include the cognitive complexity of the problem (the incomplete and contested knowledge base) and the diversity or perhaps irreconcilability of the values and

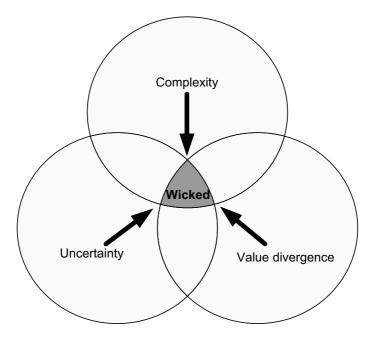


Fig. 2.1 Complexity uncertainty and value divergence dimensions (*Source* Head, 2008, p. 104; 2010b, p. 22)

perspectives of key stakeholders and institutional agencies. This contingency approach is arguably consistent with Rittel and Webber's notion that each problem is unique—owing to the different problem situations or configurations that can emerge across time and place. This approach is also consistent with a focus on analysing how leaders and stakeholders may develop more congruent understandings of a policy problem and consider pathways for improvement. Newman and Head (2017, p. 416) argue in similar fashion that variations in stakeholder perceptions and in their capacity for cooperation give rise to different dynamics in how issues are handled. Therefore the 'tendencies' towards wicked intractability are shaped by actors' behaviour in specific situations as well as shaped by their underlying interests. Standardised solutions cannot deal with the underlying complexities and differences. To the extent that specific types of complexity and diversity can be identified and appreciated, it becomes

more feasible to apply specific forms of intervention (or non-intervention) to different parts of the problem.

Hoppe and colleagues, however, argue that introducing a sliding scale does not 'save' the concept, and does not remedy the fundamental defect in the concept itself. Hoppe urges scholars to abandon the concept of wicked problems, arguing that the political behaviour of actors is the key variable affecting intractability rather than intractability being a feature of the problem itself. Well-structured problems reflect a higher level of consensus about values and information (Hisschemöller & Hoppe, 1995, p. 44). Drawing on the public policy literature, Hoppe (2010) distinguishes between 'unstructured' problems (which are low on knowledge certainty and low on alignment of values and norms) and 'structured' problems where there is higher knowledge certainty and higher agreement on norms and values (Hoppe, 2010, pp. 72-77). Tackling policy problems is likely to be much more straightforward in the second instance, and the political process should be about shifting problems towards more structured or manageable forms. Hoppe suggests that the core focus for managing difficult or intractable problems should be on the politics of inclusion and the methods for overcoming partisan distance or gridlock. Policies can be improved through democratic debate leading to iterative and partial solutions (albeit not comprehensive and enduring solutions). Turnbull and Hoppe argue that practitioners can seek to mediate differences and address the policy puzzles through a series of discussions to explore various 'sub-questions' that lead to partial 'answers' (Turnbull & Hoppe, 2019, p. 315). The key question then becomes whether stakeholder engagement processes are effective in fostering improved levels of mutual learning and better integration of competing representations of the problem (Hoppe, 2010, p. 27).

In conclusion, it would be widely agreed that identifying suitable policy processes to address 'wicked' problems has become the most important challenge for public governance in the modern era. Rittel and Webber criticised the tendency for policy and planning professionals to reframe policy problems as 'tame' and manageable—as in a game of chess where goals and rules are well-defined, and where solutions can be achieved through applying established knowledge and deductive reasoning. Rittel and Webber accepted that data, logic and expertise were useful and essential, but these were seen as insufficient for understanding wicked problems that are contested by stakeholders. They argued that improvements could only be achieved through participatory engagement processes which recognised the multiple values co-existing in a pluralist society.

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CHAPTER 3

Political Governance of Wicked Problems

Abstract When difficult problems arise in a democratic political system, government leaders have a range of possible responses. This chapter suggests a repertoire or classification of typical responses that can be observed in practice. On some occasions, leaders retreat into various forms of avoidance, denial or symbolic reassurance. Where difficult problems and urgent threats continue to attract significant attention and public debate, several other strategies are found. When the challenges are portrayed as national security threats, policy responses typically involve centrally imposed executive decisions. However, for many difficult social problems, the standard processes for policy development usually work towards incremental adjustments, informed by the contributions of stakeholders, managers and experts. For large emerging issues with high levels of uncertainty, ongoing engagement with diverse stakeholders is valuable for articulating different perspectives, sharing information, and seeking closer agreement on goals, strategies and cooperative action.

Keywords Policy design · Governability · Problem denial · Incrementalism · Risk and uncertainty · Prevention policies · Expertise · Collaboration

Introduction

This chapter examines the approaches and strategies actually used by democratic governments in managing policy challenges and responding to complex and contested issues. Wicked problems are managed politically. Leaders may choose to avoid or downplay the tough issues, or they may redefine the issues to align with their existing agendas, and impose their own solutions. They may choose to take relatively familiar pathways of policy adjustment or, alternatively, seek new ways to tackle uncertainties and manage conflicts. The capacity of government leaders to achieve long-term improvement in a policy field depends on the quality of leadership, the capacity for stakeholder collaboration, the capacity to identify effective options and policy strategies, the availability of core skills and resources and the overall governance capacities of the system (Howlett, Ramesh & Wu, 2015).

The public policy literature has long speculated that some problems are too massive to be 'tamed' by government interventions and too broadranging and dynamic to be fully understood by scientific research. The debates of the 1970s about 'big' or 'overloaded' government in western democracies (King, 1975; Parsons, 1982) reflected neo-conservative demands to reverse the growth in government spending and halt policy 'over-reach'. The neo-conservatives wanted to lower public expectations and reduce governmental ambitions to resolve enduring problems (such as inequalities and social unrest). Instead, governments should 'go back to basics', reduce the taxation burden of welfare state programs, and increasingly rely on non-state partners to address ongoing socio-economic concerns.

The public policy literature also highlighted the likelihood that governments will sometimes make incompetent or myopic policy choices (Hogwood & Peters, 1985), resulting in policy interventions that are not only ineffective but that might worsen the initial problems (King & Crewe, 2014). In other words, in some cases the policy 'cure' could be worse than the 'disease' (Logan & Preble, 2008; Sieber, 1981). Moreover, it is possible that a well-defined problem that is not inherently wicked might be drawn into wider intractable problem areas (a case of 'wicked by design') because political actors want to use the well-defined problem as 'a surrogate to debate larger and more controversial problems' (Nie, 2003, p. 314).

This chapter outlines the main policy governance strategies actually used by government leaders for dealing with wicked problems. The literature on this theme is surprisingly slim. Nancy Roberts (2000) identified three sets of strategies for responding to wicked problems, drawing largely from examples in international relations: competitive strategies (where power is dispersed but contested), *collaborative* strategies (where power is dispersed but not strongly contested) and authoritative strategies (where power is concentrated rather than dispersed). Her attempt to highlight the links between these strategies and the power dynamics within policy fields is instructive and useful. However, this threefold classification does not provide all the nuances required for understanding the diverse policy choices made by government leaders facing complex policy challenges. Hoppe (2010) has argued that the main dividing line in governmental responses to complex and controversial problems is between determining solutions either through 'powering' (i.e., impose the answer) or through a process of 'puzzling' (i.e., discuss the options). Again, this is a helpful insight into the spectrum of choices, but each of these two main strategic choices may include a wide range of categories reflecting the full suite of process strategies and institutional contexts.

In considering the available array of strategic choices, government leaders will not only assess the perceived threats, but also take account of their own political obligations (to their parties, stakeholders and supporters), and the institutional context of program legacies and resources they have inherited. They bring to the table their own leadership style and tactical preferences. Their personal style will be modified by the need to acknowledge the cultural perspectives and material interests of their own support base. As noted in Chapter 1, leaders are very actively involved in shaping perceptions of the problem itself, the context in which decisions need to be made, and the preferred responses. These persuasive efforts serve to legitimise a particular form of action preferred by the decision-maker. In effect, the problem-context itself is reconstructed as a 'political arena', in which leaders use persuasive mechanisms 'to render situations more tractable and compliant to their own preferred form of authority' (Grint, 2005, p. 1492). In considering policy priorities and actions, leaders also scan information about stakeholder opinions, or community debates about the nature and salience of problems. To reduce the possibility of failure, successful leaders review the likely reception of various policy options, examine the costs and benefits, and consider the implementation capacities of all the relevant governmental and non-state organisations that may be needed as partners (Howlett et al., 2015).

This chapter offers a broad classification of strategic process choices for policy responses, based on the actual observed behaviour of leaders (not to be confused with normative models that have been recommended for addressing specific policy challenges). The seven strategic process choices outlined below include problem avoidance, authoritative imposition, micro-management, science-based technocracy, incremental 'muddling through', collaborative dialogue and long-term coping and prevention strategies. Clearly these seven types should not be seen as stand-alone categories; they will tend to overlap in political and policy practice. In other words these various approaches are not neat alternatives but are usually found in combinations.

A full discussion of strategic approaches to policy governance would need to outline the various contexts in which the challenges arise, and the different capacities of leaders, governmental agencies and civil society organisations to cope with such challenges. Some crises and challenges are more 'governable' than others, as the effective levers available to government are always limited, and some 'natural' disasters are not avoidable through human intervention. There is no space in this book to examine detailed cases and circumstances, but Chapter 4 will broadly outline some of the different forms of 'crisis' which form the context of many contemporary wicked policy issues. Crises can be slow-moving, creeping and incremental, but with cumulative harmful impacts that eventually signal major risks and a need for action. Alternatively, crises can be acute, abrupt and highly disruptive in a more concentrated timeframe. In both the slow and fast scenarios, crises involve a diverse range of interconnected issues. They generally attract divergent perceptions about their scope, urgency and significance. These controversies arise under conditions of uncertainty about the knowledge base, the responsibilities for action, and the preferred forms of intervention. These differences and uncertainties confirm their status as wicked policy problems that eventually demand governmental attention and action.

GOVERNMENTAL RESPONSES TO WICKED PROBLEMS—SEVEN STRATEGIES

Determining 'fit-for-purpose' strategies is always difficult, even for the most astute leaders and policy managers. The 'best-available' solutions crafted by actors in one situation are not readily transferable to other locations, because they are closely linked to their original political and

institutional context. In those fortunate situations where robust solutions have been successfully negotiated, the agreed policies must be well implemented, raising a further series of governance and resource challenges (Crowley et al., 2020, Ch 8). Moreover, even the 'best' policies might have only short-term benefits, because economic and political circumstances may shift over time and policy goals might need adjustment. In some of the more complex and multi-layered policy problems, the standard for success might be very modest—a perspective that will be argued in more detail in a later section. For example, coping strategies to stabilise a problem and prevent harmful deterioration might be the best-available approach (albeit less than ideal) in some contexts or circumstances.

Seven major strategic pathways can be discerned when we observe how government leaders in democracies respond to wicked problems: avoidance and denial, authoritative coercive controls, micro-management of problem elements, technocratic problem-solving, incremental adjustment, stakeholder collaboration and 'coping' strategies. This classification highlights the processes chosen for steering or managing policy problems, rather than the specifics of policy design for different types of policy issues in various policy fields. And it is worth repeating that these seven types are not necessarily distinctive or self-contained choices; rather, they are likely to co-exist in policy practice.

Avoidance, Denial and Minimal Responsibility

A common response to complex problems and emerging threats is simply to deny their reality or significance. The capacity to ignore information and arguments, and the capacity to deflect attention from a potential issue, is an important form of power. These capacities have been well demonstrated in two fields of research—firstly, the literature on the impact of issue-framing and problem definition (Bacchi, 2009), as discussed in Chapter 1 above; and secondly, the literature on 'non-decisions', which can be seen as the capacity to block certain interests or issues arising, whether through deliberate veto behaviour or through the latent power of embedded routines and institutional practices (Hayward, 2006; Isaac, 1987; Lukes, 2005). This deliberate ignoring or denial of key information occurs in the private sector as well as governmental decision-making—such as the extended attempts by the tobacco industry to downplay and discredit scientific studies linking smoking and disease (Oreskes & Conway, 2010). Governmental and private sector actors can resort to

'strategic ignorance' by exaggerating uncertainties about an issue in order to avoid accountability (McGoey, 2019).

In recent years there has been heightened concern about the blatant disregard of 'the facts' by political leaders, whose partisan interests prevail over any considerations of objective analysis. It is often observed that politicians tend to reject evidence that contradicts their prior attitudes, regardless of whether they are populist leaders who articulate identity-based rhetoric or more accommodating politicians who are willing to discuss issues more openly. The scholarly research literature on 'motivated reasoning' has widely documented this phenomenon of biased cognition. Its specific application to the study of political debates has confirmed that inserting 'more evidence' into policy discussion does not moderate partisan bias of political actors (Baekgaard et al., 2019). Similar findings emerged in experimental research when citizens were asked to interpret key facts—the patterns of significance, attribution and blame were closely tied to partisanship (Bisgaard, 2019).

Successful democratic leaders seek to influence the content of policy agendas in particular ways, highlighting some issues and avoiding or minimising others. In doing so, they seek to influence public opinion, and they also seek to define the matters on which their own performance will be judged. In addition to limiting and prioritising the policy agenda, leaders are very concerned to avoid blame (Hood, 2002, 2011). One common tactic is to deflect responsibility for many of the issues raised in media debates, for example by arguing that the issue is really the responsibility of individuals, families, community groups, business investors, or another level of government. Leaders are also concerned to claim credit for positive outcomes on other related matters including the work of partners or delegates.

Denying the significance of a problem involves the exercise of persuasive power. Keeping a complex and intractable issue 'off the agenda' allows government leaders to avoid taking explicit action to address the issue (Shpaizman, 2020). Successful leaders shape how priority issues are understood and debated. The corollary is that leaders downplay or minimise the significance of issues raised by critical stakeholders, political opponents and the media. Information which casts doubt on the good intentions of government leaders are increasingly labelled as 'fake news', and an increasing flow of deliberate misinformation has become evident in political discussion (Iyengar & Massey, 2019; Persily & Tucker, 2020).

To the extent that a significant issue remains a matter of public debate, leaders often argue that it is someone else's problem.

However, wicked issues cannot simply be wished away'. When government leaders lack the organisational capacity and political will to tackle these issues, they may nevertheless decide to take symbolic actions. In doing so, they might explicitly acknowledge the problem, but offer only a conspicuous gesture. Symbolic and weak policy responses have been termed 'placebo policies' (McConnell, 2020). Such interventions address the symptoms rather than tackle the underlying causes (e.g. of inequality, discrimination, aggression, etc.). A related political tactic is the intentional overlooking of information that could reflect badly on leaders and managers, akin to the notion of strategic amnesia in the literature on policymaking and policy learning (Stark & Head, 2019).

Intentional 'under-reaction' to a policy problem can be explained as driven by political leaders' desire to avoid blame (Maor, 2021); but such responses can also be explained by ideological preferences and framing contests. Maor suggests that under-reactions may sometimes be counter-productive, in the sense that the issues could evolve into more intense forms that provoke political leaders into an equally inappropriate over-reaction (Maor, 2021). Other analysts who specialise in the study of stories and narratives have used the enticing metaphors of political dramaturgy and stagecraft. In this approach, government leaders tend to focus on managing 'front-stage' impressions (the official messages, as codified in speeches, media statements and policy documents), whereas the 'back-stage' complexities and contradictions experienced by citizens, stakeholders and frontline workers may be very different (Edelman, 1964; Hajer, 2009, p. 55; van Hulst, 2008; Schlenker & Pontari, 2000).

The concerns about 'big' or 'overloaded' government in the 1970s and 1980s were partly about cutbacks, but also about changing how public programs and services were delivered. The desire to reduce the size and the roles of the government sector led to various attempts to externalise responsibilities (away from state actors). This was pursued through three methods, all of which turned out to be double-edged. Firstly, governments delegated responsibility for operating utilities to non-state actors through privatising state-owned commercial businesses. Secondly, they outsourced service delivery programs through contractual agreements with non-state parties. Thirdly, they established 'light-handed' market mechanisms as an alternative to prescriptive regulation (Fink, 2011; Lobel, 2012; Salamon, 2002).

Privatisation immediately cut the size of the public sector, since private corporations replaced state-owned trading entities in such fields as water, energy, communications and transportation. However, in cases where the assets were monopoly businesses, such as utilities and airports, the state retained obligations to oversee fair treatment for consumers and potential competitors. The outsourcing of service delivery was achieved by competitive tendering to engage third parties (both private corporations and not-for-profit community organisations). However, while these non-state organisations delivered the public programs under contractual agreements, the state retained its obligations to fund the services, 'steer' the scope and conditions of service provision, and monitor compliance with the terms and conditions. Hence, while the service providers took formal responsibility for mistakes and potential fiascos, service design was largely a matter for the state and poor outcomes could reflect badly on the government designers. Finally, governments increasingly championed market mechanisms and voluntary codes of industry conduct as 'lighthanded' approaches to influencing stakeholder behaviour, thus allowing businesses and consumers to adjust their own investment decisions or consumption choices. However, while avoiding the costly overheads associated with prescriptive rules and their enforcement (i.e. the twin burdens of 'red tape' and monitoring/policing of rules), the task of designing fair and efficient markets proved to be very difficult for state authorities.

In short, inaction and deliberate deferral of policy attention by government can be explained in several ways (McConnell & t'Hart, 2019). In some cases it is rational to 'let the dust settle', lower the temperature of disputation, or allow conflicting groups to articulate their values and interests before attempting mediation and conflict resolution (Cantekin, 2016). In other cases, government leaders seek to deflect attention from problems, minimise their responsibilities for issues, and attempt to depoliticise difficult challenges. Where they decide to take action, they often select symbolic actions and routine administrative techniques that would usually be used for 'tame', settled or manageable issues, but which do not work well for wicked problems. Alternatively, governments seek to manage at arm's-length through contracts and markets. In most cases, the politics of avoidance, denial and minimisation amounts to the politics of distraction or the politics of managing 'at a distance'.

Coercive Controls

The second type of response to an emerging problem is almost the opposite of avoidance and distancing; rather, the regime leaders relish the opportunity to grasp the challenge and to demonstrate they have the answers. They do not hesitate to impose policy solutions by using centralised and coercive approaches. This route is not confined to the leaders of authoritarian one-party regimes which seek to impose conformity and punish diversity of views. In multi-party political systems, government leaders might impose decisive solutions through executive action. This tactic is used to manage crises that are seen as requiring forceful and rapid responses. Populist leaders sometimes utilise a 'heroic leader' style of decision-making, especially on matters framed as security threats where emergency powers can be invoked to deal with external and internal threats. Real or supposed national security threats are often used to bolster support for the ruling party and to suppress dissenting voices in the name of patriotism and national identity (Wojczewski, 2020). As Edelman noted some decades ago:

..... there is always a ready audience for concerns about 'national security'. Because such anxieties are easily aroused and because they can easily be directed against any domestic or foreign group that is labeled a threat, worries about national security are constantly evoked. (Edelman, 2001, p. 7)

In recent years, for example, the Hungarian government of prime minister Orbán responded to the refugee crisis, in defiance of the European Union policy framework, by imposing a range of measures to repel refugees; furthermore, in response to the pandemic crisis in 2020 he introduced emergency powers to suppress criticism. More generally the government has taken measures to harass and criminalise journalists, academics and civil society organisations that promote pluralism (Grzymala-Busse, 2019; Serhan, 2020), while also recently announcing plans to privatise the public universities.

National security concerns can be substantial and warranted; but centralised executive action by democratic leaders can proceed without also undermining democratic institutions and civil liberties. For example, research on Scandinavian governmental responses to domestic terrorism has shown that an effective response to terrorist incidents requires a high level of coordination between government agencies but does not

require suppression of civil rights. Better coordination is widely seen as a necessary element in effective responses to many kinds of wicked problems (Kettl, 2003), but the political and managerial challenges of effective coordination can themselves be challenging (Christensen et al., 2013, 2016). Managerial coordination pressures have also been felt in emergency responses for natural disasters like fires, floods and storms. Emergency management organisations have strong commandand-control management styles; but they have recently recognised the need to design processes for 'learning lessons' and sharing experience, as a result of repeated natural disasters where previous knowledge about effective and coordinated responses was overlooked. For example:

Following major reviewsthere was recognition across the sector that many of the findings and recommendations made in these major reports were similar to findings made in earlier incident reports and reviews. The sector felt that many mistakes were being repeated. Despite an intention to continuously improve, there were no procedures or mechanisms to ensure opportunities to improve were implemented or shared. The [recent] increased level of collaboration between organisations provided an opportunity to develop a process to involve all organisations in a lessons management approach. (Victorian Government, 2020, p. 67)

In short, strong executive-led action is common in the face of disasters, emergencies and perceived security threats. Leaders play a large part in articulating the nature of the challenge and the type of response required. The politics of perceptions and framing are vital in this decision-making process. Implementation capacities and contingency planning are often overlooked, and lessons from past experience can rapidly be forgotten.

Compartmentalised Micro-Management

In practical politics, as well as in scientific inquiry, it is common for large problems to be analysed in small pieces rather than in their totality as complex systems. The intention is to identify bite-size chunks that can be carefully described and more easily managed. Complex wide-ranging problems can be intimidating and difficult to grasp. In policy analysis and practice, it is genuinely difficult to select the appropriate level of analysis and action. There is a strong tendency to focus on one visible symptom of a significant problem instead of searching to address the

underlying causes. Moreover, real-world problems tend to be interlinked and 'nested', ranging from specific phenomena through to higher-level processes. In national and global terms, each of the 17 sustainable development goals of the United Nations occupies a huge terrain (see https://sustainabledevelopment.un.org/sdgs) and they all interconnect in various ways.

When summarising Rittel's first seminar presentation on wicked problems in 1967, Churchman reported that it is common to undertake partial analyses by 'carving off a piece of the [wicked] problem and finding a rational and feasible solution to this piece' (Churchman 1967, p. B-141), and then to 'deceive' people that the problem has been solved. As Rittel and Webber noted: 'one should not try to cure symptoms: and therefore one should try to settle the problem on as high a level as possible' (Rittel & Webber 1973, p. 165). From a similar perspective, Ackoff (1974) claimed that social and economic problems cannot be understood and addressed in isolation from their wider context:

Every problem interacts with other problems and is therefore part of a system of interrelated problems, a system of problems.....I choose to call such a system a mess.....The solution to a mess can seldom be obtained by independently solving each of the problems of which it is composed....Efforts to deal separately with such aspects of urban life as transportation, health, crime, and education seem to aggravate the total situation. (Ackoff, 1974, p 21; emphasis in original)

More recent research has argued that a complex system or a complex problem cannot be explained 'merely by breaking it down to its component parts'; rather, the interdependent elements 'interact with each other, share information, and combine to produce systemic behaviour' (Cairney, 2012, p. 348). As noted in the following chapter, large complex problems take many different forms, each with its distinctive challenges for analysis and action. Instead of assuming similarities between problems, it is helpful to identify the distinctive configurations of each problem and 'recognize how different problem properties can lead to different policy pitfalls' (Ruhl & Salzman, 2010, pp. 99–100). It is important for government leaders and departmental units responsible for policy development to understand the dynamic causes of the problems, map their inter-relationships, and design appropriate policy frameworks that allow for adaptive management and effective implementation.

