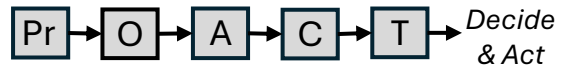


Structured Decision Making (SDM) Cheat Sheet



2 key elements of SDM:

1. Values-focused

- Objectives discussed first
- Contrasts with alternative-focused methods

2. Problem decomposition (PrOACT)

- Break problem into components, separating science from values
- Complete relevant analysis
- Recompose the parts to make a decision

Problem framing: Creates an explicit and shared understanding of the problem

Secret Formula: "Decision Maker (D) is trying to do X to achieve Y over time Z and in place W considering B."

D = decision maker(s) **X** = type(s) of action that needs to be taken **Y** = ultimate goal(s)

Z = temporal extent of the decision problem **W** = spatial extent of the decision problem

B = potential constraints (legal, financial, etc.) and important uncertainties (scientific or other)

Objectives: What the decision maker cares about and wants to achieve

Pieces of an objective = direction (minimize or maximize) + the 'wants' + attribute (the units)

Steps: 1. Transform concerns → objectives, 2. Structure objectives (distinguish types), 3. Develop measurable attributes

1. **Example:** Concern = I don't have enough money for the project → Objective = minimize cost

2. Types of objectives:
- *Fundamental* (basic reason for caring about the decision)
 - *Means* (intermediate objective to achieve fundamental)
 - *Process* (concern for how the decision is made)
 - *Strategic* (higher level/ agency mandate)

3. Measurable attributes: how you measure an objective (*natural, constructed, or proxy* scales)

Natural = directly measurable, *Constructed* = sliding/ relative scale, *Proxy* = correlated with objective

Alternatives: The options for the decision maker

Tips: Brainstorm, challenge assumptions and constraints, work independently then as a group, revisit objectives

Strategy table: →

Example alternative/strategy: Strategy 1 (aka Alt1) = Action Ai + Action Zi

Themes → ↓ Strategies	Theme A	...	Theme Z
Strategy 1	Action Ai	...	Action Zi
...
Strategy N	Action Ai, Aii, Aiii	...	Action Zi, Zii, Ziv

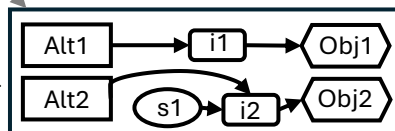
Consequences: measures alternatives (Alt) in terms of objectives (Obj)

Tools: modeling, experts, consequence tables, →

influence diagrams: →

s = stochastic factor (e.g., weather)

i = intermediate factor (e.g., predation)



Alt	Obj 1	Obj 2
Alt 1	Obj 1 outcome	Obj 2 outcome
Alt 2
...

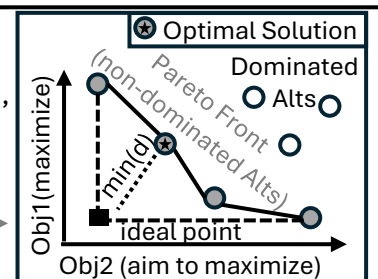
Tradeoffs: giving up on one objective to make gains in another

Tips: remove irrelevant objectives (performance does not vary over Alts), remove dominated alternatives (another Alt better on all/some Objs), make even swaps (if two Objs are in the same unit → combine)

Tools: - Multi Criteria Decision Analysis

(tools to weight objectives and calculate scores of alternatives)

- Pareto frontier analysis (identify dominated solutions, →
- best with two objectives)



*Adaptive management = special type of SDM involving learning and iterative decisions