RE-THINKING HOW WE PLAN TO ADDRESS TECHNICALLY COMPLEX PROBLEMS: DRAWING ON PLANNING THEORY TO GUIDE PRACTICE IN REVISION OF LAND USE PLANS IN COASTAL HIGH HAZARD ZONES

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Queensland's new State Planning Policy for Coastal Protection, released in March and approved in April 2011 as part of the Queensland Coastal Plan, stipulates that local governments prepare and implement adaptation strategies for built up areas projected to be subject to coastal hazards between present day and 2100. Local governments with lands within the delineated coastal high hazard zone (as determined by models incorporating a 0.8 meter rise in sea level and a 10% increase in the maximum cyclone activity) will be required to re-evaluate their plans to accommodate growth, revising land use plans to minimise impacts of anticipated erosion and flooding on developed areas and infrastructure (DERM 2011a). While implementation of such strategies would aid in avoidance or minimisation of risk exposure, communities are likely to face significant challenges in such implementation, especially as development in Queensland is so intensely focussed upon its coasts with these new policies directing development away from highly desirable waterfront land. Indeed the Property Council of Australia, while "maintain(ing) steadfast support for the intent of the policy" has declared the Queensland Coastal Plan to "have severe negative consequences not only for the development industry, but also for owners of property anywhere within the coastal zone and the broader economy," proclaiming the plan will "have the most significant impact on the property industry since the introduction of the South East Queensland Regional Plan 2005 – 2026" (2011). Recognition of the realities of climate change, when placed in a local context through mapping of coastal high hazard zones, come into conflict with visions of how a community, believed it might develop, and further, how those with vested interests in such development advocated for such activity.

Simultaneously, local governments are faced with what can either be viewed as a second round of amalgamations, following upon those which occurred in 2008 which reordered the state's 157 local governments into 73 (LGRC 2008), or devolution of state control in recognition of geospatial and cultural differences, through the institution of regional planning areas as shown below in Fig. 1. State policy frameworks (e.g., DLGP 2011) indicate that these regions will be used in the formulation of economic development, land use, and transport strategies and will "strengthen coordination" amongst levels of governance (7). Understanding the determinants of effective collaboration amongst these multiple, hierarchically nested levels of governance, will aid in ensuring the success of such collaboration, particularly in the face of the uncertainty associated with flood hazards exacerbated by climate change.

Figure 1 - Queensland's seven regional planning areas with local governments within each region delineated in white. Map adapted from DLGP (2011).

Politicians, elected to short terms, often with the support of those propertied interests, will be tasked with making decisions over planning horizons which are at least an order of magnitude longer than they themselves will likely be in office, and which will have continuing consequences beyond their lifetimes. Queensland DERM, in collaboration with the author of this paper, developed the schematic shown in Fig. 2 to assist local governments with "conceptualis(ing)" adaptation pathways, incorporating generic trigger points to assist in decision-making, recognising that "at some point in the future (whether it is by the year 2100 or beyond) the costs of protection works and maintenance will eventually be greater than the value of the assets being protected," (DERM 2011b, 16) potentially motivating retreat. This diagram attempts to simplify what is undeniably a conflict-laden effort - one which will likely be further complicated by technical literacy (the ability to understand, communicate and "negotiat(e)" in situations where science plays a prominent role (Fourez 1997, 906). Diminished capacity to engage with technical information and concepts may impede understanding of complex dynamics associated with coastal hazards, further complicated by dynamic information and uncertainty. Pressure on these political actors to forestall change may be high, however the social, economic, and environmental costs of "defending development... justify development constraints in vulnerable areas" (DERM 2011a, 35), especially as those costs would likely accrue to the local or state government rather than solely be experienced by those opting to develop land in high hazard areas. Individuals tasked with advising decision-makers then may find themselves able to advance activities which will reduce risk exposure, but need to do so in a manner that maintains flexibility as revisions to estimates of sea level rise occur. Quick adoption of plans to get in front of the problem may seem initially a wise choice, but may actually lock a community into a new mode which in time is found to be lacking. By considering the manner in which planning is undertaken, it is possible that we may be able to reduce long-term risk without requiring decision-makers to commit political suicide.

