

GUIDE TO THE RISKS & OPTIONS ASSESSMENT FOR DECISION-MAKING (ROAD) PROCESS

Version 1.0

UNDERSTAND RISKS

ENGAGE DECISION-MAKERS

ENABLE ACTION

ROAD PROCESS

Risks to food, energy, environment and water systems are undermining livelihoods and well-being globally. The Risks and Options Assessment for Decision-Making (ROAD) process enables decision-makers to respond effectively



Conventional decision-making processes are inadequate for emerging global risks

RISKS TO CRITICAL SYSTEMS REQUIRE SYSTEMS-BASED DECISION TOOLS

Food insecurity, energy poverty, environmental degradation and water insecurity can emerge from many sources. Despite the gains made in economic development during the 20th century, global and local trajectories of resource use are unsustainable. Human societies are increasingly exposed to risks caused by climate variability and change, pollution, and population growth

The risks and dangers are well-documented. And decision-makers at all levels are responding. But getting these decisions right remains elusive in many cases because of the complexity of the challenge. Narrow, linear approaches to developing solutions are increasingly obsolete: failure to account for the feedback effects of decisions simply creates new risks.

The ROAD process enables decision-makers to comprehend and address complex risks. It is a systems-based approach to risk assessment that allows the integration of different tools and types of knowledge. A key feature is the participatory development of causal models of risk systems that provide a shared foundation for decisions.

This document is a guide to the ROAD process for facilitators and decision-makers. It outlines a series of steps that can be adapted to a range of decision-making contexts. Version 1.0 of the Guide reflects lessons from pilot applications of ROAD in four regions of the world.

FOOD-ENERGY-ENVIRONMENT-WATER SYSTEMS

The critical systems that societies depend upon are closely linked. From water pollution in agriculture to energy use for groundwater extraction and beyond, risks can be transferred across systems. Threats emerging in one system can quickly cascade into systemic risks that undermine human security.

Accounting for linkages across systems is a necessary task. But it is only the first step towards better decision-making.

We need tools to manage complex risks to critical systems



**ROAD IS A PARTICIPATORY
DECISION-MAKING TOOL**

THE FE2W NETWORK

The Food, Energy, Environment and Water (FE²W) Network was founded in 2014 to move the world beyond observation and visions to acting on systemic risks to the critical resources all people need to live.

From ministers to business leaders to farmers, we work with decision-makers to manage risks, support livelihoods, and increase the resilience of food-energy-environment-water systems.



Our 40 members are researchers & practitioners from universities, government agencies, multilateral organisations, & non-government organizations across the world



Key Insights on Applying the ROAD Process

- ROAD can be used in data- or resource-poor contexts to elicit expert judgements of decision-makers
- ROAD can also be used in data- or resource-rich contexts to integrate scientific modelling, expert analysis and stakeholder inputs into decision-making
- Simulating participatory methods prior to workshops is an effective method to train facilitators
- Conducting separate participatory workshops for different groups of decision-makers & stakeholders enables knowledge generation & knowledge transfer
- Causal risk system models are effective tools for both analysis & communication

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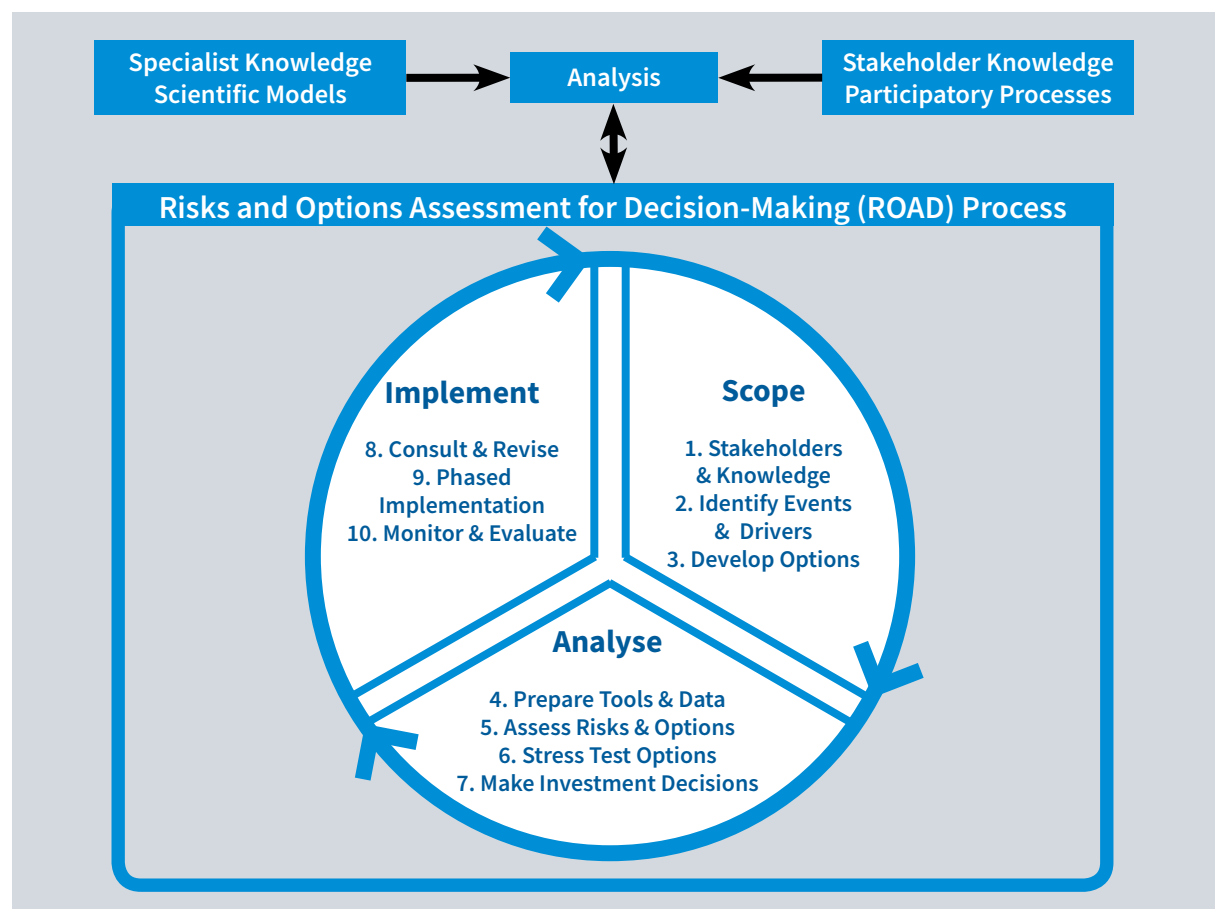
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OVERVIEW