Despite the importance of understanding the deeper causes of policy problems and the interconnections between issues, democratic political regimes are generally geared to deal with problem elements rather than focus on whole systems of problems. The standard approach is to analyse specific components of a problem field in response to stakeholder pressure, and develop policy interventions at a targeted scale, to be measured through performance indicators for each project. Arguably there has been a shift towards a 'proliferation' of policy 'projects' in recent decades (Jensen et al., 2018; Sjöblom & Godenhjelm, 2009) as an alternative to designing integrated programs pitched at larger issues. For example, if the education system or the healthcare system are seen as deficient, the political solution is likely to be a series of projects to build new facilities in various locations, or perhaps a workforce initiative to train and hire more staff. If climate change increases the incidence of severe damage from floods and storms, the political solution might be to build stronger bridges and establish seawalls to mitigate coastal erosion.

Given the enormous scope and interconnected complexities of major policy issues, public debate on large and messy problems tends to lack careful definition and tends to amplify divergent viewpoints that are hard to reconcile. Therefore, careful attention to component parts of the problem could be a useful and attractive starting point. It may be practicable and productive to seek more consensus on narrower aspects of the problem. We noted in Chapter 2 that political 'steering' of policy debates is generally aimed at shifting messy unstructured problems into becoming more specific 'well-structured' problems. Community engagement and stakeholder participation might help identify matters where agreement can be fashioned and policies developed. But there remains a serious doubt about whether difficult issues can indeed be 'solved' simply through redefining them into 'technically controllable' issues (Hoppe, 2010, p. 88).

In short, there are widespread tendencies in the political and administrative systems to decompose or deconstruct a broad problem into more manageable constituent parts. The process of policy debate can confirm this tendency towards analytical fragmentation and compartmentalisation. This trend is both limiting and understandable. On the one hand, wicked problems at the macro level cannot be 'tamed' or 'fixed' by dissolving them into multiple elements, which are then tackled separately and independently. Such a strategy overlooks the requirement for understanding and addressing their systems context. On the other hand, incremental

approaches are both useful and necessary, as will be seen in a later section below. There are many reasons to appreciate the contribution of small and cumulative changes. Small improvements can assist in learning about innovation through small-scale pilot schemes (see Chapter 7). Small wins (Weick, 1984) can inform the politics of change and can help to build momentum and support. Biting off small pieces of the problem can be seen as delivering tangible improvements, especially when the series of small measures is linked to strategies aiming for deeper change.

Technocratic Problem-Solving

The quest for rational and elegant solutions to problems, based on science and logic, has been a theme within liberal-democratic policymaking networks since the 1960s. Faith in the benefits of a scientific approach emerged as a counter to the perceived reliance on non-rational decision-making—i.e., politicised processes shaped by ignorance, prejudices, loyalties or traditions. The proponents of a more scientific approach argued that public policymaking should be based on the best-available knowledge concerning the policy challenges under consideration. In the 1980s and 1990s the concept of 'evidence-based policy' was elaborated by researchers and by government officials (Davies et al., 2000; Head, 2010a, 2015). The intent was that objective knowledge from the social sciences (as well as the health and environmental sciences) should have a prominent place in policy analysis and decision-making. Technology research (from the physical-chemical sciences) was already prominent in enabling the development of military weapons, computer systems and space travel; hence, perhaps it was possible for scientific research to also address the great social problems of social cohesion, equity and prosperity? In this context, champions of the social sciences highlighted the importance of rigorous evaluation of policy options, based on research into causal relationships and modelling the likely impacts of various policy choices. Evaluation of government programs would provide an important information base for policy improvement. Insights into the effectiveness of past programs would be complemented by detailed analysis of future policy options using quantitative measures of costs and benefits.

Thus, an 'evidence-based' approach emerged, advocating the production of rigorous and reliable knowledge, and promoting its utilisation within the policy process. Considerable efforts were made in many countries to invest in systematic data, analytical skills and evaluation guidelines

that would provide foundations for a more evidence-based approach. Evidence-based policymaking (EBP) became an attractive ideal for professionals concerned with building robust information and improving the techniques for analysis and evaluation. However, EBP was also strongly contested from three related sources.

Firstly, EBP was criticised by participatory democrats for promoting a form of elitism that privileged the knowledge of 'experts' and legitimated 'rule by technocrats'. In particular, critics claimed that when considering complex and contested issues, extensive community engagement was essential for clarifying acceptable and desirable outcomes (Fischer, 1990, 1993). Secondly, government ministers asserted their own form of elitism, by claiming that their 'mandate to govern' gave them the authority and the obligation to balance the claims of all stakeholders and knowledgeholders; and ministers necessarily made politically driven decisions for which they are electorally accountable. Governments might choose to recognise scientific/professional advice where it was useful for strengthening policy options favoured by government. As Michael Gove famously stated in the Brexit debate: 'I think the people of this country have had enough of experts from organisations with acronyms saying that they know what is best and getting it consistently wrong...' (see https://www. youtube.com/watch?v=GGgiGtJk7MA). Moreover, some of the appeal of populist politicians derives from the rhetorical contrast between their own championing of the people's will and the power of hidden 'elites' that allegedly seek to rule. Thirdly, within the academic community, many researchers have suggested that complex problems cannot be fully understood solely through the lens of rigorous experimentation and statistical analysis. Many kinds of knowledge and experience are needed to understand a complex social problem and to assess how current programs and practices might be making a difference (Pawson, 2006). There are many relevant knowledge-holders, and it is important to encourage their interaction through networks; such networks are useful adjuncts to mainstream scientific inquiry (Ferlie et al., 2011). Competition and collaboration are both necessary in order to avoid one-sided thinking about policy puzzles.

In short, better information is now more widely available than ever before, as a result of investments in science and evaluation and its dissemination through informed commentaries. In principle, the quality of decision-making should have improved over time, owing to information and analysis about program performance. However, despite the flood of data, and diverse reports about evolving issues and risks, there remains widespread skepticism about institutional capacities to deal with emerging crises and complex social problems. Even if capacities for data gathering and analysis were to be improved, the 'wicked problems' perspective would suggest that some problems are too messy to be addressed satisfactorily through a scientific-expertise approach. Schön's distinction between technical and contested issues is highly relevant. He contrasts manageable issues that are amenable to applied research on discrete topics, and complex situations that are messy and contested:

...there is a high, hard ground where practitioners can make effective use of research-based theory and technique, and there is a swampy lowland where situations are confusing 'messes' incapable of technical solution. The difficulty is that the problems of the high ground, however great their technical interest, are often relatively unimportant to clients or to the large society, while in the swamp are the problems of greatest human concern....There are those who choose the swampy lowland. They deliberately involve themselves in messy but crucially important problems and, when asked to describe their methods of inquiry, they speak of experience, trial and error, intuition, and muddling through. (Schön, 1983, pp. 42–43)

In summary, wicked problems cannot be well managed by technical experts alone. Wicked problems have to be managed politically, not just by scientific and professional experts. Government leaders cite research evidence when it suits their agendas, and they (occasionally) claim to be following expert advice on technical matters, such as decisions to impose unpopular restrictions to combat the spread of infectious diseases. In practice, experts provide advice but are rarely granted authority to make public decisions. Ministerial oversight and accountability generally prevail. Guarding against the possibility of technocratic decision-making by experts is rightly a concern in democracies, but the greater risk may be that elected leaders are making decisions based solely on appeals to political values or political self-interest. Some leaders have even encouraged the dismantling of evidence-based research capabilities in order to serve their partisan political interests (Boyle & Kotchen, 2018).

Incremental and Pragmatic Adjustment

Complex and difficult issues are regularly confronted in democratic political systems. But the manner in which these issues are framed, prioritised and managed can be diverse. The rhetoric of policy decision-making often

uses the language of rational problem-solving and managerial effectiveness, thus implying a reliance on information and reasoned debate. But the policy process itself is fuzzy, political and conflictual. This situation has been explained in the academic literature by two main factors. One is the pluralist nature of group politics and public opinion in a democratic society; the existence of multiple interests and perspectives tends to make it difficult to achieve even a temporary consensus on goals and methods. The second factor is the limited capacity of decision-makers to deal with large volumes of information and diverse opinions across many issues, so that the decision-making system is characterised by 'bounded' or limited rationality (Forester, 1984). Accordingly, to use the terminology of Herbert Simon, the decisionmaking process may reach decisions that 'satisfice' the actors concerned, rather than achieve 'optimised' decisions via a comprehensive analysis of all the relevant information and policy options.

One of the major public policy frameworks, incrementalism, has drawn on these two factors. Charles Lindblom respected the importance of good information but he also argued that the rational-comprehensive picture of the policymaking process was deeply flawed. In this claim, he shared one apparent similarity with Rittel and Webber, but their reasoning was quite different. Rittel and Webber (1973) had criticised the data-driven rationalist model for its cognitive hubris and top-down character. Hence, while it promised comprehensive policy and planning capacity, the rationalist model could not actually develop a full understanding of wicked problems or chart effective pathways for their improvement. Lindblom, by contrast, began from an assumption that the US political system had pragmatically evolved in a piecemeal way to accommodate the imperfections and partialities of human understanding and the inevitability of group disagreements (Lindblom, 1959, 1979; Lindblom & Cohen, 1979). Lindblom argued that the policy-making process, with its many checks and balances and opportunities for correction, was essentially the politics of compromise and trade-offs. This amounted to the politics of 'muddling through', with mutual adjustment among competing interests:

Instead of reaching 'solutions' that can be judged by standards of rationality, policy making reaches settlements, reconciliations, adjustments and agreements that one can evaluate only inconclusively by such standards as fairness, acceptability, openness to reconsideration and responsiveness to a variety of interests. (Lindblom, 1980, p. 122)

Once policy decisions had been determined by the political executive and legislature, the process of implementing practical programs would then lead to further rounds of adjustment in a multi-layered polity involving many actors and organisations.

For Lindblom, rigorous policy analysis was seen as valuable, but rigorous analysis was more likely to be accessed by some actors rather than others. He noted that policy analysis was often commissioned and used for partisan purposes (rather than for objective evaluations and clarifications). Lindblom saw that the policy process included many activities where scientific rigor rubs up against power, interests and values. Policy understandings and policy designs were seen as shaped more by practical experience than science. Lindblom's work became interpreted by some conservatives as endorsing the US system of incremental bargaining; conservatives wrongly discerned a normative argument in favour of incremental changes and rejecting major policy changes. In fact, Lindblom was sceptical about the likelihood of major change occurring, rather than supporting the conservative proposition that change was unwise. Lindblom's argument was that ambitious policy reforms had to contend with the weight of institutional inertia and path dependency (Pal, 2011). Moreover, reform proposals could be blocked by powerful business lobbies or other vested interests, and those proposals that reached the legislature could be heavily modified or narrowed in the process of further debate and decision.

Incremental policy trajectories imply that the political system has stable institutional arrangements for considering and implementing policy. And to the extent that policy pathways become settled and institutionalised, they cease to be controversial 'problems' that attract priority attention. Over time, the programs that appear to offer effective methods for managing social problems may become absorbed or woven into the 'settled' arrangements of policy governance. Where the ongoing risks and challenges are seen as relatively routine, they are likely to be handled administratively with incremental fine-tuning and little discussion. Where the situation is more novel, adaptive management can generate incremental change with only moderate debate about the agreed underlying directions. At the other end of the spectrum, large and complex issues may generate serious questioning of problem framing and support for new paradigms. As Lindquist noted:

routine decision regimes focus on matching and adapting existing programs and repertoires to emerging conditions, but involve little debate on its logic and design ...; incremental decision-making deals with selective issues as they emerge, but does not deal comprehensively with all constituent issues associated with the policy domain; and fundamental decisions are relatively infrequent opportunities to re-think approaches to policy domains, whether as result of crisis, new governments, or policy spillovers. (Lindquist, 2001, p. 19)

The notion of 'adaptive' approaches to policy design and management has become very fashionable. Brunner (2010) suggests that 'adaptive' approaches to governance are consistent with making iterative adjustments and 'learning by doing' at a manageable scale. This is very different from attempting wholesale and comprehensive policy transformation:

adaptive governance suggests factoring the global problem into thousands of local problems, each of which is more tractable scientifically and politically than the global one. It also suggests harvesting experience from local communities and organizing them as networks to scale out and scale up what works in practice. (Brunner, 2010, p. 306)

A broader notion of adaptive management is also discussed in Chapter 4 below, in relation to governance approaches for the improved management of social-ecological systems.

Stakeholder Collaboration

Government leaders sometimes choose to tackle problems through a consultative approach incorporating stakeholder engagement and participation. The willingness of government leaders to work closely with business, community and professional groups is influenced by such factors as political leadership styles, the perceived capacities of stakeholder networks, and the nature of the policy challenges under consideration.

Government agencies often became more fragmented in the 1980s and 1990s, linked to the managerial efficiency and outsourcing agendas promoted under New Public Management (NPM). Coupled with a narrow faith in market-based solutions, managerialism undermined the capacity of government to address complex and wicked issues that required working in partnership with other sectors. The NPM approach reinforced governmental reliance on using contractors to deliver public

services. But this contractualist approach was quite different from establishing collaborative partnership strategies for jointly addressing difficult social problems. Some governmental leaders became convinced that collaborative networks and forums should be strengthened to assist in discussing the nature of the problems, obtaining agreement on roles and responsibilities, and identifying a range of effective policy responses (Goldsmith & Eggers, 2004; Innes & Booher, 2010; O'Leary and Bingham, 2009). The advantages of collaboration were seen as improving knowledge about the issues, developing new options, and securing broader support for agreed new directions and strategies; the disadvantages were seen as the extended time and managerial effort required for dealing with the differing views and priorities of relevant groups, and the trap of 'lowest-common-denominator' outcomes (Ansell & Gash, 2008; O'Flynn et al., 2014).

When governments have used collaborative forums and networks to explore novel or difficult issues, senior officials are usually key participants who play major roles in funding the joint activities and chairing/convening the forum. Governments are reluctant to forego control of multi-stakeholder networks or venues that discuss topics impacting on the reputation of government leaders and agencies. On novel or emergent issues where the knowledge base is unclear and the challenges are unfamiliar, there is usually more support for gathering a wide range of perspectives and insights. But where the issues are longstanding and controversial, and the lines of conflict are well delineated, governmental leaders are more likely to support the establishment of a specialised public inquiry process which receives formal submissions and seeks a balanced future direction. In both cases, stakeholder participation is valuable for sharing knowledge of risks and exploring the consequences of various policy options. Stakeholder groups are likely to have concerns and disagreements about whether the chosen policy directions are both fair and effective, and on sensitive cultural issues (such as Indigenous knowledge and values), it is crucial to ensure that the benefits of new interventions are appropriately shared.

In the specific context of wicked problems, Xiang (2013, p. 2) has argued that the collective or 'social' nature of working with wicked problems and adaptation strategies requires a 'holistic and process-oriented approach' that is 'adaptive, participatory and transdisciplinary'. Such an approach, he argues, would embody a learning and exploratory orientation. Ideally, this would help to reduce conflict and build trust, and

ultimately produce better outcomes (Xiang, 2013, p. 2). This accords with Rittel and Webber's argument that there is no 'best' solution to a wicked problem, but only provisional responses that are negotiable among relevant stakeholders. Conklin notes that because there are no clear and definitive solutions: 'You don't so much "solve" a wicked problem as you help stakeholders negotiate shared understanding and shared meaning about the problem and its possible solutions. The objective of the work is coherent action, not final solution' (Conklin, 2006, p. 5). The assumption in much of the social science literature that collaborative methods could help to resolve a wide range of previously intractable problems generated a normative preference for collaboration. More recent work has paid more attention to the balance of costs and opportunities arising from working across boundaries in various contexts (Ansell & Gash, 2008).

There are several modes or levels of working together—networking, cooperating, coordinating and collaborating. None of these is intrinsically superior under all conditions. Rather, each may be better suited for specific tasks and challenges (Bryson et al., 2006). According to one experienced analyst, a strategy can be 'appropriate for particular circumstances', depending on the capacity of the actors to overcome the three standard limitations of working together—'time, trust and turf'; and depending on their capacity to reach agreement about 'a common vision, commitments to share power, and responsible and accountable actions' (Himmelman, 1996, p. 27). The literature on the theory and practice of collaboration in public policy and service partnerships has lacked a coherent framework for designing and assessing effective collaborative arrangements (Bingham & O'Leary, 2006), but appropriate criteria for assessment are being developed (Emerson & Nabatchi, 2015; Sørensen & Torfing, 2021).

Skelcher and Sullivan (2008) make a case for taking a broad approach to the appraisal of cross-sectoral partnerships. They argue that collaborative performance should be assessed not only in terms of the 'policy domain' (i.e., achieving the desired policy outcomes), but also in terms of four additional dimensions. These are the 'democratic domain' (democratic performance, mainly about legitimacy); the 'transformative domain' (path-breaking behaviour, new benefits not otherwise possible without collaboration); the 'coordination domain' (mutually dependent exchange of resources); and the 'political domain' (generating high-level ideas that integrate the actions of divergent groups). In other words, achieving the benefits of improved environmental or social values is not necessarily the whole story. There are broader governance considerations concerning legitimacy and the quality of the change management processes.

Coping and Prevention Policies

Wicked problems are characterised by lack of agreement about the problem itself and about effective policy responses, as noted in previous chapters. There has been much discussion about how to overcome these disagreements either through better science or better politics. One route has been to improve the knowledge base, in the hope that deeper understanding of causal factors can generate better understanding about policy improvements. Another route has been to improve stakeholder engagement and processes for brokering political compromises. But what if the availability of an effective solution is doubtful? What if the problem is deeply embedded in social norms and behaviour, and thus not amenable to quick solutions or remedies with lasting benefits? Examples might include the challenges of gender inequalities, ethnic or religious discrimination, health inequalities, domestic or family violence, the abuse or neglect of children, widespread use of illicit drugs and patterns of entrenched poverty found in particular localities or kinship groups. A series of small initiatives may benefit some vulnerable groups, but tackling large problems through a long-term strategic approach may require a new paradigm that can unite most of the stakeholders and elevate the sense of policy purpose.

Let us imagine that political leaders commit to achieving long-term improvement in one of these wicked problem fields. Following the initial stage of raising awareness and announcing broad reform objectives, early measures might include building a broad-based coalition of support for stabilising the problem and preventing further deterioration. Discussion with stakeholders might underline the need for a long-term strategy with many stages, drawing on the resources and experience of many sectors. Such a strategy would encompass overlapping layers of activity and a broad mix of policy instruments. It would recognise the complex interaction between social, economic, health, educational and other factors, rather than presume there is a single or fundamental root cause that explains all the phenomena. This strategy would pursue practical changes on specific matters (e.g. provide support services for victims of violence), but the strategy would also acknowledge that the achievement of substantial 'systemic' changes take a considerable time to materialise. Tackling the 'upstream' or underlying causes of harm is the basis of 'prevention' policies. The term prevention should not be confused with a bold claim to suppress or eliminate the problem, like the use of a powerful vaccine.

'Prevention' approaches in complex social fields are about reducing the probability of avoidable harms, through tackling underlying causes and building the skills needed by vulnerable groups to take protective action. For wicked problems, there are no magical solutions (though some programs are clearly better than others). Prevention is a policy paradigm that directs our attention to underlying causes of potential harm and the need for concerted action.

For example, the international literature on public health focuses on 'prevention of disease and health promotion', in order to avoid the greater suffering and expense of treating diseases through hospital services (UK-DHSC, 2018; US-CDC, 2021). Well-known examples of health promotion campaigns include information about the harms caused by air pollution, alcohol, smoking and obesity, together with positive advice about healthy lifestyle choices and sound hygiene practices to combat communicable diseases. Screening programs can facilitate early detection of health problems and more successful remediation. 'Prevention' can be seen as a long-term approach for managing and improving embedded problems, and some examples from social policy, criminology, public health and environment are discussed in later chapters. Advocates of prevention urge that precautionary actions should be taken to reduce the probability of large-scale problems developing.

As outlined by Ian Gough:

The case for preventive public policy is ever present in large welfare states. The debates over health, crime, early years interventions and many other areas of social policy stress the advantages of prevention over coping, cure, compensation or confinement. This emphasis has been motivated by a combination of normative and economic reasons: it is better for human well-being to prevent harm than to deal with its consequences. (Gough, 2015, p. 307)

Prevention approaches usually distinguish between three levels, with most attention at the first and second levels. 'Primary' prevention programs are directed at the whole society by addressing potential risk factors (those which cause harm) and by building capability factors (which protect against harm). For example, school education and community health services are designed to be widely accessible, assuming public resources are available. 'Secondary' prevention focuses on targeted early interventions to address the early stages of a harmful condition among identified social groups at higher risk of harm; while 'tertiary' prevention overlaps with more intensive service systems that tackle the impact of more serious conditions.

For example, governments have sought to mitigate the challenge of domestic terrorists who are motivated by extremist ideological doctrines. A standard crisis response by the security forces (police, military, cyber) has been to defend critical infrastructure facilities and communications systems, and to visibly occupy and protect public spaces. However, other responses include educative programs targeting 'at-risk' groups, e.g., intensive training courses to encourage the rehabilitation of low-level offenders, and education programs to influence the attitudes of social groups that are believed to be most vulnerable to the ideological messages of terrorist networks (Fischbacher-Smith, 2016). In designing these programs to counter violent extremism, program managers are likely to use public health prevention approaches. These measures are likely to be qualitative, educative, and take account of complex issues around social identity and social interaction rather than policing and coercion (Weine et al., 2017).

The advocates of preventive public policies claim that education services and early intervention programs are cheaper (and more effective and more humane) than responding to the acute harm generated by full-blown social crises, which are obviously very costly and difficult to treat. The core purpose of preventive programs is to avoid deterioration on key problem indicators—social, health, economic, environmental, etc.—and to provide a strong platform for future improvement through targeted initiatives. Examples include policies to tackle addiction, reduce harmful consumption, provide skills and training, mitigate crime and antisocial behaviour, design and enforce industry standards for environmental health, provide social services to diminish child abuse, and fund programs to counter deep and persistent disadvantages suffered by children and families.

Prevention approaches make use of rigorous data analysis and multifactor causal modelling to understand complex social patterns and especially the risk factors that exacerbate social problems; indeed, many proponents of 'prevention science' are strong advocates of hard-science approaches and experimental trials (Baron, 2018; Boruch & Rui, 2008; Campbell Collaboration, 2021; Kellam & Langevin, 2003). However, it can equally be argued that preventive programs are less about producing

technocratic solutions and more about influencing complex social interactions. In this sense, prevention approaches seek to utilise the best-available knowledge but they are more deeply aligned with 'resilience' and 'coping' strategies than with rational-comprehensive planning. The resilience and coping dimensions are further discussed in later chapters.