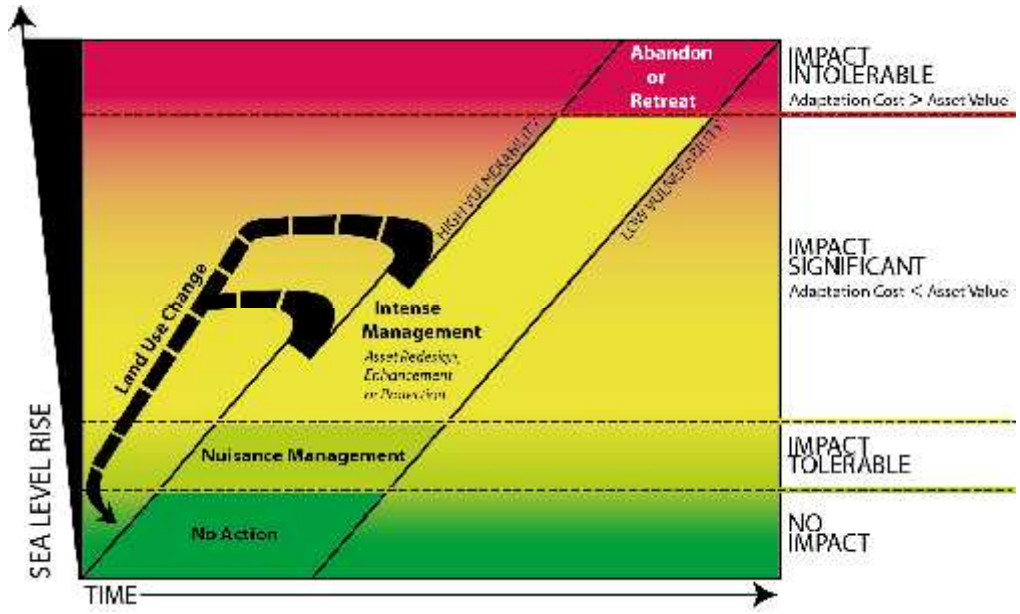

Figure 2 - Sea level rise adaptation trajectory for existing assets outlining adaptation options and trigger points to inform when and what adaptation measures should be undertaken. Graphics and embedded concepts developed in collaboration with Queensland DERM for inclusion in DERM (2011).

This paper offers a preliminary framework to structure examination of the potential challenges faced by those who advise political decision-makers as they navigate amongst strategies to address increased risk associated with coastal high hazard zones, looking particularly at issues of information selection and technical literacy in communication of risks, and path dependency in determining likely courses of action. This framework, which will be applied to a set of case studies of communities in Queensland in 2012, is anticipated to aid in framing interactions between planners and engineers in the guise of advisers to those with decision-making power, and those decision-makers themselves. Further application of an expanded framework, recently funded by the Queensland Premier and Cabinet, to the interactions between these actors in neighbouring local governments within the seven Regions, and between varying hierarchical levels of governance, will also be undertaken in 2012.

THEORETICAL BACKGROUND

In the absence of force or external incentive, rational, self-interested individuals in all but the smallest of groups will neither act nor organize towards a common goal, but will rather "rationally seek to maximize their personal welfare" (Olson 1965, 2). Given the regulatory intervention undertaken by Queensland Government to address the increasing risk posed by coastal hazards as exacerbated by sea level rise and increased incidents of cyclonic storms by requiring revision of land use plans, individual decisions to develop within the coastal high hazard zones will be constrained. However local governments will likely vary in the speed and direction of their plans in a manner that reflects the technical literacy and information selection patterns of decision-makers, previous decisions by those individuals and their predecessors, and relationships between planners and decision-makers as influenced by local planning culture, as well as decisions of other local governments who act early to respond to the regulatory requirements. The following sections address literature on these factors to frame considerations of likely challenges for local government actors in Queensland faced with revision of land use plans for coastal high hazard zones.

