

### CE 5366– Water Resources Management Exercise Set 1

**Purpose:** Uncertainty and the impact of subtle changes in consequences and costs on the decision making. Critical thinking and reading of classic documents from the literature.

#### Exercise

1. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	198,000 live; 402,000 die	100%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the “cost” to implement either action is identical. Which action would you choose? Why?

2. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	600,000 live; 0 die	33%
	0 live; 600,000 die	66%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the “cost” to implement either action is identical. Which action would you choose? Why?

3. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	600,000 live; 0 die	33.3335%
	0 live; 600,000 die	65.6665%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the “cost” to implement either action is identical. Which action would you choose? Why?

4. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	198,000 live; 402,000 die	100%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the “cost” to implement action A has a cost, equivalent to two thousand premature deaths within one year of the action. Which action would you choose? Why?

5. Consider a decision (action) with the properties below

Action	Outcome	Probability
A	200,000 live; 400,000 die	100%
B	198,000 live; 402,000 die	100%

Suppose the decision makers goal is to maximize the expected value of number of lives. Suppose the “cost” to implement action A has a cost, equivalent to two thousand premature deaths within ten years of the action. Which action would you choose? Why?

6. Did “cost” have an effect on **your** decision? Did the timing of the cost of that matter?
7. Classify the case studies in WRSPM (pp 4-19) into dominant, secondary, and tertiary issues based on the classifications in the book:
- Too much water
  - Too little water
  - Polluted water
  - Degraded ecosystem
  - Navigation
  - Erosion
  - Storage capacity loss (a.k.a “Reservoir Issues”)