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CHAPTER 4

Complexity, Crises and Coping Strategies

Abstract Wicked problems are shaped through complex system dynamics and involve multiple stakeholders. Public concern about wicked problems is often generated through crises that provoke awareness and intensify a wide sense of urgency. This chapter outlines some key aspects of crises that affect how wicked problems are perceived, debated and managed. Importantly, some 'creeping' crises develop gradually over an extended period with slow cumulative impacts, and there is uncertainty about when to accord them high priority. Other crises are immediate and fast-moving, giving rise to general acceptance of the need for rapid responses. In many cases, there will be serious disagreements about policy responses, owing to the complexity of causal factors and the diversity of stakeholder values and opinions. Some crisis-induced challenges can be well managed in the short term, leading to a return towards 'normal' life, but most responses do not explicitly tackle the complex underlying causes that generate the crises. Finally, it is suggested that the governance of wicked problems is less about designing elegant science-based solutions and more about implementing 'coping' strategies, which manage uncertainties, strengthen community capabilities and build resilience across all sectors—social, economic and environmental.

Keywords Complexity · Creeping crisis · Cumulative crisis · Acute crisis · Disaster management · Risk management · Prevention · Resilience · Coping strategies · Uncertainty

Introduction

Wicked problems are framed and managed through highly political processes. Wicked problems are large, complex and entangled. They evolve over time. They display knowledge uncertainties in relation to causes and impacts. Diverse stakeholders cannot agree about the key dimensions of the problems and the best policy responses. Therefore, it is unlikely that conventional linear approaches to problem analysis and policy design will generate robust, effective and broadly supported strategies for improvement. Chapter 3 outlined some ways in which government leaders have used various methods of hierarchical control and consultative management to address wicked problems. In many cases they focus on attempting to reframe and normalise the problems. This chapter suggests that policymakers typically give higher priority to wicked problems when the challenges are perceived as crises rather than as routine or familiar issues. The political visibility of a wicked problem is reflected in how it registers in public discussion about priorities. All wicked problems are complex, but many complex and difficult issues do not achieve political traction. They remain off the policy agenda, perhaps because they are seen as too complex and messy to handle or because they lack strong and persuasive advocates to champion their importance.

This chapter firstly outlines some key dimensions of complexity that help us recognise the importance of understanding systems and relationships. These complexities affect how leaders and stakeholders interpret policy problems and how they perceive the 'governability' of the challenges presented. Secondly, the complexity aspects of crises are outlined, with attention to different types of crises, slow and fast. The cumulative impacts of slow changes can reach thresholds or tipping points that lead to instability and more rapid change, for which policy systems may be poorly prepared. Other crises are driven by catastrophic events such as natural disasters, technological disasters, or mass violence. Here, societies have recognised the benefits of emergency response planning and coordination. Thirdly, the chapter raises the question of what counts as success in addressing crises and complex problems. It is suggested that clear cases of 'solving' the problem are rare, and that most outcomes are mixed and uneven. Much effort is rightly directed at building capabilities to avoid further deterioration of conditions. This is about coping with crises, repairing harms, and building resilience to withstand future threats and pressures.

COMPLEXITY ANALYSIS FOR PUBLIC POLICY

Many scholars see a close connection between the discussion of wicked problems and the analysis of complex systems (Byrne & Callaghan, 2014; Geyer & Cairney, 2015; Geyer & Rihani, 2010; Ney, 2009; Tiesman et al., 2009). The policy literature on 'complex systems' is growing rapidly. The OECD has endorsed the value of exploring 'how systems approaches can be used in the public sector to solve complex or "wicked" problems' (OECD 2017, p. 4). Its recent report on systems thinking states that seeking to change the 'dynamics of a well-established and complex system requires not only a new way of examining problems, but also bold decision-making that fundamentally challenges public sector institutions' (OECD 2017, p. 3).

Democratic governance is inherently challenging, marked by political competition between actors with divergent perspectives and priorities. Democratic governance is full of trade-offs and paradoxes (e.g. reconciling stability and change, effectiveness and legitimacy, efficiency and fairness, state and non-state responsibilities for action). Given these complexities and uncertainties, broad capacities for strategic policy design, inter-group negotiation and collaborative implementation are crucial. The simplifications of 'managerialist' decision-making and target-driven efficiency regimes are viewed with suspicion by complexity thinkers (Ansell & Geyer, 2017; Eppel & Rhodes, 2018; Room, 2011; Seddon, 2008). Colander and Kupers (2014) draw a sharp contrast between two conceptions of governmental policymaking and knowledge. The rational approach focuses on policy instruments that predict and control outcomes, whereas the complexity approach highlights multiple interactions and perspectives:

The policy metaphor in the complexity frame changes from an image of government behind the steering wheel driving on a well-lit road, to an image of government trying to drive a car, with the windshield covered in mud, going down an unlit, winding road, with hundreds of people grabbing the wheel. (Colander & Kupers, 2014, p. 26)

Complexity theory, originally developed in the bio-physical sciences, draws attention to the multiple interconnections, feedback loops and surprising side-effects that can often undermine the aspirations of leaders to 'control' their socio-political systems. The term 'complex' is intended

to signal the *organic* and interactive aspects of systems, rather than the *mechanical* aggregation of elements or components. For example, Foden (2018) playfully emphasises the difference between (1) understanding and influencing the behaviour of a sophisticated living organism, such as a cat, and (2) understanding and influencing the operating mechanism of a simple machine, such as a clock. Peter Senge (2006, Chapter 6 and Appendix 2) talks about the difficulties of understanding and responding to systems, and the typical errors and failings that arise from these misapprehensions.

A core tenet is that a 'system' understanding is needed to understand how the structure of the system influences the behaviour of the system. This is different from the standard approach of focusing on events/issues (e.g. an algal bloom) or a trend (e.g. increasing nutrient levels in a river basin), which are a typical focus of policy action but may not tackle the underlying structural issues. Complexity analysts in public management and public policy have argued that the modern era is marked by crises and rapid changes that 'cascade' across borders and across policy domains. These problems are so serious that they 'challenge the steering capacity of governance' (Duit & Galaz, 2008, p. 311). Accordingly, analysts need to research 'the problem-solving capacity of existing multilevel governance systems in the face of change characterized by nonlinear dynamics, threshold effects, and limited predictability' (Duit & Galaz, 2008, p. 329).

In policy analysis for health systems, Glouberman and Zimmerman (2002) distinguish between the 'complicated' technical and managerial knowledge required for managing modern health service systems (based on applying professional expertise to address known challenges) and the more 'complex' and contestable aspects of designing healthcare systems. The 'complexity' dimension in this example denotes the disagreements on values, ideologies, priorities and partner responsibilities. Such disagreements in healthcare can occasionally lead to policy gridlock and polarisation concerning the design of service systems and the balance of public/private roles. The literature on public health policy and services has further elaborated on the theme of 'complex systems' analysis (e.g., Carey et al., 2015; Hawe, 2015; Peters, 2014) in order to make sense of the interactions between various levels of activity, multiple actors and conflicting goals in healthcare. A systems approach can make use of both qualitative and quantitative information to construct models of how various factors and proposed actions may interact to produce not only desired effects but also unintended effects (Hawe, 2015; Haynes et al., 2020; Lich et al., 2013).

The field of environmental policy research (further detailed in Chapter 5) has also embraced complex systems analysis, including extensive work on the management of natural resources, ecological systems and climate change responses. Systems thinking emphasises the need for interaction and discussion among experts and stakeholders to map the dimensions of risk and disruption, and to consider a range of pathways to address these risks (Ison & Straw, 2020). The tendency for decision-makers to demand knowledge certainty might privilege calculative methods such as cost/benefit analysis rather than broader combinations of knowledge and experience that can better deal with the complex risks and uncertainties of emerging issues (Stirling, 2010).

The literature on complexity in public administration has also demonstrated that good coordination and planning are crucial (Christensen et al., 2016; Kettl, 2003; Pierre & Peters, 2005) for ensuring that responsibilities and priorities are clarified, implementation activities are well-resourced, monitored and adjusted (Kiel, 1994), and that governance networks and stakeholder participation are well managed (Koliba et al., 2011). This approach is broadly consistent with the ecological literature on 'adaptive governance' (Chaffin et al., 2014), which highlights the importance of capacities to respond to the inevitable shifts occurring within complex systems. Traditional process-oriented management of projects and programs is regarded as too inflexible and bureaucratic to address the unpredicted and unintended outcomes of system changes and to engage with ripple effects and spill-overs. Adaptive leadership is needed to renegotiate the trade-offs among policy objectives and stakeholder interests, while preserving the governance legitimacy built through shared goals. Similar themes have emerged in research on the multiple entangled issues inherent in the policy and planning regimes of large cities. The findings in the classical studies by Pressman and Wildavsky (1973) and by Rittel and Webber (1973) have been elaborated in many recent studies. For example, Karen Christensen found that complexities abound in the interactions between layers of city government and industry sectors, and across several types of issues. She also detected several forms of innovation and learning in city planning (Christensen, 1999, p. 96).

What are the knowledge challenges of coping with complexity? Some forms of complex problems (such as designing and building infrastructure) can be addressed through high levels of coordination, managerial

efficiency, technical skills and sufficient funding, whereas other forms of complexity are characterised by high levels of knowledge uncertainty and disagreement about objectives. Reliable knowledge about future trends and social disruptions is seldom available, especially when some of the causal factors underlying a major crisis are outside the control of national decision-makers. Gaps in knowledge are normal; and attempts to fill these gaps are constantly being undertaken by both scientists and practitioners. However, the organisational context is also very important. Emery Roe's analysis of the reliability challenges facing the managers of infrastructure enterprises (water, energy, transport) found that there were three forms of unpredictability: (1) low risk with key factors known and controllable; (2) some uncertainties where the likelihood or impact of reliability failure are not known; and (3) high uncertainty (many unknowns) regarding both likelihood and impacts. Roe argues that these situations correspond with three operating styles—controlling, adaptively managing, and coping with instabilities (Roe, 2020 p. 76). Roe argues that more attention should be given to situations where 'control' is not possible and where uncertainties have to be the focus of networked discussion.

Management consultants in the 1990s developed a classification of knowledge adequacy. Knowledge that is regarded as robust and relatively complete is described as the field of 'known knowns'. More relevant to wicked problems, knowledge gaps that have been identified in key areas of concern constitute the field of 'known unknowns'; these become a major focus for scientific research and practitioner learning. Beyond the comfort zone of existing reliable knowledge and calculation lies the sphere of 'unknown unknowns', understood as a realm of radical uncertainty, and a massive challenge for scientists, practitioners and decision-makers. Donald Rumsfeld, when US Secretary of State, focused on identifying 'unknowns' relevant to potential hostile threats to US security. Rumsfeld noted that it was very difficult to anticipate such threats, and to plan for appropriate and timely responses, in the absence of clear and abundant evidence (Rumsfeld, 2011, p. xiv). In foreign policy decision-making by the White House, especially after the 9/11 terrorist strike against the World Trade Center in New York, this preoccupation with the challenges of 'unknown' security threats became transformed into the doctrine of 'pre-emptive' action, whose primary goal was to ensure that hostile states and terrorist networks did not access weapons of mass destruction (Dershowitz, 2006, Ch 5; Suskind, 2006, pp. 62, 150). Pre-emptive action against terrorism

has been described as especially risky and contentious (Stern & Wiener, 2006).

However, the urgent and well-funded responses to military security challenges can be contrasted with the weaker governmental responses to several other high-impact policy challenges. For example, in the field of US climate change policy, with its powerful corporate stakeholders and slow timelines, there has been a notable absence of precautionary and pre-emptive actions backed by well-funded programs. A high sense of urgency has not been strongly conveyed to the political executive in many countries by core stakeholders through public debate and community pressures. Debates about problem framing are highly relevant for complex issues. For example, 'climate change' can be framed as a scientific issue with expert technical solutions, or as an economic livelihoods issue where the policy response could focus on creating new jobs. Heather Cann (2021) shows that a climate and energy policy reform package was endorsed by the Illinois legislature owing to its economic orientation.

The character of each wicked problem may be very hard to discern, owing to complexity, uncertainty and divergent perspectives. Renn and colleagues have argued that 'risk governance' at a system level is fundamentally shaped by the need to deal with complexity, uncertainty and ambiguity (Renn et al., 2011). Conventional research projects, whether basic or applied, are generally targeted at filling known gaps in knowledge. Knowledge is generally patchy, and research aims to accumulate more information in order to tackle the 'known unknowns' (Pawson et al., 2011). However, the disruptions and surprises associated with new crises can raise concerns about the radical uncertainties of 'unknown unknowns'. What kind of knowledge and expertise are needed in situations where—as Funtowicz and Ravetz (1993, 2003) remind us—facts are uncertain, values are disputed, stakes are high, and decisions are urgent? In this 'post-normal' challenge to the knowledge base for policy action, conventional scientific methods of data collection and analysis are seen as too narrow and too slow to grasp the complexities of rapid change. Network-based forums of diverse experts and stakeholders are recommended to examine the implications of possible future scenarios under conditions of uncertainty (Gerlak et al., 2021). Strategies for coping with uncertainty and turbulence 'should not be about predicting the future which is unpredictable by definition—but about devising methods and systems for handling the unexpected' (Grint, 1997, p. 64). Aven and Renn (2010) have argued that different processes are needed for eliciting relevant knowledge for risk analysis and policy response, depending on the nature of the knowledge challenge—for example, is it a problem of causal complexity, uncertainty about impacts, ambiguity arising from value differences, or all of these together? (Aven & Renn, 2010, p. 187).

Policy analysts have outlined the processes by which problems are debated and 'managed' until they reach a provisional conclusion. Relatively simple or 'tame' issues with agreed solutions tend to settle into routine patterns of administration, in which incremental adjustment and performance monitoring are accepted as the dominant modes of governance. But sometimes the underlying issues may not be permanently resolved through policies decided and programs implemented. Contests about problem framing and prioritisation are recurrent. Given the complexities arising from various forms of stakeholder conflict and knowledge uncertainty, the policy governance challenge is to identify processes for dealing with the messy, ambiguous, controversial or unstructured nature of wicked problems. This policy governance challenge is exacerbated by the fact that the political theatre of public debate tends to focus on the more controversial and emergent policy problems—those which tend to require 'non-routine' processes to help identify long-term policy responses that are effective, feasible and legitimate. Serious gaps in knowledge and understanding may increase the likelihood that policy decisions about crises and wicked problems will be based primarily on leaders' intuitions or political ideologies. This is especially risky for policy crises on high-stakes issues. The different types of crisis situations and different policy responses are discussed in the following section of this chapter.

Types of Crises Shaping Wicked Problems

Crises are never welcome, but they can provide opportunities to reflect on our taken-for-granted assumptions about goals, methods and processes. In the COVID-19 pandemic crisis of 2020–2021 the initial focus on containing and mitigating the rate of infection has been joined by discussions about 'building back better'. In other words, the crisis might create space for wider discussions about social values and equity as well as about boosting economic investment and employment. In short, crises can generate either knee-jerk political responses or can facilitate deeper reflection on strategic direction and the need for new thinking. As Hannah Arendt noted:

A crisis forces us back to the questions themselves and requires from us either new or old answers, but in any case direct judgments. A crisis becomes a disaster only when we respond to it with pre-formed judgments, that is, with prejudices. Such an attitude not only sharpens the crisis but makes us forfeit the experience of reality and the opportunity for reflection it provides. (Arendt, 1977, p. 171)

The political framing of complex problems emerging in response to various types of crisis provides the canvass on which the terms of policy debate are displayed. Conflicting narratives emerge in relation to the nature of the events that trigger the sense of urgency (Birkland, 1998). Governments must respond to the different perceived challenges posed by a crisis, and they seek to influence the associated 'framing contests' (Boin et al., 2009). Debates rapidly emerge about who should be blamed for the crisis, who should be responsible for 'fixing' the problem and what would count as success in the estimation of various stakeholders. Crises take many different forms and may arise in many different situations (Drennan et al., 2015). They are frequently assessed by crisis analysts in terms of the likelihood of their emergence, the severity of their impacts, their duration, their propensity for preparedness or contingency plans, and their degree of politicisation.

Two broad categories of crisis may be distinguished, focused on either acute events or slow-onset and 'creeping' risks. Firstly, some crises are caused or triggered by sudden events with massive impacts—biophysical, technological, economic, political or environmental. Diverse examples might include nuclear-technology disasters at Chernobyl (1986) and Fukushima (2011), natural disasters (hurricanes, tsunamis, floods, volcanic eruptions, earthquakes), massive oil spills, critical infrastructure damage, fiscal collapse, mass violence or political regime disintegration. These are very different situations, with a mix of random, accidental and malicious causation. Some such crisis events are amenable to anticipatory planning and emergency response interventions. Specialised teams can be mobilised in accordance with established plans for recovering from natural disasters, and technical teams can be deployed to restore critical system functions. The restoration of political governability, and the rebuilding of robust financial systems are much more complicated. Relative success might be measured in terms of scope and speed of interventions. But 'learning' from crises (in order to reduce the incidence of future harm)

is a much larger challenge. In all these cases, organisational capacities are crucial for effective outcomes.

Secondly, some crises are generated through the slow development of patterns or activities ('creeping crisis': Jarman & Kouzmin, 1994) that may eventually reach a critical threshold. There may be serious delays in recognising that these risks have developed to a point where they will require urgent attention. When awareness increases, the latent or creeping crisis becomes more visible to stakeholders who become more motivated to demand responsive action (van Buuren et al., 2016). These 'tipping points' (indicated by evidence of serious harm) generate narratives to strengthen the shift from problem-recognition to high priority action. The cumulative impacts of a slow-onset crisis—for example in environmental and natural resource management—have built up over a long time period. Examples might include drought-induced desertification, environmental pollution (water, air and soil quality), and the deterioration of ecological assets (such as loss of biodiversity, the destruction of old-growth forests, and depletion of ground-water resources through the large-scale expansion of agriculture). The UN Framework Convention on Climate Change identified eight types of slow-onset phenomena linked to climate change: increasing temperatures, sea level rise, salinisation, ocean acidification, glacial retreat, land degradation, desertification and loss of biodiversity.

The global community seems to be confronted regularly with massive disasters where lives are lost through famine and disease. Global scale problems include climate change and the pressures of population growth. Such examples are featured in the 17 Sustainable Development Goals championed by the United Nations (see https://sustainabledevelopment.un.org/sdgs). These complex and intractable challenges are widespread across many geo-political areas but they have differential impacts across various scales or levels (local, regional, national, global).

From a public policy perspective, there are serious concerns about whether government leaders recognise and understand the full significance of crisis situations, except in a self-interested way to ensure their political survival. Some of these crisis situations can be anticipated and mitigated, so that emerging threats could be well managed if not prevented. For example, crisis events that are periodic or cyclical, such as natural disasters, can be anticipated, hence they gradually become the focus of contingency planning and emergency response services. These

anticipatory actions are formalised as funded programs led by professional specialists in emergency management.

However, there are two very different types of crisis in which anticipatory planning is likely to be either overlooked or very weak—creeping crises with slow and cumulative impacts, and fast-changing turbulent crises. In the first type, the slow onset of a crisis may obscure the underlying processes of *intensification* of risks and threats; in this case, the policy agenda may fail to accommodate the necessary preventive or preparatory work. Examples include climate change policy responses, and governmental indifference to the steady decline in the indicators of biodiversity health and other ecological assets. Delays in taking action can lead to compounding or cumulative harms, with spillover effects in related problem areas. Protracted conflicts can have tragic consequences:

The consequences of protracted conflicts are often dire, including high economic costs, destruction of vital infrastructure, division of families and communities, extreme violence, dislocation, trauma, and intergenerational perpetuation. (Coleman, 2003, p. 5)

With some forms of crisis, challenges are not only complex but are also turbulent. This means that the development of the problem is 'surprising, inconsistent, unpredictable, and uncertain' with no 'ready-made solutions' (Ansell et al., 2021, p. 2). In a turbulent situation, the advocates of collaborative approaches suggest that leaders must seek 'robust' governance solutions that are sufficiently 'adaptable, agile and pragmatic' to pursue goals or functions despite continuous disruptions. Leaders must 'abandon the idea of restoring a past equilibrium', instead engaging in an adaptive search for 'institutions, regulatory processes, and policy instruments to meet new and emerging conditions' (Ansell et al., 2021, p. 4). Other analysts agree that adaptive leadership, institutional capacities and flexible policy designs are crucial (Capano & Woo, 2018; Howlett et al., 2018; Nair & Howlett, 2016). This perspective accords with much of the literature on managing risk and uncertainty. Roe claims that in areas of high uncertainty, leadership is less about designing solutions than about managing networks of professionals and knowledge-holders (Roe, 2013, p. 98). Brugnach and Ingram argue that standard knowledge systems cannot cope with high uncertainty and high disagreement; and they call for 'knowledge co-production processes' that can achieve effective 'integration based on deliberation, open space for dialogue, negotiation and learning' (Brugnach & Ingram, 2012, p. 60).

In considering the interaction between complexity, crises and wicked problems, it is important to appreciate the linkages between different fields of policy and practice, and the cascading effects from one area spilling into adjacent areas. The think tank Future Earth commissioned a survey of global risk perceptions among 200 scientists from diverse countries. A key finding was the strong interconnections seen among five global risks: climate change, extreme weather, biodiversity loss, food crises and water crises. These risks had the greatest 'potential for synergistic effects that could lead to a global systemic crisis' (Future Earth 2020, p. i) (see Fig. 4.1 for the perceived interconnections).

STRATEGIC RISK MANAGEMENT—THE EXAMPLE OF COVID-19

In recent decades there has been increasing awareness of the large scale and urgency of problems facing public leaders, policy advisors and institutions. The repeated outbreak of contagious diseases that proved difficult to control (HIV/AIDS, SARS, Ebola, COVID-19 and others) undermined confidence that modern science has overcome the major threats to population health. At the same time, the fear of terrorist violence and the governmental response ('war on terror') reinforced widespread concerns about increased risks to human well-being on many fronts. In short, there have been interacting series of cascading crises which have posed massive challenges for policy governance. In response, a growth industry in risk management advice, forecasting and scenario analysis has emerged (Power, 2007). Given the large scale and wide scope of these disruptive factors, international organisations have also become prominent in analysing the main threats to stability and security.