Technical Literacy & Information Selection

Within a democratic society, planners often act as technical experts, analysts providing processed information as inputs to the decisions of the citizenry's elected representatives. The planner-as-expert may play a range of roles, as delineated effectively by Forester (1989), viewing information and his role in decision-making in light of his perceptions of political power and its influence on planning processes. The language which the planner uses to communicate his analyses further tempers his interactions with decision-makers, as does the technical literacy of those decision-makers, as discussed below.

All procedures which are not dictatorial, being all those in which power is shared, can be manipulated (Gibbard 1973, Satterthwaite 1975, Sager 2001a). Even when they are not involved in framing, planners can manipulate decisions by determining what alternatives are initially considered and, through the provision of "incorrect information about their preferred ranking of the alternatives" (Sager 2001a, 767), restrict the set of options for consideration by the so-called decision-makers. Information which conflicts with the desires of the powerful is degraded, disregarded, or otherwise discarded in favour of that which will aid in construction of the narrative which describes the selected policy or technology as the solution to the problem at hand; if indeed a problem is acknowledged. Such actions further marginalize those policies and technologies which potentially could generate information contrary to the prevailing will, leading to continuation along the selected path. While planners craft solutions which rely upon the cooperation of citizens, holding to an optimistic worldview wherein individuals will subvert their own self-interest for the greater good (Mukhija 2005, 212), decision-makers may opt to narrow the scope of their evaluations, opting to maximize self-interest. By excluding information which may lead to conclusions which fail to maximize self-interest, be it of an individual or a municipality, the illusion of the good solution is maintained. Further, by opting not to collect information which may challenge the efficacy of the prevailing policies, the powerful may perpetuate the myth without fear of contradiction. Indeed, failure to collect and provide such information, in combination with active propaganda against such activities, may convince the latent citizenry to oppose what might otherwise be a rational act.

If highly technical issues which may be "difficult to explain" represent barriers to participation by citizenry (Godschalk et al 2003, 735), then by extension, they may also pose similar difficulties for elected officials, those with power in planning decision-making processes, drawn from that citizenry. By extension, if fluency in "the language of expertise" (132) is a necessary precondition for formation of coalitions advocating technically intensive solutions to planning problems, policy may be rejected as a result of illiteracy rather than dissatisfaction with potential outcomes (Benveniste 1972). Decision-makers are always faced with "limitations of time, resources, and intelligence," leaving the individual to make do as best possible (Friedmann 1987, 151), which may limit acceptance of options which are difficult to understand. Further, political actors may openly oppose technically complex policies as a result of technical illiteracy, potentially even going so far as to "generate counterexpertise… provid(ing) different facts and interpretations" (Benveniste 1972, 125) of problems so as to call into question the legitimacy of the expert and his knowledge. Arguably this counter-information may represent the experiential knowledge of the public-at-large as described by Friedmann (1973), distilled by their elected representatives and likely advocating solutions separate from the technical logic of the expert. Clearly, though, a failure of the planner as expert to communicate in language accessible to decision-makers has consequences for the inclusion of his information in decision-making.

Path Dependency

Whereas theories of collective action would tell us that like-minded individuals will, when faced with an external force, organize to respond to an issue of collective interest, presumably towards a rational end, theories of path dependence would indicate that, barring catastrophic force, they would opt to continue along the same path which landed them in their troubles in the first place. Communication may determine whether or not information is included in decisions, but path dependence mitigates the influence of that information. Path dependence, originating in mathematics, indicates that decisions, no matter how straightforward and isolated they may seem, not only perpetuate patterns established through past decisions, but further narrow the range of options for consideration in future decisions, perhaps dooming us to perpetuate our troubles.

