Risk Framework:

NbS Project Risks

Review draft

May/2025

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Issue & Revision Record

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1. Purpose and Overview

The Project Risk Framework sets out standard ways of allocating risk in different types of NbS projects. With a standard model in place, it will be easier for groups to come together and set up projects because they have a standard model to follow. They may choose to vary their approach and deviate from this standard, but by having a baseline model it will be easier to set out what variations are being made.

Detail will be added through the review of case studies and lessons learned in the adoption of these approaches. For example, this framework could be useful in as a means of comparing different types of standard contract for the implementation of projects. A repository of information on contracts should be held alongside this framework as a resource for actors looking to implement projects. We use the term projects to encompass programmes as well.

This document sets out a draft risk framework for NbS project risks as follows:

Risk management categories	Section 2
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This Framework for Project Risks sits alongside two additional pieces of work that are currently being developed.

- A framework for impact risks relate to how effective NbS are and how to assess this.
- Managing uncertainty in Monitoring and Evaluation.

The purposes of providing a risk framework are to:

- reduce project costs and timelines as organisations seek to set up collaborative working.
- reduce the perceived uncertainty of NbS delivery in comparison to grey infrastructure.

NbS Impact Risk Framework

The Impact Risk Framework is required as to manage the variability – and perceived variability – of NbS interventions in achieving their intended impact. The framework will be linked in with the standardised schedule of interventions and the common value framework both produced in this project. It will identify metrics for outcomes and with an indication of uncertainties associated with those metrics. The framework will be set

out in this project and completed in the "Tracked Programme of Work". Work on the Impact Risk Framework is set to include the following outputs:

1. A systems map of the monitoring and modelled approaches to metrics for each benefit at present with perceived confidence levels provide by the EA with justification for the rating (L/M/H etc.).
2. A register of each metric/methodology of the 'potential for impact' rated using weighted scorings (framework to be developed).
3. Categorisation for each metric of low or medium confidence ranking and high-impact potential scoring to be addressed by either: empirical monitoring programme, systematic review of literature, collation of existing evidence synthesis; with associated costings.

Managing uncertainty in monitoring and evaluation

Different funders, investors and statutory bodies have different criteria for the verification of outcomes from NbS projects. Essential different project sponsors have different tolerance of outcome risk for NbS projects. One way in which this risk managed is that different sponsors have different criteria for the verification of outcomes. We have identified three main drivers of projects that influence the requirements for verification of outcomes.

- **"High integrity" markets**: The use of NbS in high integrity markets will come with a higher potential spend on verification and data management to achieve its "high integrity" status. "Good verification" means an acceptable quality to withstand scrutiny to support an investible product compatible with the "high integrity" label. This perception of quality is part of the tradeable commodity in the same way that trustworthy brands of vehicle are bought and sold at premium prices.
- **Compliance**: Much of the work in the water sector ultimately requires environmental outcomes to be compliant with regulatory thresholds. There is no benefit in spending money on verification to a higher standard than is required for regulatory compliance. "Good verification" means sufficient as is required to demonstrate regulatory compliance.
- **Collaborative working:** Where projects have a local focus and are motivated in part by the common good and collaborative working, then verification criteria may be less stringent than the categories above. In these cases there is an element of motivation for the common good and an element to which social capital (trust) is part of the project rationale. "Good verification" is good enough for the network of actors involved.

Data has a provenance – a backstory of who and how it was collected. This provenance is important in assessing which processed data may be used for. Given the diversity of different uses of data this project aims to identify and categorise the different

requirements on those who collect and manage data so that it is clear which forms of data can be used for which purpose.

The following concurrent projects are working on data

- BSI are working with Defra and others to enable NbS finance in “high integrity markets” through their Nature Investments Standards Programme.
- CIRIA have a project relating to NbS and asset management which aligns with regulatory compliance.
- CaSTCo (Catchment Systems Thinking Cooperative) is enhancing data quality to enable the use of citizen science data to inform decision-making, including NbS funding.

This project will review outcomes from those projects and seek to establish a coordinated approach.