Thus in 2011 the Organisation for Economic Cooperation and Development published an influential study of 'future global shocks' which emphasised the significance of four themes: pandemics, financial crises, cyber risks and the destructive impact of massive storms (OECD 2011). The World Economic Forum in 2017 released its 'global risks' report which identified the following as the five 'most likely' major risks: extreme weather events; large-scale involuntary migration; major natural disasters; large-scale terrorist attacks; and massive incidents of data

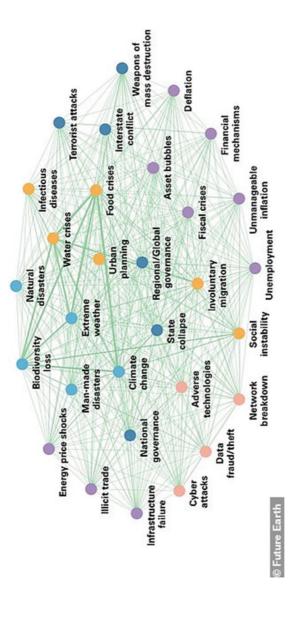


Fig. 4.1 Interconnected crises (Source Future Earth [2020] Risk Perceptions Report, p. 5)

fraud/threat. However the list of top five global risks in terms of severity of 'impact' were different: systemic financial failure; water supply crisis; food shortage; chronic fiscal imbalances; and extreme volatility in energy and agricultural prices (WEF, 2017). Two years later, before the COVID-19 pandemic, the World Economic Forum claimed that the six 'most likely' major risks were: extreme weather events; failure of climate change mitigation and adaptation; natural disasters; data fraud or theft; cyberattacks; and man-made environmental disasters. In the same report, the WEF identified the following as the top six risks in terms of severity of 'impact': weapons of mass destruction; failure of climate change mitigation and adaptation; extreme weather events; water crises; natural disasters; and biodiversity loss and ecosystem collapse (WEF, 2019).

With hindsight, it is interesting to see how the perceived threats shift over time. Everything changed in 2020-2021 with the arrival of COVID-19, which had catastrophic effects on jobs, incomes, revenues and the movement of people and goods. The World Economic Forum's report in 2021 listed pandemics as the fourth 'most likely' global risk and the top item in terms of 'impact' (WEF, 2021). Public health analysts were sensitive to the challenges and interconnected risks:

By all three measures of wickedness - complexity, uncertainty, and divergence - COVID-19 is a highly wicked problem, and will continue to be at least until there is an effective and universally available vaccine. (Núñez-Corrales & Jakobsson, 2020, p. 3)

In early 2020 the World Economic Forum commissioned a special study about the economic, social and governance implications of the new pandemic. According to this report, health system capacities are typically undermined by political considerations and competing priorities:

Pandemics have traditionally suffered from a panic-neglect cycle. Quiet periods see no action, early warnings of an outbreak tend to be overlooked, significant response and funding are late and uncoordinated, and valuable lessons from the crisis are not institutionalized. (WEF, 2020, p. 11)

Pandemic crises have massive effects that are unevenly distributed across countries and across social classes. Experts have been attempting to develop more targeted public health responses taking account of large differences in the demography of various locations:

COVID-19 poses a dramatic challenge to health, community life, and the economy of communities ...[but] the impact has been dramatically different from place to place, due to such factors as population density, mobility, age distribution, etc. Thus, optimum testing and social distancing strategies may also be different from place to place. (Núñez-Corrales & Jakobsson, 2020, p. 1)

In 2020, COVID-19 shut down economic activity, overloaded health services, infected over 70 M people and caused 1.7 M deaths; and in 2021 both the incidence of infections and the number of deaths was even higher, despite the commencement of new vaccination programs. The capacity of national governments to respond effectively was seen to be highly variable across the globe (Capano et al., 2020). Some leaders deliberately downplayed the issue and ignored medical advice, with dramatic consequences for infection rates and mortality. The rationalist assumption that reliable scientific knowledge of causes and remedies would be readily available, and that effective measures could be quickly deployed, was sorely tested at every level. Some experts urged the importance of recognising gaps and uncertainties in knowledge, and the need to take an adaptive and precautionary approach (Berger et al., 2021).

The crisis posed vigorous challenges for the ability of governments to pursue collective goals in an adaptive and inclusive manner under conditions of turbulence (Ansell et al., 2021). The challenges were not simply administrative, as in logistics and coordination, but also raised important ethical dimensions in choosing between policy strategies to protect vulnerable populations through lockdowns and strategies to maximise business-as-usual. Arguments immediately emerged about which values and goals should be prioritised. These goals included:

... reduction of COVID-19 morbidity and mortality, the mitigation of long-term social repercussions of containment policies (rising social inequalities, mental health issues due to social isolation, intergenerational conflicts) and financial adverse consequences, in the form of severe economic recessions, and subsequent rise in unemployment, poverty levels, and social tensions. (Angeli et al., 2021, p. 2)

Pandemics also generate competing narratives about causes, location of first outbreaks and reasons for rapid spread. The surface layer of explanation, often politicised, focuses on where the first outbreak was

recorded, the competence of local authorities in implementing containment measures and the prospect of effective vaccines guaranteeing public health and security. A much deeper 'systems' layer of explanation (Dobson et al., 2020; UNEP, 2021, p. 22) is that viruses of this type have originated in wildlife; they have been transmitted into human populations through unguarded close contacts ('zoonotic' transmission); and this pattern will recur if economic development policies continue to facilitate the expansion of food production areas at the expense of undisturbed forest areas. Crises can also reveal vulnerabilities in systems that we have assumed are reliable. A simple example is the food supply chain. The COVID-19 pandemic has shown that the food production, distribution and retail sectors can be badly affected when the free mobility of goods and services is heavily constrained and when economic recession becomes global. The usual cyclical causes of food insecurity—such as droughts and floods—are intensified when a wider crisis such as a pandemic disrupts economic markets. In responding to the pandemic crisis, governments have also upgraded their data systems for surveillance of citizens and restricting their movement; but civil rights activists have been concerned to ensure these measures are proportionate to the problem and would be utilised in transparent ways only for the duration of the emergency.

PREVENTION, COPING AND ADAPTIVE STRATEGIES

Policy debates about how to manage wicked problems are often focused on making decisions about a specific action—such as modifying a regulatory framework or funding a new service or facility. These short-term interventions are often seen as popular and useful. They might 'make a difference' in two ways-political leaders could strengthen their electoral stature by taking visible action; and a well-targeted policy could distribute tangible benefits to stakeholders and achieve measurable improvements. But a short-term policy agenda of 'business-as-usual' with incremental adjustments will usually neglect the underlying causes of larger problems, as noted in Chapter 3. In other words, the downside of incrementalism is that attempts to tackle the serious intractable issues are not only delayed, but are also likely to become much more costly and difficult for later generations to tackle (Nair & Howlett, 2016, 2017). If government leaders are preoccupied with short-term gains, and if they have limited political incentives to invest in developing long-term policy strategies, some of the required new thinking will have to come from outside government—through community and business groups, think tanks, research institutes, innovation networks and new media platforms.

Policy practitioners and policy analysts in democratic countries have increasingly been obliged to tackle wicked problems, but with limited success. Their dilemma is threefold: how to (1) design and implement *effective* policies, (2) through processes that maintain civic *legitimacy* (3) under conditions of flux and *uncertainty*. If wicked problems are characterised by complexity, divergence and uncertainty, then the relevant policy decisions and programs can only represent temporary settlements rather than definitive solutions.

In many cases the magnitude of the problem is daunting, and what counts as 'success' is necessarily modest. In situations of serious conflict between hostile stakeholder groups, with latent or actual violence, negotiating an accommodation between opposing groups might itself be a significant achievement, and might provide a basis for future improvements. The extensive literature on conflict-reduction strategies—extending from international peace-keeping processes (Wallensteen, 2019; Williams & Bellamy, 2021) through to resolving environmental disputes (Lewicki et al., 2003; O'Leary & Bingham, 2003)—provides an important corrective to those technocratic science-driven approaches that are dedicated to producing optimal solutions.

If optimal data-driven solutions are elusive, as is likely for wicked problems, what are the alternatives? Stakeholder-oriented approaches propose that seeking accommodation among stakeholders is the best approach, through inclusive processes of dialogue that consider shared goals and best-available evidence. The inherent difficulties of each problem are highly variable, and the nature of feasible improvements will also vary. In some policy areas there can be positive gains and a narrowing of disagreement about goals and methods. But in other policy areas, the conflicting perspectives may be so entrenched that agreement is not possible, or the scale and complexity of the problem may be so massive that future improvements are seen as distant aspirations. If intractable problems cannot be 'fixed' in a clear and definitive way, but they can be more-or-less 'well managed', then the language used for framing policy goals should reflect this shift in understanding. And if the planning context is turbulent, unpredictable and disrupted by crises, policy aspirations should recognise the value of stabilisation and resilience rather looking for neat definitive solutions or repeating the traditional panaceas of continuous growth and prosperity.

While the policy challenge varies greatly across social, economic and environmental policy fields, the above understandings of how to manage crises and wicked problems utilise key terms such as prevention, coping, resilience and recovery; and the corresponding policy development style emphasises adaptive management, learning and inclusive discussion. The concept of resilience—much discussed in ecology and environmental policy—is outlined in Chapter 5. The concept of prevention has been used in a wide array of social policy strategies, as further discussed in Chapter 6, and was prominent in the social programs of the UK Labour government of Blair and Brown 1997–2010. Prevention has also been a central theme in international relations and diplomatic processes aimed at peace-building. For example, the reports of the UN Secretary-General concerning the prevention of armed conflict and prevention of other global crises have emphasised the importance of preventive policies for averting traumatic conflicts and for advancing the conditions necessary for achieving the diverse Sustainable Development Goals (United Nations, 2020).

This approach argues that long-term preventive strategies (e.g. welfare services) can form a kind of policy safety net that can support a host of more specific initiatives for policy improvement, examples of which are discussed in later chapters. Prevention policies represent an alternative to the political stance of leaders who claim to be 'solving' major problems. Rather than solving tough and intractable problems, the more realistic focus of modern governance is often about 'coping' and recovery (Head, 2022). Where there is a regular cycle of recurrent crises, such as natural disasters, the focus on improved 'coping' leads to the strengthening of crisis preparedness—through new investments in response capacities, involving stakeholders in planning processes, and creating opportunities for learning. In most rich countries, emergency services have become well-resourced and professionalised as part of contingency planning.

In addressing the ongoing challenges of poverty and the social determinants of poor health (Taylor et al., 2016), the main focus in recent decades has been *preventive* programs that investigate and mitigate the underlying systemic causes of social disadvantage. Building on the shared knowledge of researchers, practitioners and clients of service programs, prevention programs aim to tackle the 'upstream' factors that cause the 'downstream' harmful effects. Prevention is a long-term approach for better managing *known* risks which have been shown to

underlie embedded problems and systems. The dual purpose of preventive programs is firstly to identify and reduce avoidable risk factors that cause social harms, and secondly to design positive pathways for improving the skills and well-being of vulnerable groups. There are many examples of this approach in public health (Hochlaf & Quilter-Pinner, 2020), crime reduction (France & Homel, 2007), countering violent extremism (Weine et al., 2017), tackling poverty and persistent inequalities (Van Ryzin et al., 2018), education and training programs, and services to reduce family violence and child abuse. Prevention efforts in social programs and public health distinguish between three focus levels. 'Primary' prevention services are generic and aimed at the well-being of the whole population, e.g. universal services in school education and primary healthcare. 'Secondary' prevention programs target social groups at higher risk of harm, through early intervention services to improve their pathways towards well-being. These targeted programs are typically based on detailed social evaluation studies to guide the cost-effective use of scarce funding (Freeman, 1999). 'Tertiary' prevention programs treat chronic conditions and overlap with mainstream service programs.

Evaluation research on the costs/benefits of various approaches has consistently demonstrated the benefits of shifting more public investment into preventive programs. By comparison, crisis and emergency services are inherently very expensive. The economics and social science of prevention have provided persuasive evidence to policymakers, but governments have found it difficult to take larger steps towards adopting the new paradigm. Why are preventative programs less popular with politicians than building new infrastructure? In the field of natural disaster management, for example, an Australian report identified that governments tend to 'overinvest in post-disaster reconstruction and underinvest in mitigation that would limit the impact of natural disasters in the first place' (Productivity Commission, 2014, p. 2). There have been widespread debates about how to shift the balance between spending on crisis response services (e.g. hospital emergencies) and spending on risk reduction and mitigation (e.g. health education).

There are several challenges for policy-makers and service professionals wanting to shift the investment balance from emergency services towards *preventive* programs (Boswell et al., 2019; Cairney & St Denny, 2020; Head & Redmond, 2011; Kennedy, 2020). Faced with a choice between funding hospitals and funding community health services, governments may prefer to take the credit for tangible artefacts such as buildings

and medical technologies. Policymakers may find it difficult to shift resources into long-term prevention while media-enhanced demands for crisis services remain high. Decision-makers are under pressure to respond quickly to real and perceived crises. Media attention focuses on critical incidents, and urges redress for abused, injured or harmed individuals. Commissions of inquiry (Stanley & Manthorpe, 2004) often recommend improvements in rapid response systems and crisis monitoring rather than prioritising the long-term benefits of programs to assist disadvantaged families and children. There are also political and fiscal constraints on shifting priorities towards prevention. Prevention requires financial commitments to be locked-in for many years, but the demonstrable benefits are deferred. The delayed nature of the benefits can make long-term investments less attractive for politicians who are navigating short-term electoral cycles. Prevention programs face competition in the budget process from many electorally-appealing alternative proposals. The advocates of prevention policy also have to contend with the psychological disposition to 'discount' possible future benefits against the current array of entrenched benefits (Kahneman, 2011). Finally, the need to maintain long-term commitment is threatened by continual changes in government ministers and key program managers.

CONCLUSIONS: COPING WITH COMPLEXITY

Political considerations largely determine which policy approach, or combination of approaches, will be implemented. Some strands of conservative thought have been comfortable about 'coping' as a political skill that seeks incremental adjustment and avoids over-reaction (Moynihan, 1973). In political practice, there are many examples of coping and adaptation strategies by both reformers and conservatives, and these strategies may co-exist alongside projects to promote rapid policy innovation in response to challenges. Coping strategies are likely to be found where several major problems intersect, or where problem-solving resources and capacities are low, or where layers of organisational and program change are piled together simultaneously. The wicked problems literature is gradually recognising that 'coping' (Daviter, 2017; Head, 2010c, 2022) and iterative adaptations to address changing conditions may be useful both for maintaining past achievements and for planning future benefits.

Coping can be a valuable and even necessary approach under conditions of adversity and complexity. For example, coping has been identified

by food security researchers as a survival mechanism by which poor and vulnerable populations respond to food shortages. When threats to food security are recurrent and predictable, more adaptive responses to adversity may emerge (Davies, 2009). More broadly, coping behaviours and strategies can take several forms in different locations, from individual workplace behaviours through to institutional processes of change. Much of the previous literature on 'coping' in the public sector has focused on how individual staff deal with the stresses of their work under conditions of overload, rapid change and austerity (Tummers et al., 2015). Public servants are continually obliged to reconcile value conflicts and ambiguous objectives as part of their adaptive professional work (de Graaf et al., 2016). Public policy research also needs to consider the institutional challenges of policy design, where approaches to managing value conflicts can be tackled at a strategic level.

According to Daviter, 'coping strategies aim to reflect the fragmented, uncertain and ambiguous nature of wicked problems by relying on a more disjointed and tentative process of formulating policy responses' (Daviter, 2017, p. 578). On the one hand, this suggests that there are many elements and dimensions of wicked problems that need to be mapped, debated and tackled (Alford & Head, 2017). On the other hand, the rational quest for comprehensively integrated and joined-up approaches for managing wicked problems might not always be feasible and could be unnecessary, in cases where an iterative and decentred approach with multiple local initiatives and 'small wins'—would suffice to achieve progress (Termeer & Dewulf, 2019; Termeer et al., 2015; 2019; Weick, 1984). This perspective on small wins is highly relevant for debates about the desirable speed and the multiple levels of reform required to address large and urgent problems. There will always be political differences between those who demand transformation and those who adopt a goal-directed pragmatism that supports incremental shifts on many fronts towards a new paradigm. These debates are highly relevant to the environmental and social problems discussed in the following chapters.

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CHAPTER 5

Managing Environmental and Sustainability Challenges

Abstract Wicked problems and robust debates abound in environmental policy at local, national and global levels. Over several decades, governments have responded with policies to mitigate industrial pollution, slow the rapid depletion of scarce natural resources and protect biodiversity and ecological systems. The precautionary principle has been invoked to seek thorough assessment of environmental risks before approving economic development projects and technological innovations that might damage ecological assets and human health. Scientific researchers and community groups have lobbied for strong measures to protect biodiversity and promote resilient eco-systems. Resistance to reform has generally been led by conservative parties, corporate media networks and large business firms in traditional industry sectors. Policies for environmental protection have been developed by most national governments, in conjunction with international agreements that encourage collective action. The toolkit of policy instruments has expanded, including regulatory standards and marketbased incentives. The role of scientific expertise in providing policy advice on environmental issues has been vital, but controversial. The chapter explores how science interacts with other sources of knowledge and opinion among practitioners and stakeholders. Climate change policy is analysed as an example of interconnected wicked problems, along with brief references to other environmental issues.

Keywords Expertise · Science credibility · Climate change policy · Precautionary principle · Adaptive management · Resilience · Sustainable development

Introduction

The challenges inherent in effectively managing sustainability crises and wicked problems have provoked an array of responses in both political and scholarly networks, ranging from malaise, paralysis and denial through to committed advocacy for particular solutions. In academic networks, these challenges have stimulated an increase in problem-oriented crossdisciplinary work—on the basis that the big issues demand a large pool of informed analysis that takes account of diverse perspectives. Many new academic journals have been launched to address these fast-growing fields. But many scientists and other scholars are wary of stepping outside the core themes of their discipline. For example, in the field of public management and public governance, Christopher Pollitt criticised the (limited) extent to which his research colleagues were prioritising the 'grand challenges' of the modern era, and especially the wicked problem of climate change. Pollitt drew attention to many aspects of climate change that warranted public management research, including multi-stakeholder collaborations, making and implementing agreements, long-term planning capability, policy evaluation and public opinion studies (Pollitt, 2015, p. 184).

On the other hand, the policy sciences have engaged in extensive analysis of environmental policy agendas and the development of new policy instruments (Kettl, 2002). Public policy scholars have analysed the evolution of environmental awareness and advocacy among citizens, stakeholders and the media, and have described how environmental improvement goals became incorporated into governmental policy agendas at local, national and international levels. The historical evolution of problem awareness and policy action has varied in different countries, but some broad patterns can be discerned in how these issues developed. To over-simplify, three main focal areas of environmental concern emerged in the second half of the twentieth century, generated by the pressures of population growth and global demands for economic development. These three focal concerns were the need to reduce all forms of

industrial pollution, the need to manage scarce natural resources and the need to protect and nurture biodiversity and ecological systems. These problems were initially tackled by local and provincial leaders and advocacy groups, but the broad scale and the political and legal complexities required the involvement of national governments. National governments were more likely to have the resources, information, policy tools and legal authority to undertake regulatory actions. New units of government were established to monitor environmental standards and promote desired outcomes (Rinfret & Paul, 2019, Ch. 2). An increasing number of community organisations, research centres and think tanks in each country became involved in advancing environmental knowledge and in lobbying for policy improvements (Ascher et al., 2010, pp. 30–34).

Large-scale cross-border problems at an international scale, in turn, have required the involvement of global and regional organisations and networks. Environment programs were established in the United Nations (UN), the European Commission and other international bodies, creating opportunities for negotiating international environmental agreements on a host of topics from biodiversity protection to climate change mitigation. The Montreal Protocol agreement in 1987 to phase out dangerous industrial gases (CFCs) that were destroying the ozone layer is regarded as a relatively successful concerted initiative to reverse the known and urgent risk of ozone depletion (Albrecht & Parker, 2019). Other international agreements have been more contentious and had mixed results, such as strategies to protect endangered species and to limit global warming. The increasing scale and ambition of UN strategic goals is evident in the Sustainable Development Goals 2015-2030, which encompass 17 interconnected areas including water, energy, food, resource use, climate change, land and marine ecosystems, and a host of human development issues aimed at reducing inequalities and promoting peace (https:// sustainabledevelopment.un.org/sdgs). Policymakers and scholars have recognised that the 'wicked' dimensions of environmental policymaking (complexity, uncertainty and values divergence) require policymakers and researchers to use multi-level approaches for problem analysis, policy design and program implementation. According to Meuleman (2021), public governance should prioritise 'mission-oriented' governance for designing and implementing SDG goals, rather than relying on the 'efficiency' focus of NPM managerialism.

INTEGRATED POLICY PLANNING OR PLURALIST INNOVATION?

Most analysts suggest that large-scale environmental and natural resources problems are so complex that they benefit from processes that promote policy integration and policy coherence. As noted in Chapter 3, there are strong arguments supporting governance processes that connect multiple stakeholders and service providers. These mechanisms include joined-up government, cross-sectoral collaboration and conflict-reduction processes. Many authors (e.g. Davies et al., 2015; Funtowicz & Ravetz, 2003; Renn & Schweizer, 2009) claim that 'inclusive' processes are necessary for the governance of complex risks, in order to enhance the knowledge base, explore uncertainties and accommodate the diversity of value perspectives. Inclusive processes would be required to manage the difficult choices and trade-offs that emerge across goals, values and social constituencies. They note that several types of inclusive processes for discussion and decision are available in democratic societies, and that selecting an appropriate process should take account of the types of issues under consideration and the configuration of stakeholders.

On the other hand, while dialogue among stakeholders and government agencies is generally supported for addressing wicked problems, the quest for 'integrated' policy strategies has been disputed by other groups of researchers (Candel, 2017, 2021). The critics argue that the ideal of 'integration' is a normative position as well as an empirical argument for coordination and interconnected policies. Policy integration, according to the critics, presumes that decision-makers can attain comprehensive knowledge of both problems and solutions, leading towards optimal outcomes—in other words, a holistic approach is presumed to produce 'one best solution'. The alternatives promoted by critics of integration are more pluralistic and decentred. For example, the polycentric selforganising tradition pioneered by Elinor Ostrom argues there are no overarching 'panaceas' (Ostrom, 2007), and that progress can be achieved through a multitude of locally negotiated initiatives in specific communities. This approach has been applied in analysing diverse case studies, ranging from initiatives to protect scarce natural resources (e.g. local communities managing fisheries, forestry and water resources) through to climate change adaptation measures. Polycentric approaches, according to Ostrom, 'facilitate achieving benefits at multiple scales', and also facilitate 'experimentation and learning from experience with diverse policies' (Ostrom, 2010, p. 550). Ostrom argued that while the pursuit of international goals and enhanced coordination are indeed important, local and immediate actions are crucial for policy momentum and for achieving positive gains:

Given the failure to reach agreement at the international level on efficient, fair, and enforceable reductions of greenhouse gas emissions, continuing to wait without investing in efforts at multiple scales may defeat the possibilities of significant abatements and mitigations in enough time to prevent tragic disasters. (Ostrom, 2012, p. 354)

Another decentred approach that rejects the quest for rational 'optimal' solutions is anchored in the cultural theory of Mary Douglas and her colleagues (Douglas & Wildavsky, 1982; Thompson et al., 1990). Cultural theory claims there will always be diversity in citizens' perspectives about issues, and diversity in their preferences for action. This is because social preferences are grounded in four different ways of thinking (worldviews) about social order and social change: hierarchy, individualism, egalitarianism and fatalism (Verweij & Thompson, 2006, p. 3). These alternative ways of perceiving the world are frames or lenses which broadly shape people's preferences about social arrangements and their approach to how problems should be managed. Cultural theory argues that these four perspectives are entrenched, and therefore it is sensible for policy-makers to support a pluralist approach that sustains a range of 'clumsy' and 'messy' solutions—this approach seeks to avoid privileging any one of the four perspectives over the others. Policymakers can work with a variety of policy processes and a mix of policy instruments that take account of these different preferences of citizens. In other words, tackling complex problems requires flexible combinations of approaches to problem-solving (Ney & Verweij, 2015; Verweij & Thompson, 2006). More generally, psychologists have argued that effective communication and persuasion should recognise the key values and terminology associated with the various cultural worldviews, and therefore frame policy arguments in ways that align with such orientations (Kahan & Braman, 2006). Steven Ney sums up the cultural divergence perspective by linking it to problem framing. He suggests that groups of individuals 'use frames to tell plausible and convincing stories ... they are selective accounts and specific interpretations of messy issues. Each story then is potentially contestable by someone who looks at the same problems through the

perceptual lens of a different frame and comes to divergent conclusions' (Ney, 2009, p. 180). Numerous studies have shown that problem frames and narratives communicated by experts and political leaders are regarded as more credible when aligned with the views of citizens, and framing is more influential in reinforcing views than in changing them (Lachapelle et al., 2014).