ROAD is a participatory process that integrates different types of knowledge into decision-making. Facilitators adapt the process to the decision context and modify the steps, stages, and tasks outlined in this guide accordingly

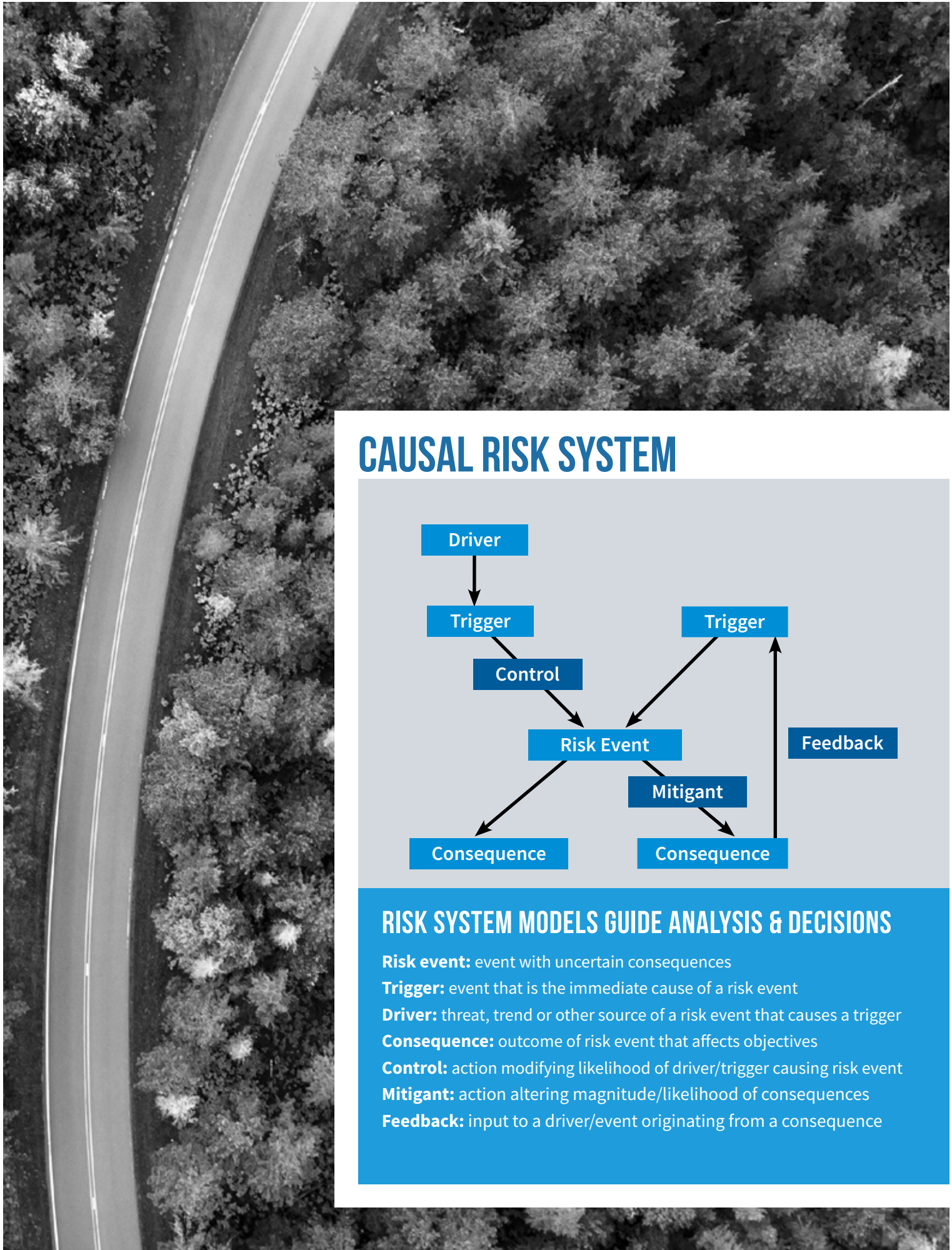


TASKS

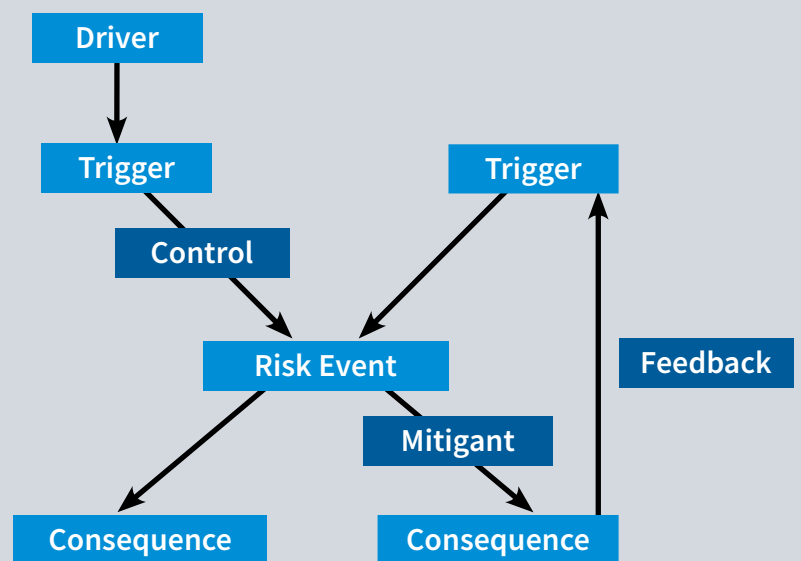
- ? **QUESTIONS** generating information and knowledge to inform decisions
- ▶ **ACTIONS** enabling questions to be answered or decisions made
- ✎ **OUTPUTS** documenting the work undertaken & outcomes

RESOURCES

- 📖 **WORKING DEFINITIONS** of key concepts and terms
- ⚠️ **GUIDELINES** informing the implementation of tasks



CAUSAL RISK SYSTEM



RISK SYSTEM MODELS GUIDE ANALYSIS & DECISIONS

Risk event: event with uncertain consequences

Trigger: event that is the immediate cause of a risk event

Driver: threat, trend or other source of a risk event that causes a trigger

Consequence: outcome of risk event that affects objectives

Control: action modifying likelihood of driver/trigger causing risk event

Mitigant: action altering magnitude/likelihood of consequences

Feedback: input to a driver/event originating from a consequence

ROAD is developed & improved through field-based testing with decision-makers

PILOT PROJECTS

The ROAD process has been developed through a series of pilot projects & applications in four different regions of the world. FE²W Network members worked with local partners to adapt ROAD to the decision-making context



VIETNAM

Local & Provincial Government