2. Risk Management Categories

2.1. Organisational Culture and risk management

Different organisations have different comparative strengths and cultural preferences in their choice of how to manage risk. Consequently, in creating a framework to manage risk in collaborative projects, such as the implementation of NbS, we need to understand the main categories and patterns in behaviour relating to risk and let that inform the way we set up projects.

Essentially, we need to understand subjective behaviour in relation to risk as well as the contribution of numerical analysis of the frequency and magnitude of shocks. The subjective perception of risk is shaped by different social norms that are held collectively by groups and organisations. This interface between risk and social norms is a well-established field called Cultural Theory and is the basis of our work. (See Appendix A, for an introduction to the theoretical basis of this work.)

Having accepted that social perception of risk informs planning, we need a categorisation of strategies by which organisations are best placed to manage risk. We will work with a four-way categorisation of approaches to risk as shown below.

- **Controlling risk**. The rationale of controlling risk is reflected in regulation – activities may be prohibited, or their limits proscribed; and in grey infrastructure in which designs are made to achieve specified outcomes.
- **Capitalising (and trading) risk**. Contracts are used to outsource risk to those willing to take it for a price. Markets are used to drive efficiencies with risks outsourced in the most competitive bidder.
- **Co-ordinating/collaborating to pool risk**. Risks are pooled and distributed by negotiation. The details of the risks may not be defined with precision, making this a cost-effective approach in the right circumstances.
- **Accepting** or **tolerating risk**. Different individuals or organisations have different tolerance of variable outcomes. Rainfed agriculture has a higher degree of variability in harvests than protected farming in poly tunnels. The Canal and Rivers trust accept a 1 in 20 year failure due to drought, where the public water supply is planned on the basis of acceptance of a 1:500 year failure.

Three of these methods are active: controlling, capitalising and coordinating whereas accepting is a passive strategy towards risk. An organisation (or a project) may draw on a combination of the three active risk management strategies as indicated in Figure 1. An organisation or project also assumes a degree to which it tolerates residual risk, once the active risk strategies have been implemented.

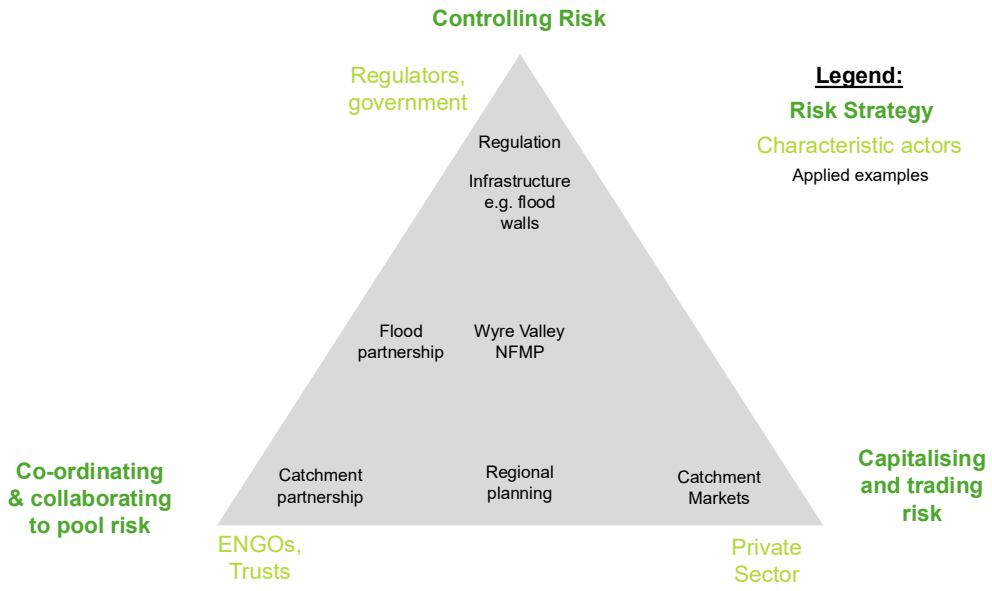
There are patterns by which different types of organisation routinely adopt different the risk strategies above. For example, government has a comparative preference for regulation as a risk management strategy – setting the rules in society – reflecting a risk control mindset. The private sector has comparative strengths in capitalisation of risk –

operating in a competitive environment to take on risk and produce agreed outcomes for a profit. ENGOs have a comparative advantage in collaboration – bringing people together around a common goal for collective action, thereby pooling the risk associated with a given set of outcomes.