Lauded by Liebowitz and Margolis (1995) “as an alternative analytical perspective for economics, a revolutionary reformulation of the neoclassical paradigm” (205), early applications of path dependence (e.g., Arthur 1983, David 1985) focused on the decision to adopt a technology from among multiple competing technologies, the reinforcing effects, or feedback, of those decisions on future decisions, and the resultant tendency to perpetuate, or lock-in, the technology selected. Arthur (1988, 1989) proposes that the persistence of such decisions depends upon a number of factors, including the magnitude of initial costs associated with adoption, technical literacy and knowledge of decision-makers related to the technology, benefits gained from coordination amongst multiple efforts related to the adoption, and expectations as to the acceptance and successful diffusion of the technology. These same ideas apply to adoption and diffusion of policy options.

Political scientists embed these ideas of path dependence into critiques of rational choice, which underpins the logic of collective action and pluralist planning theory, arguing that decision-makers are not simply “acting strategically to achieve their ends,” but rather employs historical analysis to aid in understanding “what they are trying to maximize and why they emphasize certain goals over others” (Thelen and Steinmo 1992, 9). While acknowledging that he is not the first to call it such, Ikenberry (1994) consolidates ongoing dialogues on the role of “institutions and political structures” in influencing policy outcomes with emerging notions of the importance of “historical process” in such analyses, laying out a set of basic premises for historical institutionalism, arguing that as decisions are mediated by institutional structure, analyses of decisions must occur within context as "timing, sequencing, unintended consequences, and policy feedback matter” wherein structures of institutions impact upon actors, influencing decisions (1, 2).

David (1985) asserts that “historical accidents” which occur near the initiation of a process have the greatest influence on eventual outcomes, referencing Arthur’s (1983) studies of the dynamics of technological competition under increasing returns. Early decisions largely impact upon long-term outcomes, but do so in a manner which is somewhat random, for early in a process a range of outcomes is possible, and, as a result, the initial course is somewhat unpredictable (Arthur 1994). The danger of the influence of these early decisions lies in the scope of alternatives they consider - often based upon “myopically” focused comparisons of existing options rather than “forward-looking” analyses, selected options may later be determined to be suboptimal (David 1985, 335). The trajectory assumed following decision often continues over time, as the “probability of further steps along the same path” increases over time (Pierson 2000a, 252), especially given self-reinforcing positive feedback occurs (Pierson 2004). Gradually, potential costs to switch to another alternative increase, such that the suboptimal technology may be “lock(ed) in” and the initial adoption decision becomes “quasi-irreversible” (David 1985, 335-6). Barring intervention, decision-makers encounter choices in a manner analogous to one climbing a tree, wherein:

… from the same trunk, there are many different branches and smaller branches. Although it is possible to turn around or to clamber from one to the other – and essential if the chosen branch dies – the branch on which a climber begins is the one she tends to follow (Levi 1997, 28).

As the “costs of switching from one alternative to another will, in certain social contexts, increase markedly over time,” time elapsed since a critical juncture serves to “reinforce divergent paths” (Pierson 2000, 251). Although the absolute location of the juncture in history is relevant, the notion of time with regards to increasing returns relates more to the separation of the juncture from subsequent decision points.

Models of Planning Theory which Underlie Local Planning Culture

Three models of planning theory describe typical approaches to dealing with technically complex issues, and vary in their emphases on technical knowledge and political power in dominating decision outcomes.

Starting with the idealized, at least for some, situation wherein the planner’s expertise is central to planning decision-making, the rational or synoptic model presumes the pursuit of rational actions, those “designed to

maximize goal achievement" (Dahl and Lindbloom 1953, 38). Hudson and colleagues (1979) reduce the model to what they term as "four classical elements: (1) goal-setting, (2) identification of policy alternatives, (3) evaluation of means against ends, and (4) implementation of decisions" (388), but acknowledge that the process is neither necessarily linear, nor undertaken in the specified sequence, but rather "each stage permits multiple iterations, feedback loops, and elaboration of sub-processes" (388). More recent reflections on the model place goal setting in the hands of decision-makers, leaving the technocrat, the primary actor in the rational model, to "develop information in response to questions from decision makers or… solve problems that decision makers have identified" (Innes 1998, 53). Early decisions indeed then play heavily into individual iterations of the rational model, as they set the agenda for analyses that follow.