SCIENCE AND THE CONSTRUCTION OF ENVIRONMENTAL POLICY ISSUES

Environmental challenges are the meeting place between science, politics and complex social-ecological systems. Scientific networks and institutions had already recognised the 'human causes' of major environmental changes by the 1970s, when the UN Environment Program commenced its work and many governments began to establish environment protection agencies. Calls for policy change became more frequent and urgent in the 1980s (Brundtland, 1987; National Research Council, 1992). In reviewing some decades of experience, Selman noted that despite greater scientific knowledge and the roll-out of diverse environmental programs, progress in achieving improved outcomes was likely to be patchy and iterative:

In practice, despite enormous amounts of dedication and inspiration, environmental planning only ever achieves partial success. This is due to the 'wickedness' of environmental issues, deriving not only from their technical complexity, but also from the multiple arenas where they are contested and debated. As capacities are built to overcome one barrier, another one arises; as progress is made towards sustainability, so the finishing line recedes. (Selman, 1999, pp. 168–169)

All environmental issues have a very strong reliance on scientific information about trends, causes and impacts. Scientific findings are used by policymakers and stakeholders to support their analysis of problems, assess the severity of impacts and evaluate possible options for improvement. However, as shown in many case studies, while science is a necessary ingredient in the consideration of environmental policy issues, the framing, scoping and prioritising of issues is always political and often controversial. The construction of competing causal stories is a central feature of policy debate, along with processes for stakeholder and citizen

'voices' to be heard. Green community organisations and advocates of participatory democracy are concerned that civil society organisations might be excluded if environmental 'modernisation' leads to the 'scientisation' of environmental decision-making, e.g., through over-reliance on technocratic metrics and trade-offs. For green activists, citizens and social movements must be involved to express their own values and contribute to local solutions (Bäckstrand, 2003; Fischer, 2017). Champions of civic collaboration and citizen science argue that this approach can help to generate significant improvements in addressing wicked problems such as climate change, extreme poverty, pandemics, health inequalities and natural disasters (Hodgkinson et al., 2021).

Science optimists hope that, despite political disputes about problem framing, scientific knowledge can make major differences in decisionmaking, especially when science is complemented by practical lessons drawn from stakeholder experience of 'what works'. But scientific knowledge of trends, causes and impacts is not sufficient to shape difficult environmental issues. Drawing on the management and leadership literature, Heifetz (1994, p. 76) distinguished among three situations: first, where there is clarity about both the nature of the problem and the likely solution; second, where the nature of the problem is clearly discerned, but the solutions are not-typically leading to further investigation and discussion; and third, situations where both the problem definition and the solution are unclear, requiring extensive discussion and debate over time. In short, some issues are more likely to become 'wicked' when the quality and coherence of the knowledge base interact with the conflicting perspectives and values of stakeholders (Alford & Head, 2017, p. 403). Balint and colleagues suggest that distinguishing between different problem-types is fundamental for constructing effective environmental policies and natural resource management programs. Decision-makers can better appreciate the diverse challenges of policy development if the range of stakeholder values has been mapped and if the knowledge base available to governmental and other stakeholders has been assessed as relatively robust or as requiring major improvements (Balint et al., 2011, p. 10). Different forms of cooperation and collaboration will be required to develop environmental policy strategies, taking account of these dynamics around problem framing, knowledge and values.

Weible (2008) summarised the policy studies literature by arguing that expert-based information tends to be used in three ways: instrumental,

learning and political uses. However, these three uses are likely to occur in different ways across various policy fields. These patterns will depend especially on two sets of factors—(1) the degree of openness/closure (e.g., closed sub-systems with a few powerful participants generally exhibit a higher level of agreement on problems and approaches); and (2) the gap between adversarial positions in contested policy spaces (e.g., differences can be amplified by partisans selectively relying on aligned experts). In some circumstances, there may be opportunities for developing shared knowledge (e.g. the experience with natural resources management) and for reducing conflict through collaborative forums (Weible, 2008, pp. 627-8). However, a study of joint knowledge production in Dutch water management found that alignment between experts and policy bureaucrats was more likely to occur than with other groups of stakeholders. According to that study (Edelenbos et al., 2011, p. 683), the three groups—experts, bureaucrats and other stakeholders—use 'different norms and criteria for knowledge production, ranging from scientific validity (experts), policy usefulness (bureaucrats) and social validity (stakeholders)'. In most research on policy debates, it has been found that expert knowledge is harnessed to reinforce or legitimate the existing beliefs of participants rather than generate policy learning or new perspectives. Empirical studies have shown how patterns of usage are linked to institutional structures affecting policy, the nature and origin of the information, the value placed on knowledge and the dynamics of policy conflict (Heikkila et al., 2020, p. 536).

The scholarly literature on the utilisation of scientific research in policy-making generally presumes that best-available evidence *should* be used to inform policy debates (Head, 2010b, 2016). This literature places a high premium on the perceived quality and relevance of expert knowledge. However, most decision-makers, stakeholders and the general public are unfamiliar with the rigorous methods of scientific research. Importantly, they are much more interested in the *sources* of policy-related information and the implications of the policy narratives. This leads to a strong focus on the reputation and perceived independence of particular experts. The classic article by Cash and colleagues outlines a threefold schema:

... scientific information is likely to be effective in influencing the evolution of social responses to public issues to the extent that the information is perceived by relevant stakeholders to be not only *credible*, but also *salient* and *legitimate*. In the sense used here, *credibility* involves the scientific

adequacy of the technical evidence and arguments. *Salience* deals with the relevance of the assessment to the needs of decision makers. *Legitimacy* reflects the perception that the production of information and technology has been respectful of stakeholders' divergent values and beliefs, unbiased in its conduct, and fair in its treatment of opposing views and interests. Our work shows these attributes are tightly coupled, such that efforts to enhance any one normally incur a cost to the others. (Cash et al., 2003, p. 8086, emphasis in original)

This perspective assumes that the perceived quality of scientific research findings is very important. However, this approach tends to overlook the significance of cultural cognition research about the polarised use of expertise, as demonstrated in the climate debate. For example, Kahan (2016) shows that 'politically motivated reasoning' serves to filter information in ways that reinforce pre-existing beliefs. Expert knowledge is not perceived as neutral; sources identified as agreeing with the proponent are seen as more trustworthy. In a similar manner, this cherry-picking bias is explained by Jones (2011) through cultural cognition theory, arguing that the difficulties of persuading citizens about the challenges and responses to climate change are not open to rational solutions. These disagreements cannot be resolved simply through 'more science'.

The appropriate roles for scientists in social and environmental policy debates and in provision of policy advice have been long discussed by scholars and commentators (Ezrahi, 1980, p. 118; Owens, 2016). Even when scientists largely agree on what counts as reliable knowledge, they are divided about their appropriate roles in advising policymakers on the mix of required policies and highest priority investments. These tensions have been evident in the reception of the scientific work of the International Panel on Climate Change whose reports include both scientific modelling and a summary of implications for policymakers (IPCC, 2018, 2021). While most agree that scientific findings should be taken into account, the view that scientific knowledge can and should shape policymaking is strongly resisted. According to one critic: 'We are asking science to do the impossible: to arrive at scientifically coherent and politically unifying understandings of problems that are inherently open, indeterminate and contested' (Sarewitz, 2017).

Roger Pielke (2007) has argued that scientists should beware of crossing the line from objective analysis to policy advocacy, because policy preferences do not follow tightly from scientific findings—except in

narrow technical matters where there are no trade-offs or value choices at stake. Most scientific advice should take the form of providing objective responses to questions and providing options analysis where requested by authoritative decision-makers (the 'honest broker' role). Pielke warns that scientists who choose to become policy advocates will risk undermining their own scientific credibility, and they should campaign on the basis of explicit values rather than pretend to be espousing pure science. Most commentators in science policy now recognise the nexus between values, politics and science, and accept that a science-first approach is unrealistic (Weber et al., 2017; Weible & Moore, 2010).

Scientific advice is commonly associated in the public mind with expert advisory bodies and policy development processes. There are numerous examples of researchers being invited to be members of expert panels or making expert submissions to inquiries. The purposes, composition and longevity of such expert advisory bodies vary widely (OECD, 2015; Owens, 2012). Government agencies often create specialised units that employ skilled researchers, who do not necessarily undertake new or original research but who can be crucial in translating governmental and external research findings as part of the briefing process for senior executives, ministers and legislators. In some policy fields, expert standing committees (usually with a majority of external members) may provide advice on quality standards, risk parameters, cost-effectiveness and so on. Ad hoc expert bodies may be formed to respond rapidly to contemporary crises; the most formal of these are public inquiries or royal commissions. Legislative committees also undertake inquiries on a range of social, environmental and technical topics, and usually consider the submissions of experts and stakeholders concerning current and emerging policy challenges.

Scientific analysis and advice inform the policy advisory process rather than determine the strategic direction of environmental policy and the selection of specific regulatory instruments. Scientific knowledge is fundamental for assessing the nature of risks and harms (problem definition), and thus for assigning higher priority and urgency to the issue (agenda-setting). In many areas of environmental concern, the findings of scientific research and evaluation have been consolidated into standards and performance metrics that are useful for practitioners. For example, in relation to biodiversity conservation and the vital role of nature reserves for protecting wilderness and habitat, the International Union for Conservation of Nature (IUCN) has produced standards and principles for the

effective planning and management of World Heritage areas, national parks and other conservation areas (IUCN, 2017).

While the knowledge base for environmental issues has continued to grow in depth and breadth, with some issues being thoroughly researched, many other issues suffer from lack of significant long-term research and evaluation. This is especially the case with emergent challenges driven by biotechnologies and novel resource extraction technologies. International organisations and science networks help to improve the knowledge base by sharing and comparing information. For policy scholars, research into public debates about contested priorities and policy choices can demonstrate the extent to which stakeholders agree about the quality and coherence of reliable knowledge, and the extent to which the competing policy narratives are framed by fundamental conflicts in values and stakeholder interests.

Managing Risks—Precaution, Resilience and Environmental Standards

An important threshold question in environmental policy is whether governments should take a precautionary approach to managing environmental risks. This is especially important when knowledge of causes and impacts is uncertain and incomplete (Martuzzi & Tickner, 2004; Ravetz, 2004). There have been fierce disputes about the circumstances in which precaution should be invoked to constrain or hinder technical innovations and commercial investments. The onus of proof concerning the risks of technical and commercial innovation could be allocated in either of two directions—either to support commercial business interests (i.e., innovation is supported and encouraged unless there is robust evidence of harm) or to support environmental integrity and health (i.e., innovations are not licensed unless the balance of harms and benefits has been carefully assessed as favourable or unless appropriate conditions and regulations have been implemented). The Rio Declaration on Environment and Development in 1992 declared (Principle 15):

In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

The precautionary principle has been invoked to minimise harm in a wide range of situations. Examples include regulatory restrictions on the use of novel technologies (such as genetically modified organisms (GMOs) in agriculture, or new pharmaceutical drugs in medical therapy); and licences or approvals have been withheld for industrial projects that could cause irreversible harm to ecological systems. Business lobbyists argue that entrepreneurs should be encouraged to invest in innovation and that the onus should be on regulators to prove the probability of serious harm. By contrast, the precautionary principle is more conservative than permissive. High-risk threats to human health and natural systems should not be authorised unless scientific research demonstrates there are no long-term adverse impacts (Metz & Ingold, 2017; Stirling, 2008; Van Asselt & Vos, 2006). Political lobbying on where to draw the line in particular cases has been intense.

In situations of rapid change or crisis that threatens natural assets, the question arises about whether the policy goal should be modest or ambitious—for example, is the goal simply to avoid further harmful deterioration in ecological conditions, or is the goal to 'restore' the previous superior level of the ecological system? Another approach, which also eschews restoration, is to identify the few remaining areas of relatively 'intact' or pristine ecological systems and to urge highest priority for preserving and protecting such areas (Plumptre et al., 2021). The environmental science literature canvasses debate about which standards of environmental integrity should be pursued in various situations, while increasingly accepting that policy decisions will be highly political and will be shaped by arguments about balance, feasibility and cost-effectiveness.

The ecological 'resilience' literature tends to argue that high standards of environmental protection are required, but that 'restoration' is not a realistic possibility within an evolving set of systems and sub-systems (Gunderson & Holling, 2002). Resilience is generally understood as the capacity of a system to 'absorb disturbance' and reorganise in ways that retain its functions and structures and interactions (Walker & Salt, 2006). The UN Disaster Risk Reduction group defines resilience as follows:

Resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and function. (https://www.undrr.org/terminology)

This scholarly literature emphasises the importance of understanding adaptive relationships within social-ecological systems, taking account of the 'robustness' of sub-systems and their 'nested' levels of interaction (Anderies et al., 2013). The related literature on 'adaptive governance' for social-ecological resilience (Chaffin et al., 2014) highlights the importance of building skills and capacities at every level to respond effectively to changes in complex systems. There is a key role for social learning by stakeholders, scientists, decision-makers and their networks.

Another strand in resilience literature has examined the capacity of communities to recover from disasters and from entrenched environmental crises. The central focus is how to support and strengthen 'adaptive capacity, self-organisation and agency' at the level of local communities and their wider networks (Berkes & Ross, 2013; Goldstein, 2012). The concept of resilience has also been taken up in studies of public administration and policymaking. The OECD (2014) has highlighted the relevance of this conceptual literature for a deeper understanding of how governments could use risk management and adaptive management in addressing dynamic and turbulent situations. Others have cautioned against over-emphasising flexibility and adaptive capacity at the expense of other important public sector values such as stability, predictability, reliability and efficiency (Duit, 2016).

WICKED DIMENSIONS OF ENVIRONMENTAL POLICYMAKING

Environmental policy analysis and the political debates on environmental policymaking have recognised the fundamental importance of complexity, uncertainty and stakeholder disagreement. Many researchers have described the 'wicked' features of environmental case studies—whether in food and agriculture, biodiversity, land management, resource extraction, climate change, air and water quality, renewable energy and so on. Environmental policy research highlights both the enduring challenge of wicked problems, and the enduring significance of 'wickedness' as a frame for policy analysis (e.g. Durant & Legge, 2006; Turnpenny et al., 2009). For some scientists there is continued disappointment that politics seems to prevail over scientific knowledge. However, other researchers have emphasised that in democracies it is necessary to build trust through transparent processes to mediate differences in goals and perspectives,

working across the boundaries of science, stakeholder interests and political processes (Hajer & Wagenaar, 2003).

Researchers suggest the importance of both the vertical dimension of public authority and the horizontal dimension of inclusive dialogue. Taking this dual approach, researchers suggest that unpacking the intractable or intransigent nature of the problems would require wide discussion through networks and collaborative forums. Pahl-Wostl and colleagues have argued that a structured analytical framework is a necessary element for inclusive analysis of the complex and multi-facetted aspects of environment policy coordination (Pahl-Wostl et al., 2020). Such an approach would facilitate identification of multiple pathways that could lead to an improvement (or a decline). On the other hand, analysis and engagement are not enough; effective interventions to tackle the substantive problems would additionally require strong governmental regulation, coordination and leadership (Crowley et al., 2020; Peters, 2019).

Complexities abound, owing to the different levels or scales of behaviour (e.g. local, regional, global, cross-border issues); the interconnections between various socio-economic and ecological issues (e.g. power, poverty and resource use); and the large number of organisations and institutions that play a role in policy debate and program implementation. Many types of uncertainty also abound (Bammer & Smithson, 2008), posing challenges for understanding the nature and impact of the problems and for designing or negotiating appropriate policy responses. Van Bueren et al. (2003) interrogated the nuances of wicked environmental issues in terms of the varying effects of cognitive, strategic and institutional uncertainties. Actors with divergent perspectives have difficulty in working together. The conclusion was that the uncertainties underlying and shaping wicked problems can be reduced only through network-based 'cooperation', thereby 'enhancing and intensifying interactions between stakeholders' (2003, pp. 193-194, 211). Dewulf and Biesbroek (2018) developed a detailed schema for classifying types of uncertainty. On one dimension, they distinguish between uncertainties arising from knowledge gaps, conflicting values and frames of stakeholders, and the underlying 'unknowns' concerning the behaviour of complex systems. On a second dimension, they focus on processes for debate and decision, identifying three related uncertainties about the rules of the game, the likely tactics of other actors and the concrete content of policy choices.

Brugnach and colleagues argue that a focus on reducing knowledge gaps is not enough, and that it is essential to recognise the importance of multiple frames through which stakeholders understand the problem and possible solutions (Brugnach et al., 2011). Uncertainty should be not seen as primarily about 'the facts' but as embedded in the divergent interpretations, relationships and sense-making of the various participants:

because it is from this understanding that problems and solutions emerge. Under this view, solutions do not exclusively consist of eliminating or reducing uncertainty, but of reframing the problems as such so that they convey a different meaning. (Brugnach et al., 2008, p. 1)

The future-oriented policy sciences, which assist in setting realistic goals for climate response policy, have to absorb difficult pressures to maintain their credibility and relevance. On the one hand, reliable long-term forecasts are needed to underpin incentives for investment in low-emissions technologies; but on the other hand, uncertainties about the pace and direction of change require flexibility and rapid adjustments to new information (Nemet et al., 2017).

CLIMATE CHANGE AS A WICKED POLICY ARENA

The argument that we have entered the era of the Anthropocene where industrial activities are undermining the planetary systems on which human societies depend—is intended to galvanise urgent action to arrest the deterioration of natural assets, by ensuring that governments and citizens take responsibility for inclusive remedial action at every level (Biermann, 2014; Ison et al., 2018; Lövbrand et al., 2020). The argument is that the pace, scale and depth of change have intensified, leading to cascading negative impacts on interconnected systems (Hom & Penn, 2021). The recent wave of declarations that all societies are facing a climate emergency is intended to galvanise strategic priorities to focus on avoiding future catastrophe; but the political rhetoric of climate emergency could also spark further polarisation and resistance (Patterson et al., 2021). Political leadership is required to ensure that ecological system goals are prioritised. In the past, policymaking on major issues has involved trade-offs between social, economic and environmental objectives, with economic interests generally dominant. Climate change

has become the major crisis that highlights these concerns about rethinking priorities and managing competing objectives. The large and rapid nature of planetary change could even increase the political difficulties of shifting priorities towards environmental goals (Dryzek & Pickering, 2019, p. 98).

The planetary scale of the Anthropocene perspective has also encouraged techo-engineering proposals to 'save the planet' (Lomborg, 2010), including solar heat shields, the capture and storage of industrial emissions, and various initiatives for genetic reengineering of plants and animals. However, while some of these proposals may prove to be technically feasible, the environmental and ethical dimensions of identifying and managing the associated risks have not been canvassed (Reynolds, 2021).

There are several reasons why climate change response policy can be termed a field of 'wicked problems' (Head, 2014). Firstly, the climate change challenges are actually a series of linked problems, none of which can be resolved in isolation. The interconnections between the UN Sustainable Development Goals illustrate these crucial inter-dependencies. Progress in one field may depend on parallel progress elsewhere, and negative developments in one area may undermine initiatives in other fields. Spillover or ripple effects are common. For example, a transition away from fossil fuels can reduce greenhouse gas emissions, but threats to biodiversity would be exacerbated if the 'solution' is to clear old-growth forests in order to expand the farming of crops that produce bio-fuels (Portner et al., 2021). Rural areas are often the subject of competing land uses, some of which involve competing forms of legitimacy, such as the overlay of commercial interests in areas formerly governed through traditional entitlements. Sayer et al. (2013) have suggested some procedural principles, including adaptive management and inclusive participation, which could assist in large-scale processes for reconciling agriculture, conservation and other competing land uses.

Secondly, future-oriented estimates of the costs and benefits of specific interventions—directed at tackling climate change and promoting sustainable development—are likely to be diverse, uncertain and shift over time and place. Policy responses need to account for both short-term and long-term trajectories and adapt to the constantly changing contexts. Thirdly, the risks and impacts are simultaneously local, regional and global. This multi-level diversity makes the understanding of impacts, and the choice of adaptive responses, very difficult. The underlying systemic causes can manifest in specific local symptoms (such as famine and crop failures

during cycles of drought or flood devastation in large river-delta cities). Fourthly, despite the solidity of the scientific knowledge base, key findings have been hotly contested in public debate, with scepticism and denial being promoted by some industry sectors, especially in relation to the extent of climate change and the human contribution to causality. Hence, fifthly, the allocation of responsibilities and the 'ownership' of change leadership has remained unresolved, and the urgency of change has been widely resisted by particular governments, corporations and political groups. This is true both within each country (industries, localities) and across groups of countries (developed, developing, small, large, etc.). In a polycentric system of governance, there are opportunities for both separate and joined-up initiatives. For example, in the absence of policy leadership by the US national government, 25 state governments formed the US Climate Alliance, which encourages policy innovation and investment to advance the agendas of climate change mitigation and adaptation.

Sixthly, there are significant equity issues and moral concerns around impacts and burden sharing. These conflicting perspectives reinforce the polarisation of policy debates. Examples include the argument that poor and vulnerable populations will suffer more from the harmful impacts of climate change; that poor nations should receive special incentives and assistance to make the necessary transitions; and that future generations should not suffer as a result of current inaction and selfishness. Finally, the impetus to prioritise climate action has been slowed in the wake of the global financial crisis and the global pandemic crisis; in particular, a resurgence of economic nationalism and protectionism has hindered international collective action, exacerbated by government leaders having a reduced appetite for shouldering further adjustment costs.

