FNR 22310: Introduction to Environmental Policy

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# January 8, 2019

## Lecture

* [Course overview](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/01-08.pdf)

# January 10, 2019

## Lecture

* [What is environmental policy and why do we need it?](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/01-10.pdf)

## What is policy?

* The term “policy” is used in different ways.
* The term “policy is used interchangeably with other terms.
* In this course, “policy is defined as: *a generally agreed-to and purposeful course of action that has important consequences for a large number of people and for a significant number and magnitude of resources* (Ellefson, P.V. 1992. Forest resources policy: process, participants, and programs. New York, NY: McGraw-Hill)

## What is environmental policy?

* Environmental policy
  + Public policy toward the environment
  + Also institutional changes that impact the environment
  + What is an institution?
    - An organization, law, or custom that affects the ability of people to come together and make collective decisions
  + Examples:
    - Public law: National Environmental Policy Act
    - Executive order: Grand Staircase-Escalante National Monument
    - Judicial decisions: spotted owls
    - Agency regulations and programs: Lakewide Management Plans in the Great Lakes Region
    - Special interest group statements: Sierra Club’s position statement against genetically engineered trees

## Why do we need environmental policy?

### Environmental degradation

* Figure 1.1: Human societies depend on nature in two ways (Field Ch. 1)
  + For natural resources: energy, food, minerals, air, water
  + As a waste sink: waste emissions into air, water, land

# January 15, 2019

## Lecture

* [Why do we need environmental policy and brief history](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/01-15.pdf)

## Why do we need environmental policy?

### Related key questions

* What are the different ways of explaining environmental degradation? What are its causes?
  + Malthus, Thomas. (1798). “An essay on the principle of population.”
  + Hardin, Garret. (1968). “The Tragedy of the Commons.” *Science* 162(3859): 1243-1248.
  + Meadows, Donnella et al. (2015). “The Limits to Growth.” In K. Conca and G.D. Dabelko (eds.): *Green Planet Blues: Critical Perspectives on Global Environmental Politics.* Boulder, CO: Westview Press.
  + Haberman, Clyde. (2015). “The Unrealized Horrors of Population Explosion.” *New York Times*, 31 May.
* What are the implications of problem definition for reducing environmental degradation and for solving environmental problems?

### Environmental degradation ... and markets?

* Predominantly, the world consists of market-based economies
* The marketplace dominates how goods are produced and consumed
  + You get what you pay for and you pay for what you get
* But sometimes market failure occurs
* In terms of the environment, market failure occurs when
  + Some environmental goods are not or insufficiently valued in the marketplace
  + Negative environmental externalities are generated
    - One person’s action affects another person’s well-being and the relevant costs and benefits are not reflected in market prices

### The nature of environmental good

* Environmental goods and natural resources are often shared among multiple users
* Excludability
  + “Relates to the difficulty of restricting someone who benefits from the provision of a good or service” (Ostrom, 2006)
* Rivalry (i.e. subtractability)
  + “Refers to the extent to which one individual’s use subtracts from the availability of a good or service for the consumption by others” (Ostrom, 2006)

## Four basic types of environmental good/quality and natural resource

* High excludability/Rivalry (high subtractability)
  + Private goods
* High excludability/Non-rivalry (low subtractability)
  + Club or toll goods
* Low excludability/Rivalry (high subtractability)
  + Common-pool resources
* Low excludability/Non-rivalry (low subtractability)
  + Public goods

Misuse or mismanagement of common-pool resources or public goods generates negative externalities, leading to market failure and the need for environmental policy

### Example of a common-pool resource

* Ocean fishing
* Pasture

### Example of a public good

* Public roads
* Public lands (national parks)
* Clean air

## Why do we need environmental policy?

* In terms of the environment, market failure occurs when public environmental goods or common-pool resources are not or insufficiently valued in the marketplace, resulting in negative externalities
* Environmental policy is a way to address market failures
  + Different types of environmental policy (i.e. different policy instruments/tools to address environmental problems)
* We need environmental policy because the marketplace cannot provide public goods, protect common-pool resources, or handle negative externalities

## Summary

* Policy, public policy, and environmental policy
  + Definition
* Why do we need environmental policy?
  + Problem definition: what causes environmental degradation?
  + The concept of different types of environmental good and natural resource
  + The concept of negative environmental externality
  + The concept of market failure
  + Use above concepts to explain why we need environmental policy

# January 17, 2019

## Lecture

* [Brief history and policy characteristics](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/01-17.pdf)

