Making Decisions

Objectives for Today

• Review models of decision-making
• Decision-making framework

Problem-Solving Framework

A. Problem definition
B. Problem solving
   1. Causal Analysis (Why?)
   2. Decision Making (What?)
   3. Action Planning (How?)

VALUES

Decision Making Framework

1. What is the decision to be made?
2. On what criteria will I base my decision?
3. What alternative courses of action exist?
4. What is the expected effect of each alternative on each criterion?
5. Which alternative is best?
6. How can alternative be put into action?

Decisions in a world of ambiguity

• “right” decision based on:
  – time
  – information
  – context of problem
  – understanding cause and effect
• Must resist impulsively selecting the most appealing or “feel good” decision
  – often PR campaign

Decision making models

1. Rational Comprehensive Model
   (also called the Classical Model)

2. Administrative model

Classical Model
(Rational Comprehensive)

• List all alternatives and consequences of the different alternatives
  – assumes all information is available
• Rank each alternative
  – assumes managers possess time and mental capabilities to process information
• Select alternative(s) that lead to desired future state
  – assumes managers know desired future state
### Limitations of the Classical Model

- Ambiguous Information
- Incomplete Information
- Uncertainty and risk
- Time constraints
- Costs
- Cognitive limitations
  - or what book refers to as . . . .

### Bounded Rationality

- Decision making capabilities bounded by managers’ cognitive limitations
- Need to make the optimum decision based on given constraints (which vary from project to project)
- Scenarios
  - academia (research)
  - industry (profit, deadlines)
  - government (set up committee)

### Administrative Model

- The alternative to the Classical Model
- Same idea, but acknowledges constraints
- Acknowledges Bounded Rationality:
  - risk and uncertainty
  - incomplete information
  - time and resource constraints
  - cognitive constraints
- Carry out Rational Comprehensive model to best of your ability, given constraints

### Risk versus Uncertainty

- Risk:
  - Can assign probability to failure or success based on experience and/or research
  - Can predict success of a product or process, completion of a project
- Uncertainty:
  - Probabilities cannot be given for outcomes, future is unknown, little past experience
  - Managers operating blindly

### “Satisficing”

- Adequacy not optimization is the target
- Focus on minimum targets not maximization
  - Faced with bounded rationality, ambiguous information, time and cost constraints, managers explore limited number of options and choose the “best” one rather than perhaps the “optimum”
- Example: purchasing a car or home
Cognitive Biases

- Prior (pet) hypothesis bias
- "Representativeness" bias
- Illusion of control
- Escalating commitment
- Rules of Thumb
- Group Think
- Isolation

Cognitive Biases: “Rules of Thumb”

- Avoid using rules of thumb for non-programed (no SOPs) problem solving
- Rules of thumb characterized by:
  - the usual
  - feels right
  - always done it that way
  - yes/no or either/or questions
- Introduces systematic errors
- Eliminates possibilities of alternatives

Cognitive Bias: “Group Think”

Cognitive Bias: Isolation

- Need diverse team to combat cognitive biases
- Outside organizations

Recommended Approach

Decision Making Framework

1. What is the decision to be made?
2. Criteria by which to base decision?
3. Alternative courses of action?
4. Expected effect of each alternative on each criterion?
5. Which alternative is best?
6. How to implement alternative?

Why use a framework?

- Slow down!
- Time to explore alternatives
- Time to take in relevant information
- Ability to discriminate among alternatives
- Opportunity to include others (staff, experts, public) in decision making
- Inclusion (ownership) sets the stage for responsibility and accountability
Who to involve

• Need diverse team to combat cognitive biases
  – need theoretical knowledge
  – need practical knowledge
  – big picture person (put into context)
  – conscience of the organization (values)
  – Management team

• Outside organization
  – stakeholders, public

1. Decision to be made

• Decision as a choice:
  – immediate objective
  – long-term goal
• Expressed in terms of outcome of decision
• What are we seeking to accomplish?

Warren’s Orchard Decision

• Problem situation:

• Decision:

• Immediate objective:

• Long-term goal:

River Basin Decision
(for NW Forest Products)

• Problem Situation:

• Decision:

• Immediate objective:

• Long-term goal:

2. Decision making criteria

• What are we trying to achieve with this decision?
• Control criteria - control outcome
• Criteria should not be too constraining
• Criteria should incorporate values
• list criteria through brainstorming (don’t evaluate yet)
  – criticism stifles creativity
• Rank criteria by importance

Warren’s Criteria

• Maintain present level of production
• consumer acceptance/marketability
• cost effectiveness
• minimum health risk to consumer
• reliable control of scab
• environmental safety
• don’t be too specific
NFP’s Criteria

- Reduce erosion
- Minimize cost
- Provide access to harvest
- Comply with standards on road and turbidity
- Maintain fire access
- Make crew/equipment available
- Enhance or maintain image

3. Alternative Courses of Action

- Given the criteria, what can you do?
- Quality of decision limited by quality of alternatives
- What is expected effect of each alternative on each criterion?
  - Need to research (literature, experts)
  - Rely on your experience and that of others
  - need cause and effect

Warren’s Alternatives

- Status quo – No action
- Organics/IPM
- Nova
- Resistant strains
- Treatment of leaf litter to kill fungus

NFP’s Alternatives

- Temporary culvert, meet standards in 5 years
- Meet standards now
- Grade now, abandon, rebuild in 20 years
- Grade, grass, abandon, rebuild in 20 years

4. Evaluate Alternatives

- Develop a decision matrix
- Weigh and rank each alternative based on each ranked decision making criterion
- Warren’s alternatives
  1. Status quo
  2. Resistant varieties
  3. Integrated pest management
  4. Organics
  5. Treatment of leaf litter to kill fungus
5. Rank Alternatives

- Determine how you will weight (score) the different criteria
  - Guided by “informed preference”, not “the dispassionate mathematical solution”
- Do not use a decision rule to substitute for critical thinking (avoid “weighted average trap”)
- Choose the best alternative for each criterion
- Rank the alternatives

6. First Steps to Action

- Is there an opportunity to design new alternatives?
- Decision has been made → move to ACTION
- Assign responsibilities
- Move to “Action Planning”