Water Security | Farming



BANGLADESH - INDIA - NEPAL

National Government & Donors
Rural Innovation | Livelihoods



NEW ZEALAND

Stakeholders & Local Government
Water Policy Implementation



WEST AFRICA

Officials from 9 Countries
Transboundary Water Cooperation

PARTICIPATION ANALYSIS **STAKEHOLDER KNOWLEDGE** **LEARNING** **DECISIONS** **ACTION** **RISKS**
UNDERSTANDING **REVISION** **CONSULTATION** **EVALUATION** **INSIGHTS** **GUIDANCE** **FACILITATION**



STEP 1

STAKEHOLDERS & KNOWLEDGE



Who are the Decision-makers

Who are the Stakeholders?

What are the objectives of Decision-makers & Stakeholders?



Identify & collate existing data & information

Identify key data & information gaps

Identify Baselines & Thresholds of food, energy, environment & water systems



Summarise results & use as a reference for subsequent steps



Decision-makers: People/groups managing risks with ROAD

Stakeholders: People/groups affected by risks & management actions of Decision-makers

Baseline: Current system state & reference point for change

Threshold: System states beyond which rapid changes occur



Consult all Stakeholders | Define limits of decision space

Explore food, energy, environment & water systems

Recognise dynamic nature of objectives



STEP 2

IDENTIFY EVENTS & DRIVERS



What Risk Events are being assessed?
 What are the Triggers causing the Risk Event(s)?
 What are the Drivers causing the Triggers?
 What are the Consequences of the Risk Events?
 Do Consequences generate Feedbacks?