The planner in the rational model emphasizes processes which "expand knowledge" in advance of decisions (Sager 1995, 168), however that information is not always shared with decision-makers. Indeed, the planner's early tasks, particularly in the identification of alternatives for consideration, restricts the flow of information to decision-makers, often yielding an asymmetric distribution of information in the planner/expert's favor relative to that of the decision-maker (Sager 2001b). These decisions reinforce the preferences of the planner, calling into question his neutrality, but also privileging options which he finds accessible. Technical literacy plays heavily here, as the acceptability of the planner's recommendations hinges heavily upon the ability of decision-makers to understand them.

Although the technocratic planner sees information as a source of power, he adopts a "benign view of politics," assuming that his work stands on its own merit, free from political context (Forester 1989, 29), and thereby, in some ways, is susceptible to manipulation (Sager 2001a). The technocratic planner assumes away politics and sees himself as an influential analyst, placing goal-setting outside the planning process and further assuming the absence of conflict throughout (Sager 1995). Criticism arises, however, as the model "presum(es) a general public interest rather than pluralist interests" (Hudson et al 1979, 389), such that the planner does not recognize the inseparability of his presumed rationality from the influence of power. Flyvbjerg (1998) goes further, suggesting that rationality is not independent of context, with context defined by power, such that "power blurs the dividing line between rationality and rationalization" (61). The individual planner presuming that he is operating within the rational model then may be delusional, failing to recognize the influence of power on his analyses.

Launching into discussions of the structuralist model without first considering the incrementalist would skip a necessary step in the progression from the rational model, which privileges knowledge, and the structuralist model, wherein power selects knowledge to fit its desires. The incrementalist, a bureaucrat for whom "knowing the ropes is a source of power", assists with transfers of information between powerful interests, his own role largely limited to that of a neutral facilitator who responds to "organizational needs" (Forester 1989, 30), muddling through in response to an immediate crisis (Lindblom 1959). Sager (2001b) indicates that incrementalist strategies do not place great emphasis on expertise, but rather "yields to those with the power to bring about and defend the prevailing political priorities" (526).

Although small achievements and gains made in response to small problems may enable future success (Churchman 1979, 163), the incrementalist model maintains the status quo as much as possible. Where the role of the planner is limited to that of facilitator, power exists as the driving force behind action, politicians supplying or otherwise selecting information on which to base decisions from sources other than the planner-expert. The incrementalist discards notions of framing, focusing rather on getting things done, and takes on the role, perhaps unconsciously, as the facilitator of interests. At best, under this model, the planner serves as a funnel for information, but as an actor who aims for neutrality, he does not intentionally select which information to provide unless directed to do so by those in power. Flyvbjerg (1998) suggests that the influence of rationality is limited by its ability to work with power, making the incrementalist more capable of seeing his efforts implemented than those adhering to the rational planning model. Perhaps one of the incrementalist model's great strengths is its ability to navigate complex political landscapes, along with the flexibility to respond to changes in those landscapes, incorporating feedback into short analytic horizons.

While the incrementalist planner simply aids the powerful, the structuralist actively seeks to "legitimize the maintenance of existing structures of power and ownership" (Forester 1989, 30). Aware of the power inherent in the status quo, he aids in the legitimation of its desired ends, knowingly assisting in the rationalization of pre-determined ends, such that power determines what knowledge informs action. Rationalization relies on privileging of information favourable to arguments for pre-selected outcomes. Where the previous model excluded technical information from the incrementalist planner, here the powerful direct the experts and co-opt knowledge so as to rationalize their decisions, making knowledge essentially one and the same with power, but with knowledge in a decidedly subservient role (Flyvbjerg 1998). While this may seem to place power in the hands of the planner, it is, as Forester (1989) asserts, a shallow power – one granted by and continuing only in the continued service of existing sources of power. As such, the

structuralist planner filters out that which will potentially undermine those that grant him power, perpetuating the dominance of powerful regimes.

