

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.

Exercise

1. Look up the term “expected value” in the actuarial and/or financial context.
2. 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%

Compute the expected value of the number of lives in each alternative. 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%
	0 live; 600,000 die	66%

Compute the expected value of the number of lives in each alternative. 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	600,000 live; 0 die	33.3335%
	0 live; 600,000 die	65.6665%

Compute the expected value of the number of lives in each alternative. 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?

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%

Compute the expected value of the number of lives in each alternative. 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?

6. 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%

Compute the expected value of the number of lives in each alternative. 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?

7. Did “cost” have an effect on **your** decision?
8. Did the timing of the cost have an effect on **your** decision?
9. Look up the term “triage” as it is applied to military (battlefield) medicine. How might this concept apply in the cases above?