Develop causal risk system(s) in participatory workshops
 Synthesise individual participant inputs into collectively defined causal risk systems



Collate related events & drivers to reduce the size of causal risk system(s)
 Record causal risk system(s) so that different groups of decision-makers & stakeholders can compare models

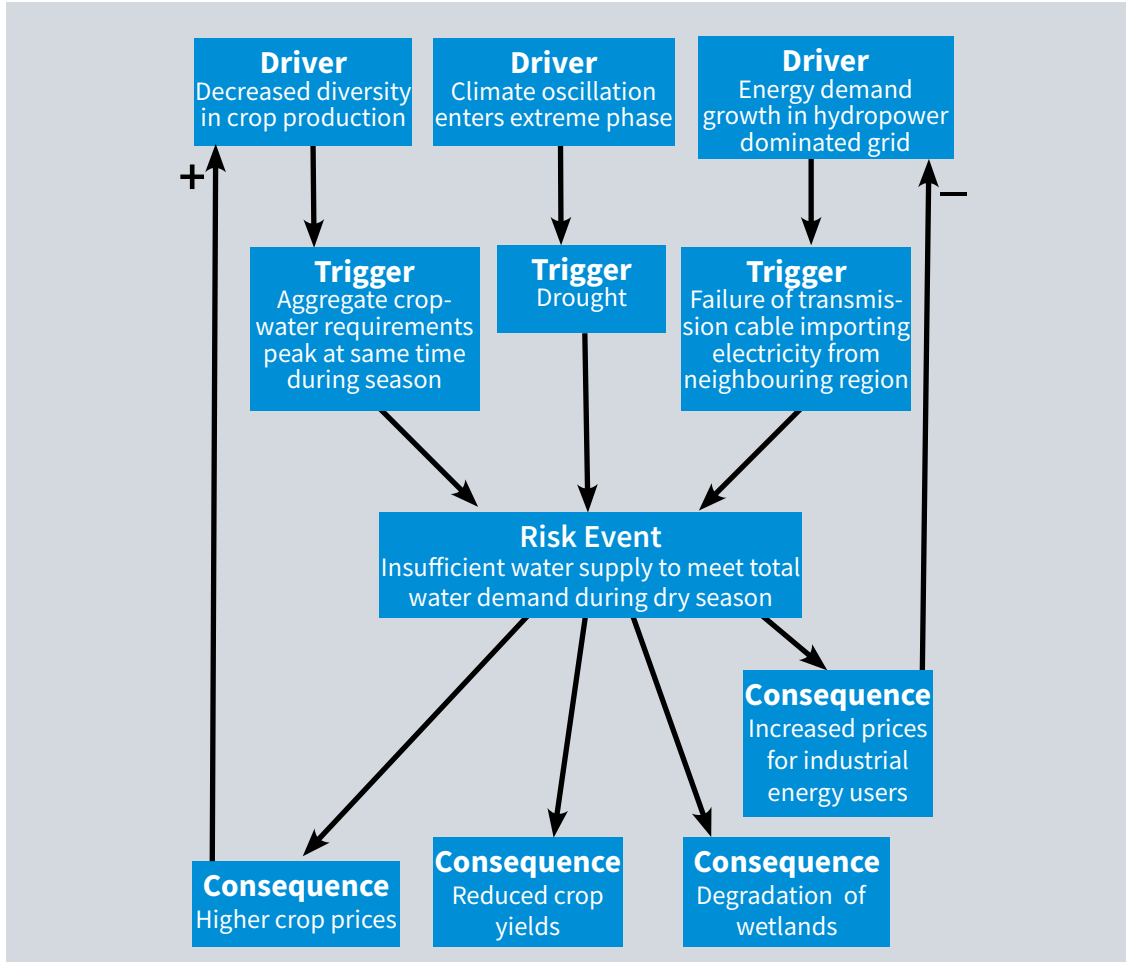


Risk event: An event with uncertain consequences
Trigger: An event that is the immediate cause of a risk
Driver: Trend, threat or other risk source causing trigger(s)
Consequence: Outcome of a risk event that is related to objectives
Feedback: Input to a driver/event originating from a consequence



Identify key system components through consensus
 Adapt definitions to the institutional and cultural context

CAUSAL RISK SYSTEM (STEP 2)



POSITIVE FEEDBACKS (+) AMPLIFY CHANGE

NEGATIVE FEEDBACKS (-) DIMINISH CHANGE

DRIVERS CAN CAUSE MULTIPLE TRIGGERS



STEP 3 DEVELOP OPTIONS



What Controls could change the Likelihood of Risk Events and Triggers occurring?

What Mitigants could change the Likelihood and/or strength of Consequences and Feedbacks?