Altshuler (1965), Rabinovitz (1970), and Benveniste (1972) each propose that politically savvy planners act within the established hierarchy, seeking to influence the decisions of the powerful by acting as a funnel of information to Benveniste's (1972) prince. Through continued interaction and accumulated trust, the planner may guide action, potentially realizing the goal of both participating in the framing of and undertaking analyses towards informing decisions, as non-participation in framing may leave him as a rationaliser of pre-determined ends. Perhaps the goal of the rationaliser, acting within this structuralist model, is to build relationships, blurring the line between knowledge and power, such that he may eventually gain greater sway in decision-making – the outcomes of his analyses will be more highly regarded. While possibly a delusion, it is one which fits well with several of Flyvbjerg's (1998) propositions regarding rationality and power, particularly that "the power of rationality is embedded in stable power relations rather than in confrontations" (233). Hillier (2002) argues that it is possible for a planner to directly influence action through information unfiltered by power, which presumes an ability to act independently. This seems unlikely in the absence of strong relationships with power, which themselves may well be moderated by communication. Reaching this independence may be desirable, however difficulties arise where policy-lock in has occurred before the relationship has been established, wherein, barring crisis, representing an opportunity for pursuit of diverging directions, the planner may indeed be just a rationaliser of the desires of the powerful. This model represents perhaps the most dangerous of planning cultures, as the planner, perhaps more likely to be successful in seeing his plans implemented, is also more likely to leave his community at risk. Further, this model is the most likely to predominate, in that the role of planner is generally confined to adviser, with decision-making power ultimately resting with elected officials.

Challenges of Uncertainty & Technical Literacy for Local Planning Culture in Times of Crisis

Given the immense challenge faced by local government in responding to the technical complexity and uncertainty inherent in increased hazards to people and property in the face of climate change induced hazards, it seems wise to reflect on how planning theory might aid in easing the likely strain between requisite collaborators, being both between technical experts and politicians within local government, and between varying levels of governance, raining the following questions:

- How does the language and technical complexity of communiqués from technical experts, affect receipt and incorporation of knowledge into planning decision-making largely undertaken by those in power?
- How do prior decisions by those in power, and the congruence (or lack thereof) of knowledge contributed by technical experts with those decisions, affect subsequent receipt and incorporation of knowledge into planning decision-making?
- How do perceptions of crisis affect receipt and incorporation of knowledge which supports alternate policy trajectories into planning decision-making?

Application of these questions to models of planning theory allows for the crafting of a series of hypothetical representations of the roles of path dependency, technical literacy, and crises in determining the interactions between knowledge and as depicted in Fig. 3 and discussed below. The figure offers a series of simplistic

