

Adaptive Management

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What is adaptive management?

- **Process of dealing with uncertainty in the management of renewable resources** (Adapted from Walters, 1986)
- **Process of treating human interventions in natural systems as experimental probes** (Adapted from Lee, 1993)
- **Incorporates research into conservation action** (Salafsky et al., 2001)

Process of Adaptive Management

Plan

Implement

Evaluate

Adjust

In a continuous loop

Adaptive Management

History of concept

- **Developed in 1970s by two ecologists, C.S. Holling and C.J. Walters, from the University of British Columbia**
- **Further developed by Holling and others at the International Institute of Applied Systems Analysis in Vienna, Austria**
- **Used mostly in US, Canada and Australia for management of fisheries, forests and waterfowl**

Holling's innovation

- **Originally named: Adaptive environmental assessment and management (Holling, 1978)**
- **Holling wanted to: 1) “bridge the abyss separating technical impact assessment studies from actual environmental planning and decision making”, and 2) discover how “present methods provide useful prediction of impacts”**
- **Concerned that we usually measure what is, instead of what is likely or what could be made to be**

Walters' extension of Holling's ideas

- **“Treat management as an adaptive learning process, where management activities themselves are viewed as the primary tools for experimentation” (Walters, 1986)**
- **Need to more clearly represent uncertainty in plans and models**
- **Design balanced policies that provide continuing resource production while simultaneously probing for better understanding and untested opportunity**

Lee's ideas

- **Adaptive management is an approach to natural resource policy that states: “policies are experiments; learn from them” (Lee, 1993)**
- **“Learning is information-intensive and requires active participation from those most likely to be affected by the policies being implemented”**
- **Increased understanding brings risks of inconvenient disclosure**
- **Borlaug et al.’s Green Revolution is an example of adaptive management**

Definitions of adaptive management

- **“Process of testing alternative hypotheses through management action, learning from experience, and making appropriate change to policy and management practice”** (Northwest Oregon State Forests Management Plan FINAL PLAN Jan. 2001)
- **“We don’t know exactly how everything will turn out, and therefore we plan our actions so we can learn from them. We use what we learn to do better in the future.”** (Northwest Oregon State Forests Management Plan FINAL PLAN Jan. 2001)

Adaptive management for N vs P

Most effective for N management because:

- 1. Complexity of predicting N availability**
- 2. Have new tools for estimating N availability**
- 3. Relative ease of collecting data from many farmers' fields to estimate N availability**

Not as effective for P management because:

- 1. P availability better defined by soil testing**
- 2. Difficult and expensive to collect data from many farmers' fields to estimate P transport and loss**

Definition of adaptive management

Draft definition:

An on-going process of developing improved management practices for efficient production and resource conservation by use of participatory learning through continuous systematic assessment.

Participants include producers, agricultural service providers, policy makers, regulators, scientists, and other interested stakeholders.

Basic assumptions of adaptive management

- **Knowledge will never be adequate**
- **Many questions can only be answered by experience and experiment**
- **Knowledge does not accumulate; it gets discarded**
- **Analyses get simplified**
- **Nothing is certain**
- **Much of what we know is wrong; we just don't know it** (Adapted from Walters, 1986)

Procedure for implementing adaptive management

- **ID key indicators, what you want to learn from the system, what are the key elements and relationships**
- **Bound the system**
- **Represent current understanding of system**
- **Represent the uncertainties**
- **Design policies to probe for better understanding**

(Adapted from Walters, 1986)

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Definitions of adaptive management

- **“An inductive approach, relying on comparative studies that blend ecological theories with observation and with the design of planned interventions in nature and with the understanding of human response processes”** (Gunderson, Holling, and Light, 1995)
- **Adaptive management has two elements: a monitoring system to measure key indicators and the current status of things, and a response system that enables modifying key indicators.** (Hilborn and Sibert, 1988)