Develop Options in participatory workshops

Define the resources available to address Risk Events

Identify external factors beyond Decision-makers' control

Conduct initial evaluation of priority Options with participants according to collectively defined criteria



Collate related controls & mitigants to reduce the number of Options to consider

Record updated causal risk systems and preliminary evaluation of priority Options



Likelihood: An estimate of the probability that an event or outcome will occur. Expressed quantitatively (number between 0 and 1) or as a qualitative interval (Very Low, Low...)

Control: An action that modifies the Likelihood of a Trigger causing a Risk Event or a Driver causing a Trigger

Mitigant: An action that modifies the Likelihood or strength of a Consequence/Feedback

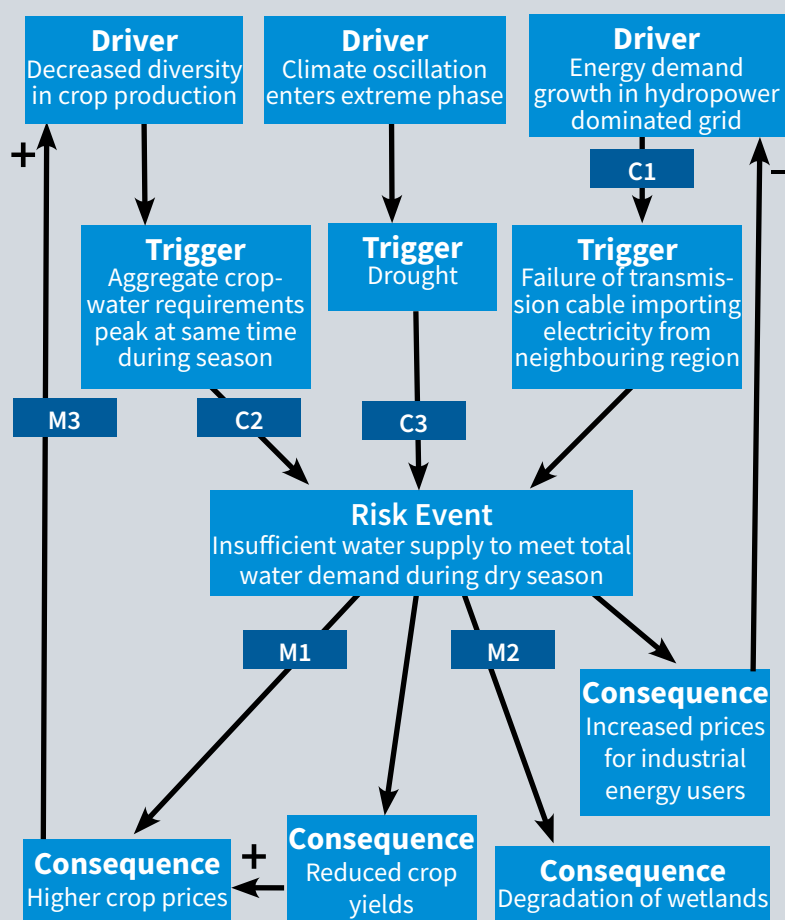
Option: Control/Mitigant that modifies a causal risk system



Consider equity implications of priority options

Acknowledge that not all causal pathways can be controlled

CAUSAL RISK SYSTEM (STEP 3)



Controls

- C1. Replace water-intensive electricity plants
- C2. Scarcity-based agricultural water pricing
- C3. Build new water storage infrastructure

Mitigants

- M1. Fixed price contracts
- M2. Deliver emergency environmental flows
- M3. Improve supply chains for crops with less water-use intensity

CONSIDER BOTH PRE-TRIGGER AND POST-TRIGGER CONTROLS

MITIGANTS CAN BE APPLIED TO CONSEQUENCES AND FEEDBACKS

OPTIONS MAY BE APPLIED TO MULTIPLE CAUSAL PATHWAYS



STEP 4

PREPARE TOOLS & DATA



What is the quality of existing data & information?
What are the key Uncertainties?
What are the key Indicators?



Collate & synthesise further data & information
Estimate Likelihoods of causal pathways
Select tools for assessing risk system & Options
Prepare criteria for Decision-makers' to assess Options