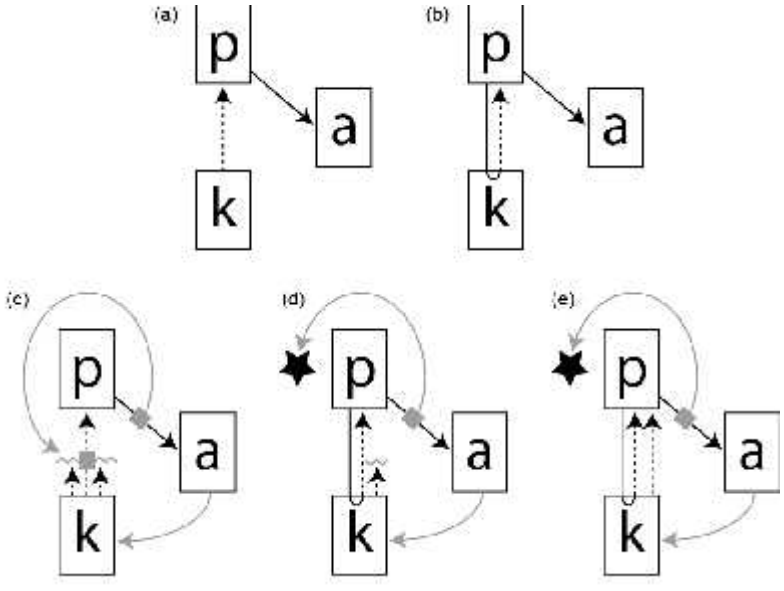

Figure 3 - Hypothesised interactions of knowledge, power, and action within local planning cultures.

models of the expected relationship between knowledge and power, starting with representations of two base models (rational and structuralist) from planning theory discussed above and moving into representations of the interactions between knowledge and power considering crisis and communications.

Each of the first two models presumes a theoretical "initial" state wherein decisions are made purely on the basis of advice transmitted by knowledge to power – these models represent a starting point for the set that follows. Reflecting Flyvbjerg's (1998) assertions of the filtering of knowledge by power, the first diagram depicts a modified rational model which acknowledges that knowledge contributes to decisions by the powerful, but does not directly determine action through its recommendations. Knowledge, within this model, is transmitted to power within recommendations as to action, but power decides which knowledge it will accept. This model differs from the following model (b) which represents a structuralist reality, wherein power more directly influences knowledge, informing it of its desires such that knowledge, if it wishes to be incorporated into decisions, rationalizes the will of the powerful. While both models recognize the power of power, they differ in the structuring of their analyses, and thereby in their ability to respond to crises as discussed below.

The second set of models depict feedback from prior decisions as both inputs to knowledge, and following literature on path dependency, reinforcement of those prior decisions by power. These representations also incorporate the moderating influence of technical literacy on communications between knowledge and power in the selection amongst multiple alternative solutions to a problem, especially following a perceived crisis. Barring crisis, the reinforcing influence of feedback from the initial decision will predispose decision-makers, acting as power, towards continued pursuit of the same course as depicted in model (c). This model also indicates that alternative solutions, already disadvantaged by path dependence, are further degraded by potential barriers posed by technical literacy, which presumably would favour the alternative best understood by power, that which has already been adopted, and otherwise, the least technically complex alternative advanced by knowledge. The fourth model, (d), introduces a crisis which disrupts the system and potentially reduces the reinforcing drive of path dependency for pursuit of the existing course. However, in the absence of technical literacy, power will stimulate rationalization of its will, and continue to ignore technically complex alternatives advanced by knowledge. Removal or reduction of this barrier, as shown in model (e), allows for the production and potential consideration of *rational* rather than solely rationalized alternatives, with selection amongst these two hinging upon the relationships between technical experts and political decision-makers.

NEXT STEPS

The current framework does not yet tie into existing literature on decision-making with regard to risk, nor to the extant body of work on planning for climate change, both of which will be addressed in continued work in this area. It is anticipated that such work will result in a hybridized framework, drawing upon both planning theory and the experiences of policy analysts who have examined planning practice with regard to sea level rise and climate change.

Following formulation and finalisation of the framework, the researcher, in consultation with Queensland DERM and DLGP, will identify suitable communities for case studies, looking to include local governments with varying in-house technical capacity and cultures towards innovation, likely including, among others, Townsville, Brisbane, and Noosa. Structured interviews will be undertaken with both political decision-makers and technical advisors in each community, as well as with staff at DERM, DLGP, and at the Local Government Association of Queensland. These interviews will be analysed for patterns to assist in the formulation of recommendations on technical capacity requirements and communication strategies necessary to aid in implementation of adaptation plans. It is hoped that these recommendations will aid in increased public acceptance of plan revisions incorporating risk mitigation, and thereby reduce strain between decision-makers and their advisers, consequently reducing the large fiscal and legal burdens potentially associated with plan revisions.

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