Taken together, these 'nested' problems constitute what Garnaut (2008) has called a 'diabolical' challenge for science and for politics, and what Lazarus (2009) called a 'super-wicked' problem for political and legislative resolution. In the same vein, Levin and colleagues asserted that the 'super-wicked' nature of climate change policy has produced a 'tragic' impasse, because 'time is running out; those who cause the problem also seek to provide a solution; the central authority needed to address it is weak or non-existent; and, partly as a result, policy responses discount the future' (Levin et al., 2012, p. 123). Psychological research has shown that discounting the future is common. Citizens and legislators generally prefer the current (and familiar) array of benefits/rewards over the

likely costs of mitigating future (but unknown) harms through substantial policy reforms and major behavioural changes. This cognitive process of 'discounting' future risks is likely to undermine the rational cost/benefit proposition that any further delay in substantially reducing greenhouse gas emissions will generate massive additional costs for remediation that will confront future leaders, stakeholders and citizens (Giddens, 2011; Stern, 2007).

Given that global warming is linked to the scale and composition of industrialisation, the pace of global industrial development has been massive. For example, the consumption of energy in India doubled between 2000 and 2020 and 80% of its energy production utilised carbon-intensive sources (IEA, 2021, p. 11). China recently accounted for half of global coal consumption and 29% of global energy-related carbon emissions (Zhou et al., 2020).

The debate on climate response policy has highlighted the differences between those who deny there is a major problem, those who seek incremental policy adjustments, and those who urge rapid and ambitious transformations. In many cases, the policy action has focused on small tangible steps to manage the symptoms of a broader evolving crisis. Examples include changes in building codes to ensure that urban infrastructure can better withstand storms, floods, fires and other natural disasters; and increased investment in emergency response capabilities. The more ambitious strategies aim at rapid reductions in the emission of greenhouse gases through a mix of incentives, standards and regulations that facilitate transition to new technologies and industry practices. Dewulf (2013) found major differences in policy framing between the mitigation and adaptation perspectives. Mitigation strategies prioritise the reduction of greenhouse gas emissions (e.g. the goal of 'zero net emissions' and phasing out 'carbon-polluting' industries), whereas adaptation strategies focus on adjusting to the likely ongoing effects of climate extremes and natural disasters. Dewulf also found that the framing of perceived threats from climate change was sometimes presented as 'external' security threats (e.g. the influx of displaced persons or 'climate refugees') rather than focusing on the need to protect the health, well-being and livelihoods of citizens. Adaptation policies have become more readily accepted as mainstream priorities because they are seen as practical necessities in the face of tangible disruptions caused by droughts, fires, storms and floods (Adger et al., 2009; Schipper & Burton, 2009; Wise et al., 2014). By contrast, emissions reduction (or mitigation) strategies have been seen as

more challenging and have been strongly resisted by incumbent industries and conservative political groups.

Substantive differences on climate policy are evident between those who champion technocratic engineering solutions (e.g., projects to deflect solar radiation or facilities to capture and bury carbon emissions), and those who seek a mix of regulatory and behavioural incentives to foster renewable energy and low-emissions industrial processes. Lomborg (2016) has argued that government leaders' pledges in 2014-2015 to reduce emissions by over 30% by 2030 would not only be expensive, but would fail to reverse global warming this century. Industry-friendly economists (and critics of 'alarmist' green politicians) have generally rejected carbon pricing schemes, instead recommending investment in technical projects, geo-engineering and energy R&D (Lomborg, 2010, pp. 381, 395). More recently, however, Lomborg has argued that carbon pricing could actually be a useful policy instrument for nudging economic change, but that the main thrust should remain with R&D for technology innovation, together with very large investments in adaptation measures for urban infrastructure and food security (Lomborg, 2020).

Climate policy preferences are tied to how people perceive the problems and their affinities with various styles of thinking. Policy research consistently shows that preferred solutions tend to be shaped by the way that problems are framed or constructed, including the way that values are mobilised by leaders and stakeholders (Peters, 2005). The framing of a complex set of issues like climate change occurs at several levels. The cognitive dimension is primarily about science, knowledge and policy ideas; the communicative dimension focuses on how messages are circulated, challenged or reinforced; the organisational or institutional dimension centres on embedded practices, rules and routines, and capacities for implementation; and the political dimension is about power, crisis management and political leadership to defend or change policies and practices. Framing of climate change response strategies should recognise these four dimensions. In doing so, policy actors need to understand the values and concerns of the public—communication with diverse stakeholder audiences needs to be nuanced and use appropriate language. The research on effective science communication has been radically revised in the light of environmental debates (Corner & Clarke, 2017; Lakoff, 2010; Turnpenny, 2012), and increasingly recognises the diversity of values across multiple audiences (Jamieson et al., 2017), as foreshadowed in theories of political-cultural segmentation. There is some evidence that framing the policy reform issues in economic terms can often be more persuasive than relying on the credibility of climate science projections (Cann, 2021).

Using Collaborative Approaches for Environment Policy

Democracies usually display a pluralistic divergence of viewpoints. Because it is not possible to resolve environmental policy disputes through 'more science', policy leadership and engagement processes need to take account of divergent interests at local and regional levels, and across industry sectors. Many areas of environmental policy and natural resource management have been regarded as wicked problems whose levels of complexity and conflict can only be managed effectively through drawing upon collaborative approaches (DeFries & Nagendra, 2017; Head et al., 2016).

Critics of contemporary policymaking argue that the standard managerialist approaches of modern government, along with the 'technocratic scientisation of public policy', cannot effectively address the wicked social, economic and ecological issues of modern societies (Fischer, 2003; Frame & Brown, 2008). Performance metrics and standards are vital, but multi-stakeholder discussion processes are necessary to articulate and mediate the differences in values that underlie policy disagreements. Ideally this could lead to constructing a better-informed basis for broad agreement on longer-term goals and medium-term policy initiatives.

Policy and planning processes for environment and natural resources have shifted over time towards higher levels of engagement and cooperation with stakeholders at local and regional levels. To take an example that has been thoroughly researched in the USA, the regulation of watersheds (or river basins) was traditionally the responsibility of specific functional agencies, but the planning arrangements have gradually been opened up to multiple stakeholders and the general public. This shift was partly due to pressures from stakeholders and partly due to the persistence of underlying problems such as water quality, biodiversity conservation and protection of coastal areas. The involvement of stakeholders led to a variety of more cooperative arrangements for managing water and natural resources (Wondolleck & Yaffee, 2000). Moreover, the emergence of network organisations has enabled the rise of knowledge-brokering functions, which increase the flows of information relevant to specific environmental issues (Michaels, 2009). Stakeholder involvement has also

been championed in the emerging environmental research literature on co-production and co-design (Miller & Wyborn, 2020).

Experience with more inclusive and networked models in some issueareas has been encouraging (Goldsmith & Kettl, 2009), but many practical difficulties have emerged in attempting to use more inclusive approaches for tackling complex interconnected problems (Koontz & Thomas, 2006). On the one hand, improving dialogue between conflicting stakeholders has been seen as 'good politics', but on the other hand, it was less certain that positive environmental outcomes were being achieved. Paul Sabatier's research team raised some tough issues:

Many of the "solutions" reached in collaborative stakeholder settings may be good political compromises, but they do not really solve the environmental or socioeconomic problems plaguing a watershed. Conversely, many negotiated solutions may be appropriate from a physical environmental standpoint, but they may leave out key stakeholders who will pursue other avenues of blocking implementation. Many collaborative efforts create policies that rely on voluntary cooperation without any formal legal enforcement mechanisms, which often creates considerable doubt about the likelihood of policy implementation. (Sabatier et al., 2005, pp. 5–6)

Thus, watershed management forums were sometimes criticised for being politically symbolic arrangements which distracted attention from ongoing water management problems. At the same time, however, inclusive processes provided the opportunity for addressing the social interaction dimension of complex problems. Sabatier's team reviewed the evidence about factors that facilitate the formation of more collaborative arrangements and increase the likelihood of producing positive results. While recognising that the US institutional and political culture is different from elsewhere, they suggested that multi-stakeholder agreements are more likely to be successful when there is a pressing need to overcome gridlock or stalemate; when all major stakeholders are included; and decisions are made through consensus. The convenor would ideally be a 'respected, knowledgeable and neutral' person, and network members should stay personally involved and committed to longterm discussion (Sabatier et al., 2005, p. 197). Building trust and respect among network members is always seen as important, but there are also practical benefits in finding the 'right' mix of membership (Ansell et al., 2020).

There is a large literature on 'collaborative' governance and the benefits of organisations working across sectoral boundaries (Weber & Khademian, 2008). Collaborative processes may contribute to better information and lead to innovative solutions (Ansell & Torfing, 2014; Sørensen & Torfing, 2021). The modern literature on interactive governance and stakeholder engagement confirms the empirical trend towards cross-sectoral relationships and interdependence, and there is an increasing number of research studies exploring the conditions under which partnerships and network forums can be successful (Douglas et al., 2020). But inclusive discussion in the policymaking process has arguably fallen short of fully 'collaborative' approaches. This is because, unlike cooperation and coordination, full collaboration requires genuine powersharing (Keast et al., 2004), and such devolution of power has been a step too far for most public agencies.

Two important caveats have emerged. Firstly, collaboration is not just about achieving consensus; effective problem-solving and effective program management require a clear focus on goals and strategic directions. Secondly, while stakeholders in industry and community are crucial, the overarching role of public authority remains vital for effective problem-solving and implementation (Crowley et al., 2020; Pierre & Peters, 2005; Torfing et al., 2012). In addition to their regulatory and coordination roles, government agencies are also vital for monitoring trends, and adjusting the flow of policy advice as circumstances evolve; these roles are required for responding to slow-onset deterioration in environmental conditions (Tosun & Howlett, 2021).

One of the processes recommended for enhancing the sharing of knowledge and developing shared goals is the use of mediation and dispute resolution techniques. This is a specialised area of professional skills. It is widely seen as valuable for managing and mitigating social and environmental conflicts (Lewicki et al., 2003; O'Leary & Bingham, 2003; O'Leary et al., 2004). The argument is that wicked problems can be better managed (though not magically cured) by exploring and mediating divergent perspectives through a process of dialogue and deliberation. This process can also facilitate consideration of the inherently difficult choices about priorities and trade-offs.

The other major process that can empower and complement collaborative forums is the mobilisation of governmental administrative resources. For example, public sector coordination is generally necessary to focus organisational effort on the strategic goals enunciated by government

leaders, who in some cases might build on the agreements forged in multi-stakeholder forums. Whole-of-government approaches and 'joinedup' government strategies are often needed to align the resources of diverse agencies to the announced priorities of government. Inter-agency coordination through 'joined-up' government is a common challenge for addressing many complex problems. The broader challenge is to establish effective cross-sectoral arrangements to bridge the vast divide between public sector agencies and the various non-government spheres represented by business, community and research organisations (Torfing et al., 2012). Framework agreements can provide a useful instrument for harnessing the activities of key actors within government, across levels of government and across other sectors. For example, in the European Union, complex environmental issues have been tackled through agreements such as the Water Framework Directive in 2000, which established principles for integrated water basin management but allowed flexibility in implementation according to local contexts. Similarly, the EU Waste Framework Directive in 2008 laid out targets for waste reduction and resource recovery while recognising the need for local variations.

In conclusion, the toolkit of environmental policy instruments has expanded greatly, taking into account the wide variety of issues, their locations, and the capacities of governments and other policy actors. Legislation to establish environmental agencies, regulatory standards and data-bases for monitoring and evaluation have significantly increased capability and awareness. Over time, business entrepreneurs have developed new technologies for green transitions, and governments have experimented with pricing, taxation and market-based incentives to leverage pro-environment behaviour. The innovation agenda is further discussed in later chapters.

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CHAPTER 6

Improving Social Well-Being and Social Equity

Abstract Protecting and enhancing the well-being of citizens is a central goal of modern governments. The specific social programs adopted in various countries reflect their local political and economic contexts. The range of problems considered is very extensive—such as public health services, education and training, social support services, crime and corrections and issues concerned with discrimination in relation to age, gender, ethnicity and religion. The core pillars of social policy—especially income support, health, education, social services and civil rights—broadly constitute the modern 'welfare state'. All the social reforms were controversial when first proposed in earlier times. As public expectations gradually increased, so political ambitions correspondingly shifted. In most democracies, the problem of deep and enduring poverty, along with gender-based discrimination, came to be seen as unacceptable features of advanced societies. But many programs have remained controversial. Thus, the key dimensions of wicked problems—complexity, disagreement and uncertainty—have permeated social policy debates. The chapter includes a brief discussion of two case studies of wicked problems in action—policies to tackle homelessness and policies regulating drug use.

Keywords Wicked social problems · Social inequality · Social equity · Homelessness · Harm reduction · Prevention policies · Drugs control · War on drugs

Introduction

This chapter outlines some core features of modern social policy in the context of wicked problems analysis. After noting the main pillars of the 'welfare state' programs found in many democratic societies, the chapter shows that social policy debates are often framed in terms of stark alternatives, such as urging individual responsibility and self-management versus providing social support for disadvantaged groups. In policy terms this translates into binary preferences—such as punishing the use of illicit drugs or minimising the harm from drug use; providing crisis health care or investing in long-term prevention programs; supporting social groups deemed to merit assistance or choosing to neglect the 'undeserving' poor; relying on charitable programs for the poor and homeless, or providing public investment for housing and livelihoods; and so on.

Lack of tolerance and disrespect for social differences are the cause of much distress and conflict at many levels, from households through to the large cities. The social movements seeking greater protection of women and children have made some progress but domestic violence and gender-based discrimination remain significant challenges. The civil and legal rights of 'citizens' are superior to the rights of immigrants and refugees (King, 2021; Murray & Longo, 2018), and these differences are fiercely defended in ongoing debates about restrictive welfare policies and border controls. Attitudes to crime and punishment have remained polarised, with little sign that the well-entrenched divide between tough law enforcement positions and the more sociological approaches to harm reduction can be bridged. Many of these social issues are anchored in multiple sources—various forms of structural power (e.g., access to economic and legal resources), together with various social norms and practices that reinforce hierarchy and tolerate discrimination. Proposed remedies are widely resisted; acceptable improvements are difficult to negotiate and implement. In many cases, changes in values and behaviours are needed, but changes in social norms and behaviours are very difficult to define, promote and enforce.

Individualist and collectivist political cultures have shaped different features of policy design, with the former preferring policies that promote self-improvement and individual choice, whereas the collectivist orientation accepts public responsibility for building support systems that enhance social well-being and potentially expand the scope of state action. These different orientations are clearly visible in contemporary debates about inequality.

CONTESTED FRAMINGS OF INEQUALITY

Many of the wicked problems noted by Rittel and Webber in 1973 were about socio-economic inequality and urban planning. They argued that the policy and planning choices available to decision-makers were inherently anchored in competing values, reflecting the divergent perspectives and priorities of stakeholders. Rigorous analysis of social data was seen to be valuable, but they argued that such analysis could not generate consensus about the 'best' policy response. Decisions should acknowledge stakeholder differences and the plural interests comprising modern democratic societies. In addition to managing different sets of values and interests, service programs need to be well managed and skilfully coordinated. These challenges have been well canvassed in comprehensive prevention programs. Thus, the impact of a specific initiative might be too weak in the absence of additional supportive measures coordinated across various policy fields. Social problems are often found together e.g. substance abuse, school drop-out and depression are influenced by risks in multiple social domains, e.g. family, school, peers and individual factors. Hence complex interventions are necessary, requiring careful planning and adequate funding across several policy domains.

The policy challenges of inequality and social vulnerability are large and ongoing, even in relatively rich countries. Social reform proposals are always controversial, with partisan advocates and critics urging different policy directions and funding priorities. The modern welfare emerged unevenly in different countries during the postwar decades of the twentieth century (Esping-Andersen, 1990), with the strongest programs in the Scandinavian countries and the United Kingdom. The core social policy pillars of the welfare state—especially income support, health, education, social services and civil rights—were widely contested when first proposed, and reforms were hard-won especially in the more individualist political cultures such as the United States. For example, the US federal legislation in 1964-1965, which granted civil rights and voting rights for ethnic minorities, was accompanied by extended turmoil and struggle for meaningful implementation of these rights and opportunities. The US government also initiated new investments in education, social security and employment programs to combat poverty and disadvantage. The success of these 'Great Society' initiatives in the 1960s was strongly disputed—advocates praised the progressive social goals and some initial achievements across several related fields (Levitan &

Taggart, 1976), whereas critics claimed there was wasteful 'big spending' on hastily constructed and ineffective programs (see overview in Aaron, 1978). The program planning and implementation capacity for urban renewal programs (job-creation, public works and housing) was also criticised for its poor coordination and lack of performance information (Pressman & Wildavsky, 1973). Similar social policy debates have echoed throughout more recent discussion of social security, citizenship rights, education, public health services and the welfare state in OECD countries (Esping-Andersen, 2015; Greve, 2020; Van Kersbergen & Vis, 2014).

In order to illustrate the wicked aspects of debates about social well-being and public health, the chapter considers two main examples—homelessness and drugs policies. There are many other debates that could provide insights about social behaviour and social regulation, such as child protection, domestic or family violence, crime and punishment, health insurance, healthy nutrition, racism and sexism, immigration and refugees, Indigenous cultures, and so on. In many instances, the historical debates about sub-group differences have been framed by mainstream demands for social conformity and enforcing dominant views about 'normal' behaviour. In prosperous times, the pressure for all groups to adhere to mainstream values and behaviours has been partially relaxed, assisted by appeals to the principles of tolerance and civic rights. In times of crisis and social turmoil, discrimination tends to be strengthened. Many social science research initiatives have explored the issues underlying these social problems and associated policy debates. Social research has attempted to:

- explain the multiple values, interests and perspectives that shape enduring disputes and disagreements about the nature and significance of social problems (e.g. Bacchi, 2009; Stone, 2012);
- examine the multiple causal factors (attitudes, processes, resources and power relations) that underpin social disadvantage, social conflict and anti-social behaviour (e.g. France & Homel, 2007; Van Ryzin et al., 2018); and
- provide reliable knowledge about the relative effectiveness of particular services and programs that address these problems (e.g. Boaz et al., 2019; Campbell Collaboration, 2021).

Homelessness as a Wicked Problem

Homelessness, broadly understood as inadequate housing for individuals or social groups, is an enduring problem internationally. Homelessness occurs in countries with very different demographic and socio-economic profiles and different levels of welfare support services. From time to time, the problem attracts enhanced political attention leading to new policy initiatives. Welfare interventions—income safety nets, social housing, performance targets and billion-dollar programs—have aimed at reducing or preventing homelessness, as part of broader concerns for poverty reduction, but the problem of homelessness persists in many forms. As with all forms of 'deep and persistent' disadvantage (Productivity Commission, 2013), several interacting factors underlying poverty and homelessness can be readily discerned. These contributing factors are all hard to prevent and mitigate. And there is a risk that patterns of social exclusion will become long-term, extending even across generations. The discussion in this section begins with a brief consideration of definitions and problem framing, and then examines causal explanations, policy agendas and arguments about policy solutions.

What is homelessness? Globally, it has been suggested that around 1.6 billion individuals lack adequate housing, while recognising different local standards (Keenan et al., 2021). Within the group of comparatively rich democratic-capitalist countries, it has been suggested that around 1% of working-age adults lack 'stable accommodation'. In addition, around 10% of families have great difficulty in meeting their housing costs and are therefore at risk of losing their accommodation (OECD, 2020). Homelessness is taken to include short, medium or long-term exclusion from stable and adequate housing. The homeless include those 'sleeping rough' in public spaces and abandoned vehicles, people in temporary or transient accommodation and immigrant refugees displaced from neighbouring countries. The quality of available shelter varies widely, including overnight dormitories provided by charitable organisations, and short-term refuges for women and children seeking safety from personal violence. In all these situations, people have very limited control over their material living conditions and thus little control over the key aspects of their lives. Their personal experiences are marked by distress, on the one hand, and gritty attempts to survive and adapt, on the other hand. In short, homelessness is a symptom of significant disadvantage, arising from diverse situations with multiple causal patterns. Some people endure

long-term or chronic homelessness (and are more likely to be registered in official statistics on homelessness), whereas others have more hidden, informal and transitional experiences.

The research literature on shelter for disadvantaged people in advanced industrial societies has a substantial history. Researchers largely agree that lack of income and the high costs of accommodation are the two overarching material factors that drive the rate of homelessness. However, the lack of access to adequate accommodation is often a symptom of other associated problems which serve to disempower the disadvantaged groups (Parsell, 2017; Snow & Bradford, 1994). These multi-layered causal factors include various forms of disability, poor physical or mental health, drugs/alcohol addiction, lack of work skills or employability, and the need to escape child abuse or family violence. Homelessness is seldom the 'choice' of the unfortunate victims of situations caused or exacerbated by others, whether resulting from individual aggression or dysfunctional household dynamics.

Research on public attitudes has demonstrated broad community understanding of the nuanced and multi-layered nature of homelessness. In other words, the public generally understands that homelessness is a multifactorial problem—a perception that is consistent with the findings of research literature. In a survey of US public attitudes, Tsai and colleagues (2019) found that a majority of respondents could identify multiple causes of homelessness, including clusters of structural, intrinsic and health factors. The research team concluded that among these structural, intrinsic and health factors, 'the strongest causes that [survey] participants endorsed in each category were shortage of affordable housing, irresponsible behavior, and substance abuse, respectively' (Tsai et al., 2019, p. 89).

There have been many difficulties in gaining high policy priority for the homeless, who comprise several sub-groups that attract somewhat different levels of sympathy and support. Deeply disadvantaged groups can be variously regarded either as innocent victims of circumstance, or as a dangerous underclass, or as a disparate collection of 'undeserving poor' (Schneider & Ingram, 2005). Among political leaders, some conservatives see homeless people through a 'deficit' lens. From this perspective, the homeless are often seen as lacking work skills, indulging in anti-social behaviour and constituting a potential threat to civility and community safety. Strong policing interventions can render the homeless less visible, by their removal from public spaces, along with provision of emergency

shelters for highly vulnerable people needing personal protection. This perspective aligns with an individualist and meritocratic view of the poor as lacking self-discipline and work motivation, and therefore requiring paternalistic restrictions on their conduct and their choices (Soss et al., 2011). To the extent the poor and homeless include victims of bad luck or external crises—hence, more deserving of support—the traditional conservative perspective holds that individuals and their kinship networks should have primary caring responsibilities for disadvantaged family members. Thus, charitable and religious organisations should play the main support role in service provision, with the state providing direct support only in the last instance. To the extent that public funding is necessary for support services, programs are generally outsourced to non-government delivery organisations under tight conditions prescribed by government. This welfare 'conditionality', according to Watts and Fitzpatrick (2018), entails prescribing a set of behaviours expected of those seeking access to social benefits, and these restrictive behavioural conditions are reinforced by systems of monitoring and enforcement.

