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

Version 1.0

UNDERSTAND RISKS

ENGAGE DECISION-MAKERS

ENABLE ACTION

PREPARED FOR
Facilitators & Project Partners

FEBRUARY 2019
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 to complex risks.

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.
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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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.

Causal risk assessment identifies key system linkages & priorities for action.

Guide to the ROAD Process: Version 1.0

www.fe2wnetwork.org
**CAUSAL RISK SYSTEM**

- **Driver**
- **Trigger**
- **Control**
- **Risk Event**
- **Consequence**
- **Mitigant**
- **Feedback**

**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
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
**SCOPE**

**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

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**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
**SCOPE**

**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
**SCOPE**

**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 Feebacks?

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)

**Driver**
- Decreased diversity in crop production
- Climate oscillation enters extreme phase
- Energy demand growth in hydropower dominated grid

**Trigger**
- Aggregate crop-water requirements peak at same time during season
- Drought
- Failure of transmission cable importing electricity from neighbouring region

**Risk Event**
Insufficient water supply to meet total water demand during dry season

**Consequence**
- Higher crop prices
- Reduced crop yields
- Degradation of wetlands
- Increased prices for industrial energy users

**Mitigants**
- Fixed price contracts
- Deliver emergency environmental flows
- Improve supply chains for crops with less water-use intensity

**Controls**
- Replace water-intensive electricity plants
- Scarcity-based agricultural water pricing
- Build new water storage infrastructure

**Consider both pre-trigger and post-trigger controls**
**Mitigants can be applied to consequences and feedbacks**
**Options may be applied to multiple causal pathways**
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.

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

Likelihoods
- Very High
- High
- Medium
- Low
- Very Low

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

Driver
Decreased diversity in crop production

Trigger
Aggregate crop-water requirements peak at same time during season

Trigger
Drought

Trigger
Failure of transmission cable importing electricity from neighbouring region

Risk Event
Insufficient water supply to meet total water demand during dry season

Consequence
Higher crop prices

Consequence
Reduced crop yields

Consequence
Degradation of wetlands

Consequence
Increased prices for industrial energy users

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

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


'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