Record updated causal risk systems
Document synthesized data & information

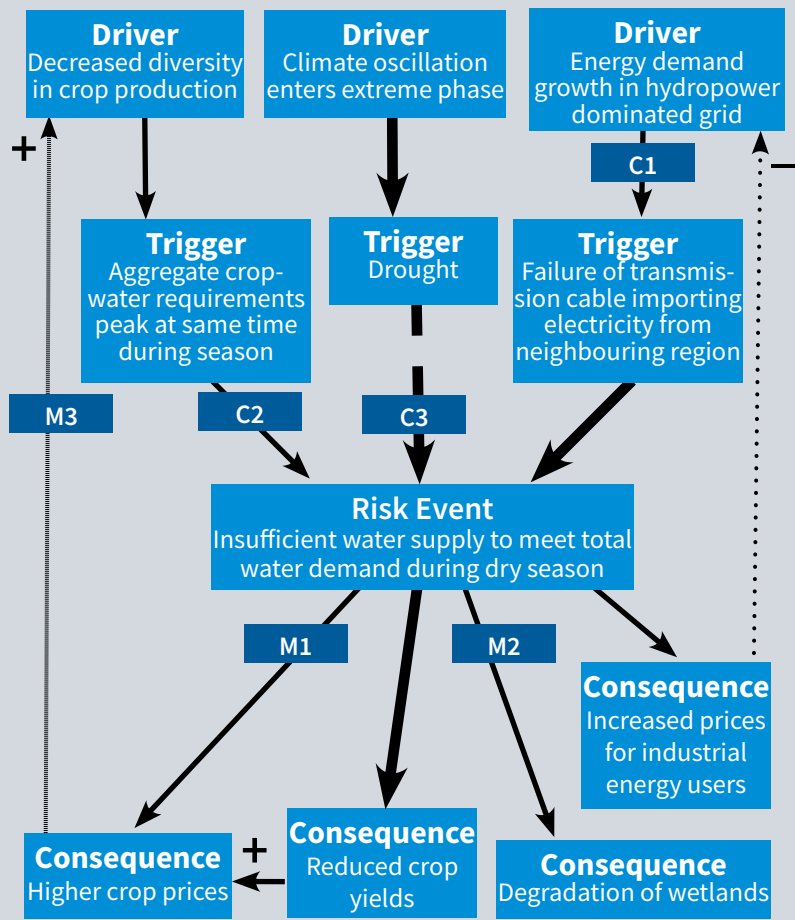


Uncertainty: A system component that cannot be accurately measured or predicted with existing data & information
Indicator: A quantitative or qualitative measure of the state of a system or its components



Assess outcomes across Stakeholders
Deploy quantitative & qualitative tools

CAUSAL RISK SYSTEM (STEP 4)



LIKELIHOODS HIGHLIGHT PRIORITIES FOR DECISION-MAKING

LIKELIHOODS CAN BE ESTIMATED THROUGH APPLIED RESEARCH AND/OR EXPERT JUDGEMENT OF DECISION-MAKERS, STAKEHOLDERS & RESEARCHERS



STEP 5

ASSESS RISKS & OPTIONS



Use criteria & indicators to assess outcomes
Estimate outcomes associated with Consequences
Estimate how Options change Likelihoods & outcomes
Assess outcomes from alternative portfolios of Options



Which Stakeholders benefit? Which Stakeholders lose out?
Are Decision-makers' objectives achieved?
Are Stakeholders' objectives achieved?
What are the Secondary Impacts from applying Options?
Sample assessment criteria:
What is the change against Baselines?
Are Thresholds breached?



Record key assumptions & Uncertainties
Document assessments of Risk Event(s) & Options