Understanding these different comparative advantages in risk management is useful in setting out a framework by which risk can be shared across different organisations working together on NbS projects.

The different active strategies to risk are set out in Figure 1. The figure shows how different types of organisation use a blend of these different strategies. In Section 2.2, we will look at how different strategies are relevant to different types of problem and in Section 2.3 we will look at how different organisations may be best placed to address different parts of a complex problem, referring again to Figure 1.

Figure 1 Active risk management cultures and strategy



Source: based on Bromwich, Crilly & Banerjee (2022).

2.2. Different types of systems and risk

Different parts of complex systems are more amenable to different risk management methods. For example, drinking water quality is an issue for which a regulatory, risk controlling approach is well established and fit for purpose. The Drinking Water Inspectorate (DWI) set out the rules on water quality and water companies must comply with these rules. This is a risk controlling approach and works well.

Infrastructure systems have relatively few major variables (e.g. management of assets, finance, water, workforce and various consumables) and key outcomes (e.g. potable water supply) consequently regulated markets can go a long way in driving efficiency. Risk is capitalised and efficiencies may be created.

By contrast the management of landscapes, including water in the natural environment, has a much larger number of variables, with a wide range of outcomes that need to be balanced. Optimisation for any one outcome may undermine other outcomes in complex ways. Therefore, management of landscapes is a different type of system management challenge from the management of infrastructure. Landscape management needs to be more collaborative and draw on collective judgement to balance potential outcomes whereas infrastructure management is more suited to a command-and-control approach, augmented with markets to drive optimisation.

Managing complex systems routinely draws on a blend of methods. In river catchments the Water Framework Directive sets outs rules and targets for water quality – a risk controlling contribution. Similarly, water resources are controlled with licences and permits. Yet, these measures don't create the collaborative approach needed to manage a catchment – a function for which catchment partnerships have been established under the CaBA programme. A current perceived gap is the application of the private sector to bring a scale of impact at the catchment level, without losing the nuance provided by the collaborative efforts of catchment partnerships. The risk framework set out in this document is intended to facilitate the scale up of investment in NbS – adding the capitalisation of risk, to the rules based and collaborative approaches currently prevalent in catchment management.

2.3. Project Risk Framework: matching organization with the problems they are best placed to manage

Recognising that different types of organisation have different cultures relating to risk management, the essence of our risk management framework is to match up the capability of different types of organisation with different challenges that occur at different stages of a project. When the overall framework is accepted, this document can be developed with detail on how to set up the arrangements proposed – for example key contractual clauses that describe the risk sharing practice set out here could be recorded to provide guidance to practitioners.

This targeting of organisational capability with risk challenges is evident in the Wyre NFM project which produced a risk management framework with the following characteristics:

- The project conveners, the Rivers Trust, are not exposed to financial risk, since capitalisation of risk is not their comparative advantage. Their principal risk is reputational reflecting the fact that their strength is in convening collective action. If the project goes well, their ability to convene further projects is enhanced, but if the project goes poorly, their reputation is diminished, and their future convening power is reduced.
- Investors take the highest level of financial risk and do so because of the potential profit that they will receive according to the investment they make.
- Landowners are generally not willing to accept risk and are therefore not exposed risk in this framework. Should they be exposed to risk, they are unlikely to engage with the project. There is some alignment between the agricultural community (particularly small upland or family farms) with a degree of risk aversion.

Risk allocation in the Wyre NFM project is summarised in Table 2.1.

Table 2.1 Risk allocation in the Wyre NFM project

	Buyers	Investors	Landowners	Convenors (Rivers Trust)
NFM Construction / delivery	£	£££	Nil	Reputational
NFM performance	££	££	Nil	Reputational
Contractual / counterparty risk	£	££	£	Reputational
External risks – policy environment	£	£	£	-

Source: Source: Hird, D. (2022, May13). Showcase of the Wyre River Natural Flood Management Project. Green Finance Institute Webinar. https://www.youtube.com/watch?v=Iductkx8EU4

3. Project Categories

The Project Risk Framework comprises a series of tables that suggest how risk is allocated across different project participants at different stages of a project.