Welfare conditionality has also been adopted by social-democratic governments in order to encourage pro-social behaviour on the part of welfare clients. But historically, social-democratic political leaders have displayed a more collectivist and egalitarian orientation to addressing deep disadvantage. They link homelessness to their wider policy agendas of reducing deep poverty and providing support services for those in most need. Together with health services, income support has been the key feature of social expenditures in OECD countries (OECD, 2019). Cash transfers are generally available for unemployed adults and their dependents, people with disabilities, the aged, and those with chronic health conditions. Reform governments have developed interventions to tackle persistent poverty through active labour markets (job skills, retraining, redeployment), universal health services and coordinated support for families and households. In many countries, direct accommodation services have also been provided, often with a focus on the needs of highly dependent social groups such as single parents with young children and victims of domestic violence.

In relation to social housing services, there have been deep debates about the most appropriate policy instruments for delivering accommodation support. The debates focus on ranking the categories of 'deserving' clients, the various forms of subsidisation, the duration and conditionality of the support, levels of public investment for building additional

accommodation, and the governance arrangements for programs. The underlying issue has been whether governments should heavily invest in the construction of 'social' housing, to assist poor tenants who cannot afford the standard costs of rental accommodation in the housing market. In some countries, considerable public investment in the postwar decades was directed into building accommodation for 'welfare' clients, although these facilities were often located in areas where land was cheaper but support services were difficult to access. In multi-level government systems, all levels of government have been involved various aspects of funding, planning and managing such arrangements. However, since the 1980s with the rise of NPM managerialism and neoliberal 'small government' ideologies, successive governments have sold public housing stock and substantially abandoned their former roles as landlords and owners of accommodation for poor tenants.

The contemporary debate is shaped by the ideological divide between state-led, market-led and community-led approaches to social housing. In all countries, lack of access to 'affordable housing' for poor families remains an entrenched or structural problem. Given that people in poverty cannot afford accommodation in the regular market, what is the role of government in providing accommodation options? The neoliberal preference is for governments to step back from a direct role and to utilise market-based mechanisms to achieve effective housing outcomes. For example, rent subsidies in the private market are preferred to public provision, thus avoiding overheads in terms of staffing, reporting, coordination and compliance. However, this does not address the complex needs of many homeless people in chronic poverty, who may require several forms of service intervention (OECD, 2020a). The neoliberal model generally overlooks the accepted links between several dimensions of disadvantage (such as the close links between shelter, health, safety and employment).

Research and evaluation studies have produced detailed knowledge about the risk factors and complex causal mechanisms that can inform service improvements and interventions. However, evidence-informed policy interventions are difficult to design, owing to the high variability in individual circumstances and contexts, and the difficulty of implementing sound strategies in the face of political polarisation. In the past, people seeking social housing have generally been assessed not only in relation to

their needs but their behavioural tractability. Conditions attached to eligibility for social housing have discriminated against people with criminal histories, drug use and mental health issues.

An alternative approach has been trialled since the 1990s in several countries. Known as 'housing-first', this model places much less emphasis on conditionality and more on rapid access to accommodation and human rights for housing (Clarke et al., 2020). The assumption is that health-related and skills-related challenges can be best addressed within secure housing. 'Housing-first' strategies seem to have an early record of achievement (Padgett, 2013), providing they are fully funded (Parsell et al., 2013). Two systematic reviews for the Campbell Collaboration recently confirmed that timely provision of social housing enhances stability of accommodation tenure and improves effective treatment of health-related conditions among tenants (Keenan et al., 2021; Moledina et al., 2021).

However, the structural problem of housing under-supply is a huge obstacle to improvement. Thus, while several OECD countries are developing innovative 'housing first' approaches to address homelessness, 'temporary shelter and emergency services' remain the dominant model of provision, despite their limited capacity to facilitate sustainable exits from homelessness (OECD, 2020a). According to a critical overview of studies to reduce street homelessness, the lessons that should have been learned include: 'be housing-led, offer person-centred support and choice, take swift action, employ assertive outreach leading to a suitable accommodation offer, ensure services address wider support needs, and collaborate effectively between agencies and across sectors' (Mackie et al., 2019).

A multi-layered approach is clearly necessary to reduce homelessness and mitigate risk. Cooperation across sectors is needed, and competition for scarce resources needs to be managed (MacLeod et al., 2016). Given the chronic scarcity of housing, additional strategies are needed to ensure the safety and dignity of those who fail to access adequate accommodation (Coleman, 2012, p. 277). The 'housing first' approach has been complemented by 'micro' services provided by charitable groups (such as food distribution and mobile laundry); these are indeed important and well-intentioned initiatives. But they cannot deal with the fundamental challenges of insufficient housing availability and declining affordability. Market structures and tax incentives drive the spiralling costs of rental accommodation and private home purchasing (for example, see Metcalf, 2018 for USA and Maclennan et al., 2021 for Australia). Some elements

of the social housing crisis could be improved through encouragement of innovative not-for-profit housing associations, and through policy and regulatory changes to tax incentives. However, the power elites that enjoy the benefits of large inequalities in asset wealth are also adept at political persuasion and resisting major reform. These massive untamed housing problems occur in most large cities of the world.

DRUGS POLICY AS A WICKED PROBLEM

Modern societies have long grappled with the complexities of regulating the use of drugs. Some drugs are specified or endorsed for official use in clinical-medical settings. Very different rules—including prohibition and criminalisation—govern the use of 'illicit' drugs in recreational and social settings. The political economy of drug production and distribution is 'big business' in every sense. On the one hand, the authorised pharmaceuticals industry is a vast and profitable sector. But on the other hand, the lucrative illegal trade in narcotics is dominated by criminal cartels, which use violence, intimidation and corruption to protect their supply chains and expand their illegal enterprises.

There are many ways of framing the problems and goals in drugs policy, depending primarily on whether the key priority is given to strong law enforcement (to suppress drug use and distribution), or alternatively, whether the priority is given to the health of all citizens (by reducing avoidable deaths and diseases associated with drugs). There are disagreements about values and major gaps in knowledge regarding drug use and drug regulation. In short, there are major debates about measures to tackle the diverse challenges, the scale at which responses are required, and who should be responsible for fixing the problems. Policy responses vary widely. At one end of the spectrum, militarised force is used to repress drug cartels, disrupt their business models and incarcerate large numbers of gang members. At the other end of the spectrum, public health services provide treatments for drug addiction, conduct education campaigns about the dangers of non-medical use of drugs, and consider the likely effects of decriminalising 'soft' drugs for personal use. Individuals with drug addictions often suffer from multiple risk factors including mental and physical health conditions and unstable housing. However, mainstream politicians who want to project an image of 'strong leadership' in the war on drugs are often attracted to tough law-and-order policies that are intended to deter drug supply and drug use, with high penalties and well-publicised enforcement efforts. Policies about illicit drugs tend to be directed either at controlling and suppressing illegal production and distribution (supply-side controls) or directed at regulating individual users of illicit drugs. The research evidence tends to show that prohibition and deterrence are not effective, or have unintended negative effects, owing to the profitability of trading in illegal commodities and the addictive dependencies of many consumers. Suppression or disruption in one locality may facilitate expanded activities elsewhere.

Many commentators regard the drug-control policy field as marked by inconsistencies, paradoxes and unanticipated effects (McKeganey, 2011; Roberts & Chen, 2013). The criminal violence that underlies the illegal drugs trade is a product of the illegal status of the narcotics and the premium prices available in rich countries for the raw materials (e.g. opioids) produced mainly in developing countries. Complex situations have emerged in the latter countries owing to the inter-dependencies between the livelihoods of rural workers and local warlords in remote borderlands. International organisations hoping to broker peace-deals must contend with the 'fundamental tensions and trade-offs' between the goals of sustainable development, drugs control and peace-building (Goodhand et al., 2021). The international dimension of the drug trade increases the political complexities and knowledge gaps. Many analysts have agreed on the need to rethink fundamentals (Clark et al., 2021). Recent appraisals indicate a growing consensus across the political scale from conservatives (Covne & Hall, 2017) to progressives (Bartilow, 2019)—that the so-called 'war on drugs' and its prohibitionist attempt to crush the drug importation trade has been a failure and even counterproductive. Criminal gangs have also turned to other lucrative options based on local production of synthetic narcotics (such as amphetamines), which have become widely available through a myriad of decentralised labs.

Alternative policy strategies, such as decriminalisation of several classes of drugs, have been increasingly advocated by domestic and international lobbyists as the best way to undermine the profitable business model of the crime gangs that control the illegal drugs trade (Garcia-Sayan, 2018). These alternative approaches to drugs policy have largely been motivated by public health concerns rather than law enforcement. The drugs challenge is reframed in terms of improving health services to minimise harm to individual drug users and their households. Clinical measures include specialised centres for the treatment of drug addiction, such as

safe-injection clinics which aim to reduce drug overdose deaths, minimise transmission of needle-related diseases and encourage drug substitution (such as methadone) and the rehabilitation of addicts. Some such initiatives benefit from retaining a low-key public profile, while being strongly supported by local professional networks (O'Keefe et al., 2020). Senior health bureaucrats and program evaluation researchers are likely to focus on the strategic level of policy learning and design, leaving the advocacy groups and service providers to generate political momentum for expanding harm-reduction services (Baker et al., 2020).

In countries where drugs policy has become aligned with health service delivery rather than policing, the political culture may be more open to considering sensitive policy options such as decriminalising certain forms of drug use. Decriminalisation in various forms has proceeded in many countries since around 2001 when Portugal deregulated the possession of drugs for personal use (Hughes & Stevens, 2020). Proposals to permit individuals to consume small quantities of certain drugs for personal use are sometimes accompanied by proposals for the state to establish heavily regulated markets for various drugs (Rolles, 2010). There is substantial evidence that countries taking a more liberal stance have not witnessed an overall rise in drug use and drug-related deaths. But the disjunction between evidence and politics is severe on these issues. A UK parliamentary committee reported in 2019 that the traditional repression model for drugs control was failing and that a health-oriented model should be considered. However the government responded that it would not be changing its stance on drugs policy (Burki, 2019). This outcome is consistent with debates in the UK in earlier decades. For example, Monaghan (2011, 2014) found that the expert advisory bodies had tended to favour liberalisation of the regulatory regime governing personal drug use (especially regarding cannabis); but that ministers and MPs were guided by conservative political values.

The prohibition approach and the 'war on drugs' have reinforced the militarisation of law enforcement to combat crime gangs. In some countries like the USA, this policy also accelerated the number of incarcerated offenders (Travis et al., 2014), and even encouraged private investment in the prison sector as a growth area for private enterprise. An analysis of US drugs policy and enforcement systems, commissioned by the American Enterprise Institute, concluded that drugs policy was failing in most of its elements (Boyum & Reuter, 2005). This study recommended that incarceration for low-level offences for distribution and use

of soft drugs should be avoided; and that programs be greatly expanded for treating addiction. Harm minimisation programs, aimed at mitigating adverse effects of drug addiction, provide safe facilities for drug injection to reduce the danger of infection or overdose. Critics of this approach claim it might encourage drug use. In some cases, an offending addict is required by a court to undertake a methadone program as an alternative to prison.

Strengthening primary prevention strategies, through drug education, is also recommended by many health professionals. Drugs education programs, to reduce the likelihood of children and teenagers experimenting with drugs, are aimed at the entire school-age population. Some programs are also targeted to address the social precursors to drug use, such as troubled family life, low self-esteem or poor schooling. This is a very difficult area of social intervention, given that family dysfunction may increase the difficulties of a collaborative approach.

Thus, formulating and implementing policies to control illicit drugs is highly complex and contested (Alford & Head, 2017, p. 408). There are many types of drugs, some extremely dangerous and not suitable for legalisation. There are also many moral viewpoints about the use of soft and hard drugs. Drug use is found across all social classes, from rich celebrities through to socially marginalised groups. There are many types of actors with diverse roles and motivations among the disparate groups of suppliers, consumers, enforcers, policy managers and regulators. At the heart of drugs policy lie two inherent complexities: illegality, which generates gaming around access to rewards; and addiction, which rules out solutions dependent on the rational interests of addicts. The clandestine nature of the illegal drug trade and its global dimensions entail many unknowns about how to influence the large and small actors in this trade. At the level of individual addicts and habitual drug users, there are many contending views about how people become addicts and the place of personal responsibility for self-harming decisions. There is a strong argument for non-custodial sentencing in response to low-level offences such as simple possession (Stevens et al., 2022). All these factors and diverse perspectives combine to ensure that clarity and consensus about drug policy cannot be reached.

The case for conceiving of drug policy as a wicked problem is very strong. There is no basis for reasoned consensus either about the framing of the overarching problem or about the preferred effective solution. Such examples help us come to terms with the degree of difficulty in tackling

wicked problems. They also help us to identify which particular aspects of the problem are more deserving of our attention, and what kinds of intervention might be effective in tackling which part of the problem.

CONCLUDING COMMENT: KNOWLEDGE FOR TACKLING WICKED PROBLEMS

The positive contribution of the social sciences in the domain of wicked problems is to provide evidence-informed analyses of issues and options and to work alongside policy-related actors to improve the quality of public debate and deliberation on important issues. The 'science' dimension of policy knowledge is diverse, since there are several valued forms of understanding and there are diverse stakeholders who hold relevant knowledge and experience. In considering wicked problems, it is clear that the 'science' element (however broadly defined) is plural rather than singular; and that values and interests form the context in which various forms of knowledge contend to determine an acceptable solution. This approach implies that different problems have different features that increase the prospects for a shared understanding and agreed solution. In this sense, a policy problem will be more likely to be experienced as intractable and wicked when some or all of the following conditions are present:

- *Structural complexity*: inherent intractability of the technical (i.e., non-stakeholder-related) aspects of the problem.
- *Knowability*: Not only is there little knowledge about the issue, but the nature of the problem or its solution is such that it is *unknowable*—that is: the relevant information is hidden, disguised or intangible; it comprises multiple complex variables; and/or its workings require taking action to discover causal links and probable outcomes.
- *Knowledge fragmentation*: the available knowledge is fragmented among multiple stakeholders, each holding some but not all of what is required to address the problem.
- *Knowledge-framing*: some of the knowledge receives either too much or too little attention because of the way it is framed, thereby distorting our understanding.

- *Interest-differentiation*: the various stakeholders have interests (or values) which are substantially in conflict with those of others.
- *Power-distribution*: There is a dysfunctional distribution of power among stakeholders, whereby very powerful actors can overwhelm less powerful ones, even if the latter constitute a majority consensus; or whereby sharply divided interests are matched by sharply divided power (Alford & Head, 2017, p. 407).

Many analysts agree that the level of intractability of a policy problem depends on the extent of divergence among stakeholder viewpoints, linked to different values and different assessments of uncertainty and complexity (Hoppe, 2010). But the capacity to manage difficult problems also depends on governance capacities (Howlett et al., 2015; Pierre & Peters, 2005). These capacities and resources include organisational resources, skilled analysts, competent managers and performance-oriented leadership, but these factors must operate in local contexts that are shaped by patterns of conflict and cooperation, the previous history of policies and programs, and community perceptions of procedural fairness and legitimacy. The capacity to develop relatively evidence-based or expertdriven approaches to social problems is not widely available, and the desire to follow that pathway is considered misguided by some scholars and practitioners. Given the inadequate development of governance arrangements for dealing with large and compound problems, some analysts have argued for a pluralist and incremental approach (rather than a comprehensive architecture for rational policy planning). In accord with the pluralist assumptions of cultural theory, the quest for rational scientific solutions has been rejected by those who favour a more pragmatic and adaptive approach that tolerates iterative and partial solutions.

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CHAPTER 7

Policy Innovation in Turbulent Times

Abstract Innovative solutions are increasingly recommended because many of the old-style solutions (see Chapter 3) are found to be ineffective. This chapter explores the felt need for greater innovation in tackling social, economic, technological and bio-health issues. Improved knowledge and understanding are required not only to appreciate and foster innovations, but also to identify appropriate ways to regulate new technologies. The chapter considers recent work on design methods for facilitating social innovation. Much of this work is aimed at the local level and place-based contexts, rather than aspiring to design mainstream programs at a national level. The chapter considers the arguments in favour of social experimentation and co-design processes for addressing wicked problems. It concludes with some observations on the contemporary politics of populism and opinion-based policy ideas.

Keywords Innovation · Trust · Risk regulation · Legitimacy · Policy effectiveness · Digital economy · Artificial intelligence · Biotechnologies · Social experimentation · Co-design

Introduction: Competing Sources of Policy Knowledge

Policy problems and challenges abound. Many of them are politically contentious. They test the strength, capacity and legitimacy of democratic governmental institutions. Some of the crises and wicked challenges arise at the global level, such as the destructive turbulence of civil wars, military conflict and trade competition. At the level of domestic policy, wicked challenges arise from structured inequalities and competing visions for social well-being, economic livelihoods and environmental protection. Understanding these problems is difficult and controversial. Calls for new thinking and policy innovation are increasingly common.

The social sciences can make large contributions to understanding and improving social and environmental problems, by working in conjunction with other stakeholders. The social sciences seem to go through cycles of over-confidence and self-doubt. In 1969, the US Social Science Research Council, reflecting on several years of ambitious Great Society programs, ruefully pointed out that the necessary knowledge was not yet available. But it was hoped that new policy programs, based on new knowledge, might emerge slowly and iteratively through pilot schemes that could be improved over time (SSRC 1969, cited in Moynihan, 1973, p. 267). Fifty years later, the same Social Science Research Council was somewhat more concerned about the rise of 'politicization and misuse' of social knowledge. It was also very worried about the much greater role of private corporations in producing and interpreting social data, and the gradual but steady diminution of public funding for social research. These trends posed serious risks for the reputation, integrity and perceived value of the social sciences. The SSRC called for new forms of 'collaboration among researchers, institutions, policymakers, and the private sector, to improve the pursuit of social knowledge and its potential to contribute to the common good' (SSRC, 2018, p. 2). However, there are no institutional mechanisms for achieving widespread collaboration, dedicated to agreed public purposes. Democratic political institutions provide a rough mechanism for balancing competing interests and objectives, but the quality of decisions will depend greatly on the skills of leaders. Political leaders who can innovate to achieve better outcomes while maintaining broad stakeholder support are relatively rare.

Ideally, the social sciences can contribute to well-informed discussion by improving the knowledge of participants in policy debates; and more directly, they can assist government leaders and officials to make sense of complex and contested issues. The capacity of democratic institutions to manage tough problems and conflicting viewpoints has become a critical test for the robustness of democracy. Building stakeholder confidence and public trust in institutions is difficult. The OECD (2017, p. 24) outlines five factors which contribute to building public trust in governmental institutions: responsiveness, reliability, integrity, openness and fairness. These five dimensions are linked to government responsibilities for providing public services, protecting citizens and using resources ethically. All aspects of trust-building require adherence to good governance principles, including the expectation that leaders should engage with a wide range of practical experience and sources of knowledge.

Very commonly, the polarised clamour of media commentators provides fertile ground for populist leaders to amplify impatient demands for certainty, in a world perceived by the general public as turbulent and threatening. Paradoxically, the era of data abundance has facilitated a greater diversity of interpretations and priorities rather than encouraged reasoned consensus. These fast-moving streams of opinion about threats and risks can leave many stakeholders feeling disgruntled, overlooked and resentful, and perhaps believing their interests and identities have been undermined in recent times. Given the pluralisation of the public and private spheres, it is all the more important to identify and negotiate 'effective and acceptable' policy responses. Policy knowledge and process legitimacy need to work in tandem to produce effective policy reform.

In supporting policy improvement, the social sciences do not provide a single storehouse of unified knowledge, but rather a range of methods and lenses through which complex social phenomena can be appreciated, assessed and debated. Expert knowledge is plural, ideally providing a range of complementary and informative perspectives on complex social realities. In the market-place of evidence-informed policy ideas, the social sciences can make useful contributions when researchers are attuned to significant issues and participate in discussions among practitioners and stakeholders. Social science expertise is conveyed not only through academic research centres, but also indirectly through the work of knowledge-brokering networks, think tanks, management consultancy firms and advocacy groups. There are many sources of policy innovation ideas.

In previous chapters we have noted the importance of crisis response capacities to anticipate and effectively manage disasters and sudden catastrophes (emergency management systems). We have also noted the importance of strategic foresight to inform policymakers in responding effectively to slowly evolving challenges (such as the impacts of climate change, new technologies, and the negative externalities associated with rapid industrialisation). In emerging problem areas there is low confidence in the adequacy of traditional approaches to problem-solving. Many government agencies and think tanks have become more open to encouraging new approaches. The breadth of issues on the policy agenda, including both new and old issues, has provided opportunities for re-thinking the policy innovation agenda. But the quest for new solutions needs to be progressed in ways that combine good processes (inclusive), good evidence (wide range of expertise and experience) and iterative adjustment of program delivery (adaptiveness). These factors provide the best prospects for steady improvement in outcomes under conditions of continuing change, assuming that the policy system also has adequate resources and intelligent leadership (Bryson et al., 2020). This style of policy deliberation is very different from the paradigms rational-comprehensive planning and data-driven optimisation—that were the object of strong criticism by Rittel and Webber in their 1973 article.

There is wide interest in recent debates about how to improve policy development capacity under conditions of risk and uncertainty. The arguments for more collaborative and networked approaches to policy deliberation have already been outlined in previous chapters. The other recent approach for tackling wicked problems centres on processes to facilitate innovation and experimentation; the advocates of this approach see great potential for developing novel and effective solutions.

Innovation, Experimentation and Policy Transitions

New technologies and new practices, if widely and rapidly adopted, are inherently disruptive. As Joseph Schumpeter noted (1943, Ch 7), the transformations of industrial processes and business systems constitute a continuous process of 'creative destruction'. Schumpeter's insight about the dual face of innovation reminds us that there will always be winners and losers in system-level changes driven by technical innovation. In the early phases of industrialisation, economic transformations were driven by

mechanisation and electrification. In more recent decades, these processes have been overlaid by revolutions in computerised data analysis, digital communication, machine intelligence and bio-tech engineering.

Technical inventions and patents are generally taken as the key signs of rapid innovation and economic value, but many inventions and technical adaptations do not produce social value. Public policy in a democratic society should be judged by normative criteria such as public value, social equity and environmental impacts. When innovation drives socioeconomic and environmental change, the outcomes are seldom neutral. Benefits in some areas are often offset by harm or disadvantage elsewhere. Just as there have been major disruptions and uneven impacts in economic system changes, a similar pattern of disruption is evident in the impacts of industrialisation and rapid urbanisation on ecological systems and natural environments (e.g. depletion of natural resources, destruction of biodiversity habitats, pollution of air and water resources). Such environmental destruction was largely overlooked by policymaking elites for two centuries. As noted in Chapter 5, environmental policy issues have become more widely recognised and prioritised only in recent times, signalled by strategies and agreements aiming to protect ecological systems from further irreversible damage.