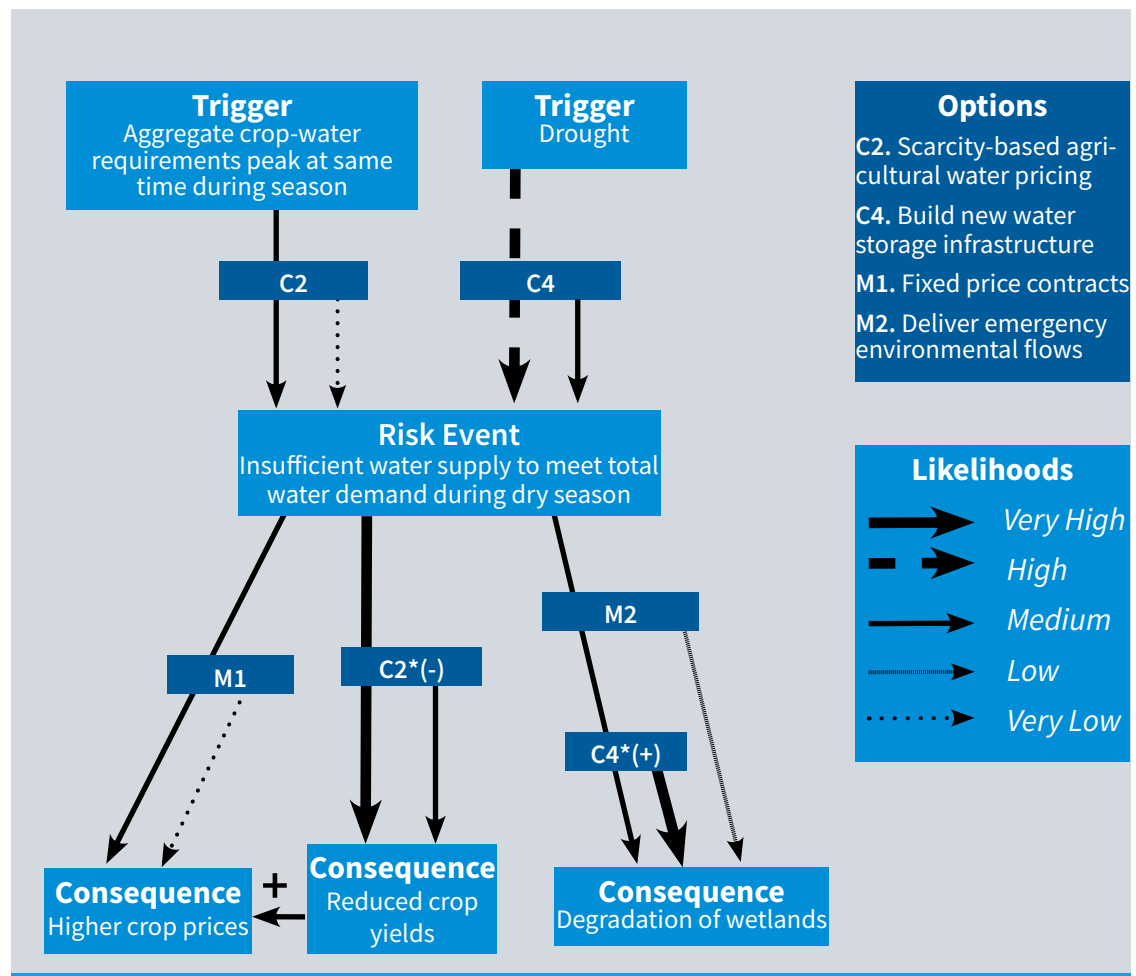


Secondary Impact: A change in a Likelihood caused by the application of an Option to a different causal pathway



Assess outcomes across Stakeholders
Deploy quantitative & qualitative tools

ASSESSMENT OF OPTIONS PORTFOLIO



THE COLLECTIVE IMPACT OF OPTIONS SHOULD BE THE FOCUS OF ASSESSMENT

SECONDARY IMPACTS NEED TO BE CONSIDERED

SECONDARY IMPACTS MAY STRENGTHEN OR DIMINISH LIKELIHOODS



STEP 6

STRESS TEST OPTIONS



Conduct limited secondary risk assessment of Options with stakeholders & experts

Reassess causal pathways & expected outcomes under alternative assumptions

Identify policies & actions to support effectiveness of Options



Would a different portfolio of Options be selected under alternative assumptions?

What are the potential causes & consequences of an Option failing to achieve objectives?

How will stakeholders respond to Options?

What actions manage the risks of Options failing?



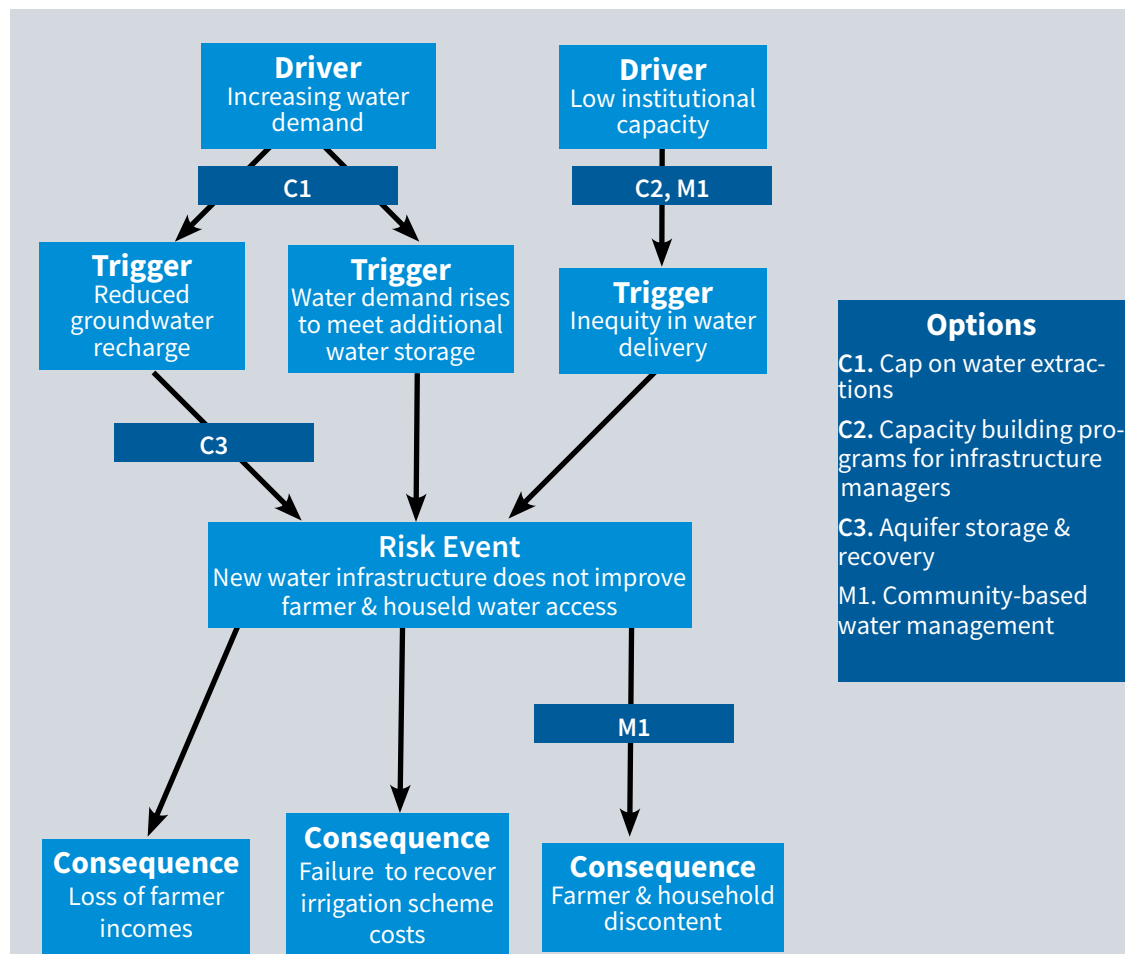
Document results to provide reference for Investment decisions & subsequent implementation