3.1. Project Participants

Our framework adopts the following categorisation of project participants:

- **Buyers**: actors that pay for the direct benefits of NbS implementation. E.g. local government procuring flood management benefits, or Water and Sewerage Companies procuring water quality benefits.
- **Investors**: actors that invest in the project in return for a profit derived from payments from buyers of ecosystem services created by the NbS. There may be a range of different investors.
- **Landowners**: Owners of the land where the NbS are situated. Often, but not exclusively farmers or local government.
- **Supply side convenors** bring together landowners to implement a combined programme of actions
- **Implementors:** contractors or ENGOs designing and building NBS interventions.
- **Anchor organisations:** Organisations with connections to a place able to manage large funds and operate mindful of the common good in that location.

We understand that these are not homogenous categories in terms of actor or risk management strategy. For example, we note that landowners may be considered as comprising the following three main sub-categories:

- Institutional landowners – who a likely to have a clear organisational structure and strategy that enables a more developed approach to risk management including some ability and willingness to carry project development costs and risks.
- Private landowners – some of whom may operate with clear strategies but others may not be able to carry project start-up costs and risks.
- Tenanted sector – again there is considerable variation within this sector depending on the duration of the tenancy and the type of business.

Overall our working assumption is that landowners are not willing to take on project risks, noting that there are significant exceptions to this – in which case the risk profiles shown in this table can be modified. We will investigate this issue further in the next phase of the project.

3.2. Project Stages

We use work with the following indicative project phases as shown below and in Table 3.1

1. NbS Concept development
2. Project development
3. Implementation: design, construction and delivery
4. Operation

Table 3.1 Project Stages

	Activities	Completion milestone	Risks
NBS concept development	**Individual actors develop plans**	**Commitment across participants to co-create a plan.**	**Wasted effort by each actor if no project materialises.**
Project development	**Actors work together to create a collective plan and commit to its implementation.**	**An outline plan and agreement to proceed with planning permission and raising funds.**	**Wasted effort**
Implementation	**Design and construction: Appropriate NbS built to standard**	**Funding secured, and planning approved**	**Failure in procurement. Inappropriate selection or design of NbS. Poor quality construction.**
Operation	**NbS operational**		**NbS do not perform as intended.**

3.3. Project Types

We provide risk frames for the following project types. These types may be understood as having increasing scale and complexity.

1. Simple, eNGO convened projects.
2. Simple, eNGO convened project, with start-up grants
3. Larger project with a start-up grant and anchor organisation
4. Complex transformative multi-sector projects

We provide project risk management frames for the first three types. Complex multi-sector projects would replicate frame Type 3 across the sectors. The Project risk management frames are provided in Section 4.

4. Project risk management frames

We show Project Risk Frames on the following pages as described below. The Frames give an indication of how risk is shared with the following broad categories shown in Table 4.1.

Table 4.1 Legend for the Project Risk Management Frames

Symbol	Risk exposure
£	Own funds to engage with project development
££	Larger project development costs
£££	NbS procurement / implementation costs
££££	Large scale investment finance
R	Reputational risks
L	Liability

Type 1: A simple eNGO convened project – See Table 4.2

Risk is shared as set out as follows in the different stages of the work:

1. Landowners and/or an eNGO develop their own ideas for a NbS project. There is no formal agreement. This work precedes the establishment of a recognisable project. Everyone is working at their own risk. The stage ends when a project is set up and participants begin to work together.
2. Actors work together to create the project by
    a. getting buy-in across a sufficient number of landowners.
    b. by creating plans and submitting these to the relevant risk authority for approval.
    c. by raising funds.
    d. by setting up governance arrangements e.g. a Community Interest Company or other Special Purpose Vehicle.