Advances in productivity benefit some more than others. The development of new products and services can be very profitable for investors and inventors. However, some stakeholders in economic systems are typically left behind—for example, those whose capital investments and jobs depend on systems that are rapidly becoming obsolete. Without rapid adaptation they become major losers, without a safety-net. Hence, in contemporary democracies, industry innovation and structural adjustment policies have become a higher priority for political leaders (Edler & Fagerberg, 2017), in order to mitigate the negative impacts of transitions. Modern industry policies—such as measures to accelerate a shift from fossil fuels towards renewable energy (Green & Gambhir, 2020)—accept that incentives and subsidies will be needed for two different sets of stakeholders, reflecting the two faces of innovation. Firstly, there are measures to reward and encourage entrepreneurs who are willing to invest in desirable new technologies; and secondly, other measures are designed to compensate those who cannot readily adapt because their capacities are low and transition costs are high.

In contemporary democracies, one of the great public policy challenges is to encourage innovative solutions and new agendas (Albury, 2005;

Bason, 2017; Mulgan, 2014; Wanzenböck et al., 2020). Applying new technologies for social and economic improvement has become a vital commitment on the part of modern governments. But the *quality* of the policy system outputs should not be determined solely by novelty and innovation. It is also necessary to ensure that social value is advanced, externalities are mitigated, and the hard-won benefits of past endeavours are protected, including good governance processes. This is a difficult balancing act between the old and the new, but the quest for policy innovation should take full account of institutional knowledge and experience. In the absence of institutional knowledge and memory, novel policy options might be difficult to implement and might have unintended effects on state capacities and public trust.

In a fast-moving policy field, where risks and uncertainties are high, experiments that fail are likely to be frequent. Innovation advocates regard this as opportunities for learning ('intelligent failure'), and opportunities for improvement through rapid cycles of trial-and-error (Hartley & Knell, 2021; Mulgan, 2014). Edmondson has argued persuasively there are many reasons for failure in social, economic and governmental decision-making. Some types of failures arise from ignorance or incompetence and are avoidable; some failures arise from well-known risks and can thus be anticipated, with procedures in place to mitigate risk. In other cases the events may be novel or unpredictable, in which case the challenge is to respond rapidly and 'learn from failure' (Edmondson, 2011). This approach works best at the level of small-scale experiments, where there is an acceptance that useful outcomes emerge only through iterative refinements (Cannon & Edmondson, 2005).

A number of policy scholars suggest that policy learning should be a specific goal in policy review and reform. For example, Sanderson (2009) argues that policy learning should be central in the processes for designing innovative approaches to complex and intractable policy issues. Adaptive approaches, with rapid evaluation and adjustment processes, could allow new ideas to be tested with minimal risk of negative impacts elsewhere in the system. Sanderson (2009) argues that placing a high priority on learning and continuous refinement of options can facilitate the necessary adaptations to unpredictable changes occurring in complex systems. Policy innovation to tackle wicked problems thus requires a more flexible and open mindset by policy leaders, including both public managers and their Ministers. In many countries, some key features of the political culture (e.g. bureaucratic risk-aversion, Ministerial control of policy

agendas and priorities, focus on performance metrics) may hinder highlevel understanding that policy solutions for wicked problems are always provisional and require continual review.

The quest for policy innovation clearly requires the development of new skills and capabilities—for example in data analytics, foresight analysis, scenario mapping and experimental design—while at the same time encouraging facilitation methods to elicit new ideas and creative thinking via multi-stakeholder processes. Ansell and Gash (2018) argue that building 'platforms' for ongoing collaborative discussion, design and oversight can identify pragmatic and adaptive processes for addressing complex needs under conditions of constant change. Collaborative platforms can leverage the diverse benefits of bridging and brokering organisations. They can utilise a wide range of stakeholder knowledge and can help to expand commitments to shared goals and aspirations.

In response to practical social challenges, a large number of collaborative networks have emerged in many countries, drawing upon various forms of co-funding from the social and public sectors. Examples include NESTA in the UK (https://www.nesta.org.uk/brief-history-nesta/) and TACSI in Australia (https://tacsi.org.au/about/). They work on a range of social innovation challenges—from early childhood to aged care, from poverty alleviation to skills development and from rural development to transportation efficiency in large cities. The hallmark of these organisations is their openness to many types of knowledge and their willingness to work with other networks, clearing houses and social enterprises.

The core focus of innovation design activities is on group processes, stakeholder dialogues, and a decentralised scale for problem solutions. Key methods include design labs or policy labs (Bason, 2017, McGann et al., 2018, Whicher, 2021), group workshops and digital networks that can harvest 'collective intelligence'. Innovative design ideas emerge from dialogue among knowledge-holders who explore different perspectives and future possibilities. Recognising the impossibility of one single 'correct' answer, the emphasis is on identifying a few promising approaches which, in turn, require rapid testing and refinement. Stakeholder discussion tends to be anchored in specific local contexts. Many of the participants have no ambition to 'scale up' promising local programs for future adoption as mainstream programs at a national level. Finally, most of this 'design' dialogue work is conducted outside the core operations of government departments, often through consultants, think tanks and research centres working directly with citizens and stakeholder groups.

This positioning may limit the impact or uptake of the policy innovation ideas by government officials and leaders unless the latter are closely involved in network steering processes (Lewis et al., 2020; van Buuren et al., 2020).

Design thinking for policy innovation may draw upon a wide range of tools, approaches and types of knowledge. The toolkit for innovative thinking is diverse, and rather different from reliance on economic cost-benefit analysis, which was a key tool for options analysis in previous decades. Design thinking approaches should be distinguished from three other contenders that purport to undertake policy innovation. The first is the long-standing quest for evidence-informed policymaking, which seeks to promote the use of best-available evidence inside the politically charged institutions of governmental decision-making (Cairney, 2016; Head, 2016). Rigorous research and analysis are expected to increase understanding about relevant trends, causal links, probable risks and likely impacts of selected interventions. Much of this research uses statistical data to explore social patterns and correlations. In a 'rational' policymaking process, scientific knowledge would provide expert foundations for evidence-informed solutions A second variation of evidence-rich analysis is the use of randomised controlled trials (RCTs), to test the relative efficacy of specific messages or specific adjustments to service delivery programs. The debates about the advantages and limitations of RCTs are well known, often centred on the trade-off between the analytical rigour that guarantees reliable findings, and the narrow scope of the research questions that can be the subject of tightly controlled experimentation.

A third variation is the Nudge framework (Thaler & Sunstein, 2008), as further elaborated by the Behavioural Insights Team in the UK (Halpern, 2015) and by various Behavioral Economics networks in the US (Samson, 2021). The self-limiting nature of their behavioural trials approach (micro focus on individual choices, narrow research questions for testing, and avoidance of regulatory issues) diminishes their capacity to tackle large problems. Their advocacy of try-test-learn is consistent with the pragmatic incremental outlook of Lindblom's 'muddling through' (Lindblom, 1979), but their testing of non-regulatory choice options cannot rise above 'fine-tuning' unless they partner with other approaches that can engage with improving macro policy strategies and regulatory frameworks.

Many questions remain about the scale at which innovations need to be designed. For example, does it make sense to focus on small and manageable innovations that address part of the problem for some of the people? or do we need to focus on macro system-level changes? or develop an approach that combines all the levels? This problem is central in the 'sustainability transitions' literature, which encourages new thinking across all levels of the system, but also insists on connecting up every scale from local niche innovations through to strategic institutional reforms (Sengers et al., 2019; Voß et al., 2009). Challenges arise in every policy field concerning how learning can occur (Goyal & Howlett, 2020) and how small-scale initiatives can effectively contribute to tackling the complexities of wicked problems. We noted (at the end of Chapter 4) the potential value of the 'small wins' approach as formulated by Weick (1984) and endorsed by Termeer and Dewulf (2019).

But a 'small wins' approach or purpose-driven gradualism is a different space from the heated debate about experimental methodology that recently emerged concerning whether localised experimental initiatives can address entrenched inequalities. Two examples are noted here. Firstly, in about 1998 the World Bank began taking a more flexible and pluralist approach to program design for economic development and poverty alleviation. Its new interest in 'grassroots innovation' and experimentation led to several rounds of innovation grants, attracting hundreds of proposals. This approach also found enthusiastic support from leaders in the management innovation industry. Wood and Hamel (2002) argued that 'big messy problems' are not solved by 'a few smart people' in a policy or planning unit. These problems require that decision-makers rigorously test and refine an array of possible innovations, many of which should be sourced through grants to development stakeholders outside the traditional policy channels.

Secondly, in development economics, the award-winning research program of Banerjee and Duflo (2009, 2012) has strongly influenced the design of initiatives to address poverty and disadvantage in low-income countries. Their approach, working in cooperation with local community networks, focused on establishing trials to implement micro programs for small business. Evaluations then assessed whether these trial programs have contributed to improved skills, better access to small loans and expanded market access through new internet-based linkages. The findings of these trials then informed further refinements in the programs.

However, critics have queried the validity and relevance of scientific experimentalism at a local scale, and especially queried the transferability of findings from one context to another (Deaton & Cartwright, 2018). Other critics have claimed that the impact of micro programs is necessarily very limited in regard to tackling the complex structural inequalities of power that perpetuate disadvantage and discrimination (Rodgers et al., 2020).

REGULATING INNOVATION—THE DIGITAL ECONOMY AND BIOTECHNOLOGIES

Rapid changes involve a mix of risks, surprises and opportunities, and in turn these generate a range of arguments about strategies and tactical responses. Fast-moving crises such as natural disasters are never welcome, but they can be anticipated to some degree, and emergency response managers can therefore initiate planning and mobilise useful resources to mitigate the impacts. On the other hand, technical innovations can emerge quickly and continuously in all areas of economic and social life. These innovations are strongly promoted by entrepreneurs who claim to be delivering benefits for targeted social groups (as well as profits for inventors and investors). The typical framing of their innovation pitch is that citizens and businesses can share the benefits and widen their choices through engaging with the new products and services. Regulatory oversight of innovations is variable, and in some cases non-existent. The dilemma for regulators is that insufficient is known at the outset about the nature and impact of novel products and services, but that once the latter have developed momentum and consumer support it becomes much more difficult for regulators to gain a mandate to restrict their operations (Moses, 2013, p. 8).

Impacts on health and safety are among the most carefully assessed and regulated. The safety and efficacy of drugs or health therapies are oversighted by regulatory bodies, with rigorous testing of the claimed medical benefits of new products. Less rigorously, the likely effects of industrial projects on environmental values are scrutinised through impact assessment regimes. In other cases, the proponents of new products and services deliberately ignore or directly challenge regulatory standards—as with the digital platform services that entered regulated markets for personalised transport. Profit-seeking companies such as Uber aggressively marketed their services directly to the public in the name of choice

and competition, challenging the established taxi industry and transport regulators to block their entry into restricted and regulated markets. They then sought deregulation to allow their own operations to expand rapidly. Well-resourced innovators seek both industry disruption and policy disruption to advance their interests. Their 'on-demand' services were ideologically framed in terms of the 'sharing economy' that claims to benefit consumers and the public interest by making use of 'idle capacity'—in this case, the vehicles owned by casual drivers. Other for-profit platforms, such as Airbnb, have entered the accommodation services business, by signing-up the owners of houses and apartments to list their facilities as short-term rental options in competition with hotels. In both these industry sectors, some jurisdictions have pushed back by requiring licenses and safety standards or by capping the volume of services available through these new channels (Spicer et al., 2019; Thelen, 2018; Tzur 2019).

The types and levels of innovation necessary for socio-economic and environmental improvements are highly variable. The standard policy approach for encouraging the technology innovation required for advancing productivity growth was to subsidise research and development (R&D) investment by private firms which are seeking market advantage and profitability. In the context of globalised competition, more recent policy frameworks have widened the analytical lens by focusing on 'innovation-systems' at the national level. This policy approach focused on 'building links, clusters and networks, and on stimulating learning between elements in the systems, and enabling entrepreneurship' (Schot & Steinmueller, 2018, p. 1554). Many questions arise as to whether these innovation-system frameworks can address the 'transformative' challenges entailed by sustainable development, renewable energy and climate response policies. The transitions literature suggests that multi-level innovations are required.

All forms of innovation can produce both benefits and risks. Two further examples are discussed below. Firstly, we consider big data and artificial intelligence, and secondly, biotech innovations based on gene-editing techniques in the food and health sectors.

It is widely observed that the digitisation of data has allowed a range of new applications or uses of information not available in earlier decades. Data can be analysed by computer systems for a variety of purposes. The 'good' uses can enhance opportunities, provide relevant information and improve client services. Other uses might entail negative risks, such as

contributing to unfair or repressive treatment of individuals. Various techniques for surveillance and monitoring are a case in point—on the one hand, they can be used responsibly to protect citizens, reduce criminal behaviour and identify offenders; but on the other hand, monitoring can generate a massive data-bank of personal information that can be used by public and private organisations for profiling, targeting and commercial self-interest. Artificial intelligence (AI) systems utilise programs to analyse and interpret data within prescribed rules. They seek to optimise specified outcomes by learning from previous experiences (Nordström, 2021). The algorithms that govern digital operations are determined by organisational and commercial imperatives, and therefore the processes and outcomes should be shaped by ethical organisational leaders and governed by transparent protocols (Desouza, 2021). Ethical leadership is required for the use of AI systems in both the private and public sectors. The European Commission (2019) has published 'ethics guidelines' for trustworthy AI systems, outlining seven requirements: human oversight, system security and accuracy, privacy protection, transparency, non-discrimination, social and environmental value, and accountability.

The potential risks and negative impacts of digitisation and AI have attracted wide discussion, including concerns about the transformation of work (online workers, automation, robotics), the commodification of personal information for commercial marketing, and the trade-offs between enhanced community security and respect for the privacy and confidentiality of personal information. According to Winkel (2021), digitisation and AI are far from being neutral technical processes; rather, they are likely to intensify the wicked aspects of conflicting stakeholder values and perspectives arising from social complexity and uncertainty. International bodies such as the OECD have considered these concerns about the need for responsible and trustworthy innovation. The OECD (2020b) published a complex roadmap for digital transformation, similar to the European Commission guidelines, aiming to advance innovation, economic prosperity and inclusive well-being through effective regulation and good governance. Key considerations include: wide access; diverse applications; encouraging innovation and entrepreneurship; skills formation for new jobs; more effective policies to address social exclusion; enhancing trust and security; and market openness (OECD, 2020b, p. 4).

Turning to the second set of major debates about responsible innovation, we note the recent history of policies to regulate genetically modified organisms (GMOs) in the agricultural and food sector, and

policies to regulate the use of gene-editing technologies for medical therapies. In the agricultural sector there is a very long history of experimentation to enhance the productivity of animals and food crops, using selective breeding techniques. The subsequent application of genetic modification (GM) techniques led to commercialisation of new crop varieties on an industrial scale, tightly protected by patents held by a few powerful US corporations (National Academies of Science, 2016). These GM products were marketed internationally with support from the US government. Many European and other countries were more circumspect and precautionary in their stance. They chose to restrict the use of GM seedstock and required product labelling for goods containing GM ingredients. Thus the framing of narratives concerning the balance of risks and opportunities was quite different in the US and elsewhere (Durant & Legge, 2006; Vogel, 2012, Ch 3). The US tended to aggressively promote domestic and international trade in GM products; the US also subsidised the inclusion of these products in foreign aid programs. European and other stakeholders deployed a broader range of impact criteria including perceived threats to rural culture and lifestyle, as well as concerns about cross-contamination and the influence of commercial monopolies. Additional types of GM technologies are being developed to address biosecurity threats, such as controlling pest species (feral animals, weeds, organisms) that cause disease, reduce productivity or displace native flora and fauna. The development of ethical guidelines for using lethal techniques to control pest species can also generate strong debate about relevant principles and various conceptions of animal welfare.

Several broader initiatives have emerged to strengthen the role of citizens and local communities in oversighting the activities of corporations that promote GM agricultural products and other potential threats to the natural environment (Gordon et al., 2021; Kuzma & Grieger, 2020). The intention is to strengthen the governance and accountability elements of the regulatory frameworks, whether those currently operating in specific countries or those proposed by international organisations. Specific industry sectors have found it necessary and useful to take community engagement seriously—for example, corporations in the extractive industries sector (mining, and gas 'fracking') have had to negotiate a 'social licence to operate' (Owen & Kemp, 2013), owing to significant disruptive impacts on farming communities. This engagement has been important for demonstrating that mining corporations can minimise risks and can distribute a range of community benefits. In

many industry sectors deploying new technologies, community-focused initiatives to improve trust, transparency and accountability are being developed. These may include public dialogues about emerging technologies, and the appointment of 'lay' members to science advisory committees (Raman & Mohr, 2014).

Similar value-based considerations arise in the field of genome-editing technologies for improving human health outcomes. On the one hand, genomic techniques are being steadily developed to mitigate otherwise incurable conditions and to assist in new therapies to tackle cancer and degenerative diseases (Dunbar et al., 2018). On the other hand, the socially acceptable boundaries of technical innovation are having to be continually redefined in the face of unregulated and reckless experimentation, such as interventions to modify the heritable DNA of human babies (NZ Royal Society, 2019, p. 4). An expert advisory committee of the World Health Organisation has emphasised the importance of appropriate ethical standards and precautionary principles to govern human genome editing (WHO, 2021), and recommended that these standards are linked across the local, national and international levels. The common theme in all these reports and reviews is that several principles are central for oversighting biotech innovation—such as access and equity, inclusion and engagement, ethics and values, effectiveness of treatment methods and intellectual property rights. All of these add up to 'responsible' innovation.

PARTISANSHIP AND POPULISM IN PUBLIC POLICY

The fundamental challenge for government leaders, practitioners and researchers is to identify, develop and mobilise the capacities required for addressing the policy challenges marked by complexity, diversity and uncertainty. In these endeavours, confusion and misinformation are likely to be abundant. As noted in previous Chapters, the perceived reliability of knowledge is often linked to 'trusted sources' of advice. These may be political-economic in nature rather than science-based. Uncertainties in knowledge are compounded by political narratives serving partisan purposes. Leaders often under-estimate problems and disparage the evidence-base. Claims about emerging threats and scenarios are necessarily speculative and become the subject of blame-games. Recent experience of turbulent crises has shown (Weible et al., 2020) that the

research sector will have abundant case studies about why 'learning' from crises can be so fragile.

The wicked problems perspective emphasises the diverse perceptions, values and interests of stakeholders and policy actors. As outlined in Chapter 1, narratives and viewpoints about past events often inform current perceptions about likely future risks. These viewpoints largely shape how issues are defined, priorities are set, policy values are communicated and possible solutions considered. Public policy, from this viewpoint, is not so much about establishing truths but more about legitimating feasible and 'acceptable' next steps. Rather than a reliance on expert-driven science and data analysis, a central focus is on how to convince a majority of citizens that political leaders are providing policy leadership.

Citizens' views are highly segmented on many issues. Government leaders therefore have to mediate between the values and interests articulated by multiple 'publics', namely: citizens, consumers, business lobbies, community and environmental groups. But interest-group mediation is not the full story. What if the government decides to abandon any pretence of evidence-informed diagnosis of the key issues, reject an inclusive approach to stakeholder deliberation, and instead pursue a populist agenda aligned to its partisan support base? The argument in Chapter 3 was that such a stance could be electorally popular but could undermine the long-term capacity of public governance systems to achieve sustained improvements in addressing the more difficult social, economic and environmental challenges. Partisan polarisation undermines community confidence in procedural fairness and legitimacy, which are crucial for building trust in public institutions. Polarisation inflames confirmation bias and provides excuses for ignoring inconvenient information (Nichols, 2017). Leaders are wary of accepting lessons that might reflect badly on their own competence. By contrast, long-term commitments to building good information and developing collaborative relationships can become even more valuable under crisis conditions, when these strengths need to be quickly mobilised under stress.

The populist and divisive character of public debate, reinforced by the shallow and emotive character of media communication, has influenced the quality of policy debate and leaders' behaviour across the political spectrum (Persily & Tucker, 2020). Populist leaders attempt to amplify grievances, intensify anxieties and promise quick fixes. Populism is often pitched at the people who feel resentful about their interests

and identity being overlooked or displaced through social, demographic or economic change (Galston, 2018; Mudde & Kaltwasser, 2018). This leads to identity politics based on 'us versus them' polarisation. Populism generally rejects reliance on independent expert advice—indeed, 'experts' are often seen as part of the problem (e.g. their perceived elitism, or their cosmopolitan values). Populist politicians often blame 'remote' elites (e.g. the EU bureaucrats in Brussels, or the WTO bureaucrats in New York) for their apparent lack of policy responsiveness to the immediate needs of the people. Populist politics therefore has little space for objective scientific and professional advice (Head & Banerjee, 2020). Michael Gove expressed his frustration with 'experts' who raised concerns about the UK government's case for Brexit, and President Trump frequently expressed disdain for policy advisers in government agencies and research organisations.

Public leaders wish to promote an appearance of being in control, and having answers for tough issues. However, wicked problems are inherently complex and contested, and difficult to control—whether the challenge is the Brexit transition, a refugee crisis, family violence, climate change or domestic terrorism. Hence, public leadership roles are sometimes more about navigating a turbulent sea than about reaching clear policy destinations. These uncertainties are reflected in the scholarly literature, where multiple criteria are recommended for assessing the extent of success and failure. As McConnell notes (2015, 2018), policy outcomes for complex and wicked problems are likely to be mixed, and appraisals are likely to be strongly affected by political loyalties. Progress in addressing the problems should be seen as both desirable and possible, but today's policy decisions should be seen as provisional, and in need of review and adjustment as situations evolve.

Much of the public policy literature has maintained a pragmatic scepticism about human capacities to solve major problems. Wildavsky, for example, recognised the difficulty of tackling broad and persistent social problems: 'problems are not so much solved as alleviated, superseded, transformed, and otherwise dropped from view' (Wildavsky, 1979, p. 386). Problems themselves are reinvented and refurbished, just as the proposed solutions are refreshed and recycled. As Wildavsky remarked, 'past solutions create future problems faster than present troubles can be left behind' (Wildavsky, 1979, p.70). Policy success is seldom complete or enduring—it is more likely to be temporary, qualified and iterative. Even successful programs require adaptive management and regular evaluation.

In conclusion, improvements in the management of wicked problems are clearly possible, and some policies are more effective than others in addressing large and enduring social and environmental problems. Several factors increase the possibility that significant progress can be achieved—the quality and judgement of leaders, sufficient information, financial resources, the capacities of analysts and managers, reliable partners and cross-sector coordination. But some contextual factors are beyond the influence of governments. The contemporary era seems marked by compounding and intensifying problems which have cascading or spillover effects. There are many types of wicked problems, and they evolve in distinctive ways. Over time, some problems may diminish in intensity and become more tractable, for example, through improving the safety nets to deal with entrenched poverty. The terms in which problems are framed will shape the 'meaningfulness' of possible solutions. But where problems seem to become more serious over time, or where the same problem seems to be recurring with growing ferocity, more robust policy design processes are necessary, including strengthening the capacity of systems to address crises and uncertainties. In effect, public policy is a fast-moving stream in which the parameters change rapidly.

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