Assess portfolios of Options

Account for different time-scales and spatial-scales

SECONDARY RISK ASSESSMENT OF OPTIONS



STAKEHOLDERS & EXPERTS CAN HELP DECISION-MAKERS IDENTIFY UNEXPECTED RESPONSES TO OPTIONS & PREVENT PERVERSE CONSEQUENCES

GOOD RISK GOVERNANCE REQUIRES MEANINGFUL STAKEHOLDER ENGAGEMENT BEFORE FINAL DECISIONS ARE MADE



STEP 7

MAKE INVESTMENT DECISIONS



Make Investment decisions according to pre-defined criteria
Consider both quantitative & qualitative data



Which portfolios of Options are most likely to achieve objectives?

Does the institutional capacity exist to implement chosen Options? If not, what additional investments are needed?

Are the risks of implementation failure acceptable for a given Option?



Document Investment decisions & criteria

Provide rationale & highlight supporting evidence

Explain why alternative decisions were not made



Investment: The assignment of financial and non-financial resources to the implementation of Options



Account for the costs of monitoring & evaluation
Enable flexible implementation of Options



STEP 8 CONSULT & REVISE



Consult Stakeholders on the implementation of Options

Identify alternative approaches to implementation, including locations or programs to pilot Options

Review Investment decisions



Where can Options be field-tested before scaling up?

What Monitoring & Evaluation process is required to assess progress towards objectives?

How can Stakeholders contribute to the implementation process?



Monitoring & Evaluation: A formal process to assess the implementation of Options



Identify and challenge assumptions
Enable Stakeholders to guide implementation



STEP 9

PHASED IMPLEMENTATION



Pilot Options & implement Investment decisions in phases

Integrate lessons from pilots into review of Investment decisions & Options

Scale-up implementation



What new data & information have pilots provided?

Should implementation be scaled up?

How can implementation be adjusted to different contexts?

Do Investment decisions need to be adjusted?

Should alternative Options from Steps 5-6 be reconsidered?



Deploy a piloting approach to implementing Options
Incorporate new data & information into subsequent stages of implementation



STEP 10

MONITOR & EVALUATE



Enable Stakeholders to play a central role in Monitoring & Evaluation

Monitor & Evaluate outcomes across objectives, Baselines, Thresholds, Key Indicators, and other criteria

Identify whether risks of implementation failure are being managed



Do outcomes diverge significantly from expectations?

Are objectives achieved?

What changes are required to improve implementation?

Do causal risk systems need to be re-evaluated?



Document outcomes

Update causal risk system models with data & information obtained through Monitoring & Evaluation

Synthesise data, information, results & decisions across Steps 1-10 for subsequent assessments



Monitor : Ongoing assessment of the outcomes from implementing Options

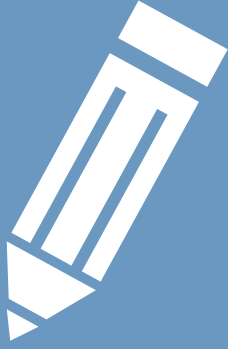
Evaluate : Examination of the performance of Options and their implementation



Monitor across Stakeholders

Evaluate across time-scales

Learn from both successes and failures



FURTHER READING

'Decision-making for systemic water risks: Insights from a participatory risk assessment process in Vietnam' (2018), *Earth's Future*, available at: doi.org/10.1002/2017EF000777

'Possible pathways and tensions in the food and water nexus' (2017), *Earth's Future*, available at: doi.org/10.1002/2016EF000506

'Responding to global challenges in food, energy, environment and water: Risks and options assessment for decision-making' (2016), *Asia Pacific Policy Studies*, available at: doi.org/10.1002/app5.128