    The milestones that signify the close of this stage are planning approval, a funding or finance agreement; and established governance. The convener may be putting money into the project at this stage which would be at risk if the project does not progress. Other participants such as land owners may be making expenditure. The convener carries reputational risk.
3. The NbS are designed, procured and implemented. The investors carry the financial risk at this stage. Risk may be transferred to the providers if the contract stipulates that.
    The milestones for completion of this stage are the completion of the NbS.
4. The NbS perform over time. Risk is carried between the Buyers and investors according to the contract. The land-owners may carry liabilities associated with the structures on their land.

Type 2: A simple eNGO convened project, with a start-up grant – See Table 4.3.

Type 2 is similar to Type 1 except that a start up grant is provided to the convener which means that they are not exposed to financial risk.

This frame is added in recognition of the impact that start up grants can make in de-risking engagement in NbS projects by a wide range of potential partners. They are an important risk management tool.

Type 3: A larger project with a start-up grant and an anchor organisation – See Table 4.3.

Type 3 is provided in recognition that to achieve scale in NbS there will be a need for a large organisation (with a credit rating) to manage finances at scale. Organisations that have financial capability of this type and a presence and interest in a given place are known as anchor organisations. They are able to take the risk associated with large scale finance, thereby derisking the project for large scale investors.

Complex transformative multi-sector projects

Where projects involve multiple sectors for wider landscape transformation then these frames can be used in modified form for each sector as appropriate. There will be some sectors with higher development costs and risks. The key point is that as the scale of ambition grows then more substantive work is required in the preparatory stage and the risk for participants increases, especially where the complexity and scope of the transition is large – if a critical number of actors need to buy in at scale for the transformation.

Table 4.2 Project Risk Management Frame Type 1 - simple, eNGO convened project

Type 1	Buyers	Investors	Land owners	Providers	Supply side Conveners	Concluding milestone	Note
1. Concept development			£		£ / R	Parties agree to work together to set a project.	Land owners and eNGOs develop options with their own effort as the investment at risk. The conveners carry a reputational risk.
2. Project convening / initial design	£		£		££ / R	Planning approved Finance raised	NbS may be designed at this stage to a level sufficient for planning approval. The amount of risk conveners carry depends on project outlays they accept.
3. NbS Design and Construction delivery	£	£££	£	£	R	Appropriate NbS built to standard	Some more detailed design may be after planning approval. The risk carried by providers depends on the contract used.
4. NbS performance	££	££	L		R	NbS perform over time	Risk sharing during the performance phase depends on the contractual arrangements.

Table 4.3 Project Risk Management Frame Type 2– simple, eNGO convened project, with start-up grant

Type 2	Buyers	Investors	Landowners	Providers	Supply-side Conveners	Concluding Milestone	Note	Start up grant provider
1. Concept development			**£**		**R**	Parties agree to work together to set a project.	Convener does not carry financial risk in this model	£
2. Project convening / initiation design	**£**		**£**		**R**	Planning approved Finance raised SPV/CIC established to carry investment	NbS may be designed at this stage to a level sufficient for planning approval	££
3. NbS Design and Construction delivery	**£**	**£££**	**£**	**£**	**R**	Appropriate NbS built to standard.	Some more detailed design may be after planning approval. The risk carried by providers depends on the contract used.	
4. NbS performance	**££**	**££**	**L**		**R**	NbS perform over time	Risk sharing during the performance phase depends on the contractual arrangements.	

Table 4.4 Project Risk Management Frame Type 3 – larger project with a start-up grant and anchor organisation

Type 3 Anchor organisation	Buyers	Investors	Land owners	Providers	Supply side Conveners	Concluding Milestone	Note	Start-up grant provider	Anchor organisation
Concept development			£		R	Parties agree to work together to set a project.	Convener does not carry financial risk in this model	£	
Project convening / initiation design	£		£		R	Planning approved Finance raised SPV/CIC established to carry investment	NbS may be designed at this stage to a level sufficient for planning approval	££	££££
NbS Design and Construction delivery	£	££££	£	£	R	Appropriate NbS built to standard.	Some more detailed design may be after planning approval. The risk carried by providers depends on the contract used.		££££
NbS performance	££	£££	L		R	NbS perform over time	Risk sharing during the performance phase depends on the contractual arrangements.		££££

5. Feedback and next steps

Please review this framework and provide feedback on the scope and context to: hiba.khan@mottmac.com; copying brendan.bromwich@mottmac.com.

