27. How?

In bringing together the three domains to consider the third question—'*How is the integrative applied research undertaken (the knowledge synthesised, diverse unknowns understood and managed, and integrated research support provided), by whom and when?*'—the task is to consider both the interactions between the methods and how congruent they are with each other. To recap, the methods described for each domain are presented in Table 27.1.

Table 27.1 Methods for Knowledge Synthesis, Managing Diverse Unknowns and Providing Integrated Research Support for Policy and Practice Change

Domain	Classes of methods
Synthesis of disciplinary and stakeholder knowledge	Dialogue-based Model-, product- or vision-based Common metric-based
Managing unknowns	Reduction Banishment Acceptance Exploitation Surrender Denial
Providing integrated research support for policy and practice change	Communication Advocacy Engagement

Three issues are dealt with in more depth here

1. the value of some methods for more than one domain

2. achieving congruence between the methods used across the three domains

3. classification using reciprocity and action-orientation.

It is worth making the point explicitly that scoping and boundary setting also apply to the choice of methods used. The point of scoping is to highlight all the possible methods, while boundary setting involves deciding which ones are most likely to be helpful in the particular situation, as well as feasible given the available resources.

Value of Some Methods for More Than One Domain

Although to date I have linked specific methods to single domains, using particular techniques in more than one domain is an area that needs exploration in the further development of I2S. Two obvious candidates are some types of dialogue and modelling. For example, dialogue methods that develop shared judgments implicitly assess unknowns, because judgment is required when facts are missing or not sufficient for addressing the problem. At present the consideration of unknowns is largely implicit and more work is required to make it explicit and systematic.

Some modelling methods are useful not only for synthesis of disciplinary and stakeholder knowledge, but also for providing integrated research support for policy or practice change.[1] A good example is provided for water management in the Middle Rio Grande Basin, where various groups not only provided input into building the model, but also used the completed model to test a range of 'what if' scenarios.[2]

Achieving Congruence between the Methods Used Across the Three Domains

In examining the three domains together, the aim is not just to look for methods that can be used across more than one of them, but also to identify which methods can productively be used together, as well as which methods are likely to be incompatible. Methods may conflict because of some intrinsic feature or because of the way they are used. For instance, advocacy for a particular research outcome is fundamentally incompatible with methods for fairly assessing unknowns.[3] An example of methods that are not inherently conflicting but that are used in a mismatched way is employing a dialogue method to synthesise knowledge from a broad range of disciplinary experts and stakeholders and then advocating a particular solution—which discounts some of the perspectives— to policy makers. These methods are likely to be compatible if participants in the dialogue are told that this is how the results will be used, but incompatible if the ultimate purpose is unstated or kept secret.

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1 Further, as discussed in Chapter 12, modelling can also help in understanding different kinds of unknowns.
2 Passell et al. (2003).
3 A related issue is that of partisanship. If researchers are aligned with a political party they may find that methods relying on open communication or dispassionate examination of the issues are unsuited to their needs.

Another congruence issue relates to research quality, especially when different methods used have different levels of rigour. This may occur, for instance, when a mixture of formal and informal methods is used. For example, using modelling to provide decision support may lose validity if only informal dialogue methods were used for collecting disciplinary and stakeholder input, as there will be uncertainty about the representativeness of those views, as well as how accurately they were captured.

Classification Using Reciprocity and Action-Orientation

In considering I2S as a whole, it may be useful to develop an overarching classification for the available methods. One way of doing this may be to examine reciprocity and action-orientation. Reciprocity occurs when a method is two-way (and is absent when it is one-way), whereas action-orientation is present when the aim of a method is to stimulate policy or practice change (and absent when it is to increase understanding only). As shown in Figure 27.1, all four types of methods can be useful for particular aspects of integrative applied research.

		Reciprocity	
		No	**Yes**
Action-orientation	**No**	Convey information only *Example*: stakeholders or disciplinary experts provide input to model building	Gain mutual understanding *Example*: disciplinary experts work together to improve understanding of the problem
	Yes	Convey information with the purpose of stimulating others to act *Example*: advocacy	Gain mutual understanding for action *Example*: engagement between researchers and policy makers

Figure 27.1 Classifying Methods According to Reciprocity and Action-Orientation

Source: Author's illustration.

Tasks for the I2S Development Drive
Collect methods (and underpinning concepts) that can be used across two or all three domains, along with illustrative case examples.
Identify which methods can productively be used together, as well as which methods are likely to be incompatible. Explore other issues affecting congruence. Compile case examples that illustrate the range of issues involved.
Further explore the nature and value of an overarching classification based on options for reciprocity and action-orientation.

By Whom and When?

Just as there are no right answers for 'by whom and when' in the individual domains—but instead a range of options that may be more or less appropriate depending on the circumstances—there is also no one right way to ensure compatibility across the domains when considering the research as a whole. There are some general considerations, like ensuring that those undertaking each of the tasks are well informed and that the sequencing makes sense. To take extreme examples, it is unlikely to be appropriate for someone who was not involved in the knowledge synthesis or comprehensive consideration of unknowns to be given the task of engaging with the policy makers or practitioners. And in terms of an appropriate order of events, results have to be gathered before they can be communicated.

Task for the I2S Development Drive
Collect case examples looking at the congruence of 'who' and 'when' across the three domains.