In particular please provide advice on:

- Is the categorisation of projects suitable? Are other project categories needed?
- Is the categorisation of project stages suitable? Are other categories needed?
- Is the categorisation of project participants suitable? Are other categories needed?
- Is the categorisation of risk management strategies clearly explained?
- Do the risk allocations (e.g. £££, R, L) look right?
- How are liabilities handled in these projects?

How can the work be taken forward?

- How do planning milestones differ from one region to another?
- Does this framework apply for Wales, England and Northern Ireland? Are there other factors that need to be addressed?
- Do you have examples of contracts for these project arrangements that you can share? What are the key ways these arrangements are taken forward contractually?

This Project Risk Framework will be taken forward with case studies and collection of relevant data such as contract clauses that indicate how risks may be allocated.

The Impact Risks framework will be taken forward in collaboration with WWT. This work will have an interface with the Common Value Framework, currently under development in the MNbS project. This workstream will also feature under the proposed adjoining project to gather evidence for NbS implementation during a “Tracked Programme of Work” for the water sector planning cycle AMP 8.

Work on managing uncertainty in monitoring and evaluation, will be taken forward in liaison with other actors working on these topics.

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Appendix A. Theoretical Basis

This Annex provides the theoretical basis for the risk management categories discussed in Section 2. This section principally draws on Bromwich Crilly and Banerjee (2022).

Understanding diversity: Plural Rationality and Cultural Theory

The theoretical basis of the four-fold categorisation of approaches to systems is drawn from Plural Rationality and Cultural Theory (Thompson et al 1990, Douglas 1986). The theory applies Mary Douglas' "Grid Group model" to a systems analysis context and categorises bias in systems analysis with a two by two matrix (Douglas 1986). The theory posits that across society there are four main approaches to risk and that these assumptions are aligned with attitudes to understanding systems (Thompson et al. 1990). See Figure A.1.

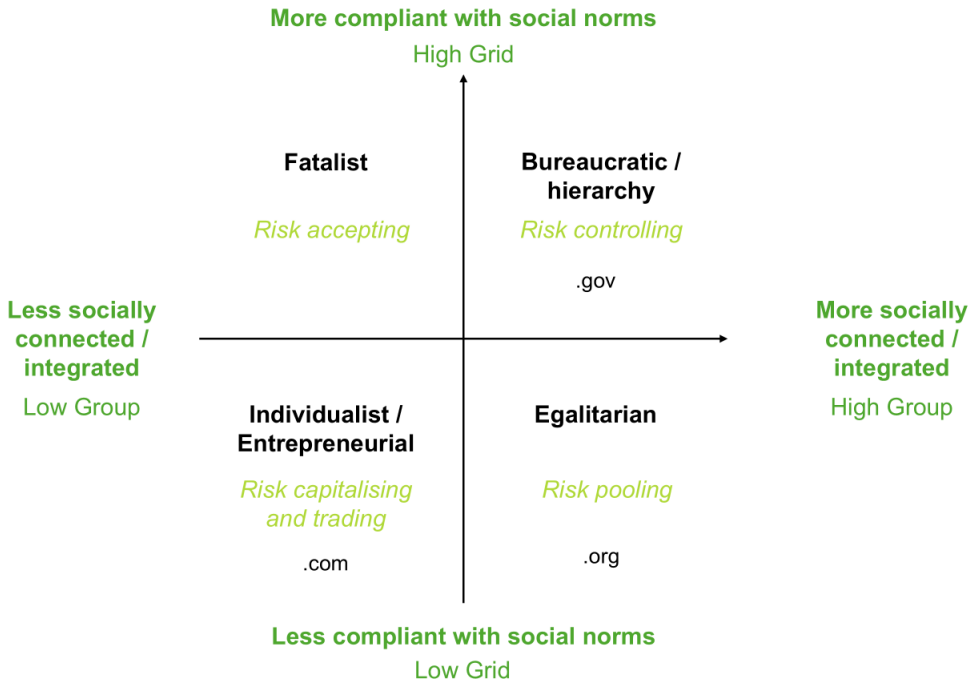
The Grid-Group matrix identifies those who are more or less constrained by social norms (Y axis) and more or less well socially connected (X axis). At the top of the matrix actors are more constrained by social norms – people are more compliant with cultural practices and with rules (high "grid" in Douglas's terms). Rule makers in government are here, as are risk accepting "fatalists" - those who accept the rules but don't engage with creating them. At the bottom of the matrix people are low grid and therefore more likely to contest social norms and rules: entrepreneurs and innovators are here as are those who contest societies rules such as NGOs. On the right of the matrix people are more engaged with social and political discourse through being more socially networked and engaged (high group), whereas on the left of the grid people are less well connected and less engaged (low group). The matrix gives us the following four categories of actor.

- In '**bureaucratic'** or '**hierarchical'** organisations, actors are well connected and compliant with social conventions. This group looks to create rules or other controls on systems. This group is **risk-controlling**. Given that they have confidence in social networks and social norms, confidence is put in competent authorities to oversee and implement an orderly approach to environmental problems. Professional expertise is valued, design codes are respected, and targets, action plans with appropriate monitoring are drawn up and implemented. This approach to risk is often reflected in government and in conventional engineering management (.gov on Figure A.1).
- In '**egalitarian'** or community settings, actors are socially connected with political and social groups. They are inclined to contest social convention. Given their strong social networks they favour collective action. This groups **coordinates/collaborates to pool risk**. However, unlike hierarchists, the egalitarian contests social norms arguing that society's collective behaviour can, indeed must, be changed. Actors in this context have a challenge function to government and to the private sector. This perspective is prevalent in

environmental NGOs – participation matters, collective analysis is embraced, they advocate for change (.org on Figure A.1).

- In 'Individualist' or '**entrepreneurial'** settings, actors have less social engagement with those involved in the cultural and political discourse and are less constrained by social norms and conventions. Individualists consequently have a freedom to tackle challenges through their own innovation and endeavour. Risk is seen as an opportunity and can consequently be traded. This group is capable of **capitalising (and trading) risk**. Where constraints occur, they believe the market will create opportunities for the most innovative actors to produce new solutions - at a profit, in competition with others (.com on Figure A.1).
- Fatalists are those who comply with social norms and are not engaged with a network of relationships to effect change. They are conservative and risk averse. Unlike the individualists/entrepreneurs this group doesn't not see risk as an opportunity, but as something to be endured. Actors internalise risk and accept what comes their way. They are **risk-acceptors**. This is a passive rather than an active risk management strategy.

Figure A.1 Grid group model: organisational culture and approaches to risk



Source: based on Bromwich, Crilly & Banerjee (2022).

As Allan (2002) observed, these categories map onto public, private and third sector organisations, and broader society in the following ways. Government organisations are bureaucratic and more inclined towards regulations and planning. NGOs contest social norms (low grid) and advocate for collective action to address problems (high group). They are engaged in political discourse (high group).

Private sector actors are more inclined to present problems in ways amenable to market-based solutions and innovation. The grid group framework indicates that they are not bound by convention and so are free to innovate. They are less engaged (low group) in terms of being less involved with policy discourse than the high group categories of government and NGOs.

An example of a group that is conservative in terms of compliant with convention, and not well-connected would be family farmers. They tolerate a high level of risk but due to the dispersed nature of farming don't have developed organisational structures that enable them to speak with a coordinated voice.

Practical implications

The key observation that comes out of this theoretical framework is that there are three main active risk strategies comprising, controlling risk, capitalising (and trading) risk and co-ordinating/collaborating to pool risk. There is a passive risk management strategy which is the acceptance or tolerance of risk.

This categorisation is seen in other risk related policies, such as Defra's Green Leaves III report (Gormley et. al, 2011).

- Termination and mitigation are risk controlling measures.
- Transfer and exploit are both means of capitalising and trading risk
- Acceptance is a category that is seen in both risk management frameworks.

A weakness of the Green Leaves III framing is that it does not give due attention to collaboration as a risk management method. See Figure A.2.

Figure A.2: Risk management framework – Green Leaves III

Source: Gormley, A., Pollard, S. Rocks, S. and Black, E., (2011)

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