## History of environmental laws and policies

* Many current laws and policies governing the protection and use of the environment and natural resources resulted from actions in the 1940s, 1950s, and 1960s
  + New York City, 1940s: smog and air pollution from cars and industry
  + Oil burning on Cuyahoga River, Ohio: caused by nearby railroad sparking spilled oil
  + Love Canal, New York: children playing in soil surrounding construction got burned from acid in groundwater
  + Santa Barbara Oil Spill, 1969: 3 million tons of oil spilled and covered coast, animals suffocating to death

## Two types of federal (environmental laws)

* Those that apply to federal agencies only (e.g., NEPA, NHPA, NAGPRA)
* Those that apply to everybody – federal, state, and local governments, and private citizens (e.g., CWA, ESA, ARPA)

### National Environmental Policy Act (NEPA)

* Passed by Congress in December, 1969
* Signed by Richard Nixon in January, 1970
* Main sections
  + Section 101 – the spirit of the law
  + Section 102 – the letter of the law
  + Section 103 – requires federal agencies to develop regulations to implement the law
  + Section 104 – requires federal agencies to follow other relevant environmental laws
  + Section 105 – requires federal agencies to continue doing their job
  + Section 202 – Council on Environmental Quality

#### NEPA is a procedural law

* Three principal procedural requirements of NEPA and the CEQ Regulations:
  + Give the environment appropriate consideration
  + Involve the public
  + Write a detailed statement
* The courts have found nothing in NEPA prohibits “unwise decisions” only “environmentally uninformed” decisions
* Different from some other environmental laws that impose more substantive environmental obligations, NEPA is a procedural law

#### NEPA applies to …

* Major federal actions significantly affecting the quality of the human environment
* Major federal actions include any new and continuing plans, policies, programs, and projects that are undertaken by federal agencies, are funded by federal dollars, or require federal permits.

#### Three levels of environmental analysis and documentation

* Categorical exclusion: a proposed action qualifies for CATEX when the action would not individually or cumulatively cause a significant impact on the human environment
* Environmental assessment: a proposed action requires an EA if the proposed action is not eligible for a CATEX and if it probably would not cause significant, adverse environmental effects
  + Finding of No Significant Impact (FONSI)
* Environmental Impact Statement: a proposed action requires an EIS if
  + The proposed action does not qualify for a CATEX or FONSI
  + The proposed action might cause significant, adverse environmental effects
  + Might have substantial environmental controversy concerning the significance or nature of the environmental impact of the proposed action
    - Record of Decision
* The main difference between an EIS and an EA
  + An EIS tends to be more complicated resulting in higher cost and a longer time commitment
  + An EA ends in a FONSI and an EIS ends in a ROD
  + Generally, an EA has less public participation than an EIS
  + The burden of proof, in the case of a lawsuit is different between the two documents
    - An EA can be harder for an agency to defend
* Three primary functions of NEPA documents
  + Provide sufficient information to the decision maker to make an informed decision
  + Ensure that procedural requirements of NEPA have been followed and completed
  + Inform the interested public

### Endangered Species Act (ESA)

* In 1972, President Nixon declared that conservation efforts in the U.S. aimed toward preventing the extinction of species were inadequate and called on the 93rd Congress to develop comprehensive endangered species legislation
* Congress responded and signed ESA into law on December 28th

#### Purpose and administration

* The purpose of the ESA is to protect and recover imperiled species and the ecosystems upon which they depend
* ESA is administered by
  + U.S. Fish and Wildlife Service – terrestrial and freshwater organisms
  + Commerce Department’s National Marine Fisheries Service (NMFS) – marine wildlife (e.g., whales) and anadromous fish (e.g., salmon)

#### Species that are subject to protection

* Under the ESA, species may be listed as either endangered or threatened
  + “Endangered” means a species is in danger of extinction throughout all or a significant portion of its range
  + “Threatened” means a species is likely to become endangered within the foreseeable future
  + All species of plants and animals, except pest insects, are eligible for listing as endangered or threatened
  + For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments

#### ESA prohibits “taking” of listed species

* Once a species is listed, ESA makes it unlawful for any person, including private and public entities, to “take” individuals of any endangered animal species
  + “take” means to harass, harm pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct
* ESA also prohibits the interstate or international trade of listed plants and animals
* [More information on Endangered Species Act](http://www.fws.gov/endangered/laws-policies/)

## Policy characteristics

* Tend to be vague and ambiguously stated
  + Examples
    - “The public lands (shall) be managed in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmosphere, water resource, and archeological values.” – Federal Land Policy and Management Act of 1976
    - “National Forests are established and shall be administered for outdoor recreation, range, timber, watershed, and wildlife and fish purposes.” – Multiple-Use sustained Yield Act of 1960
  + Accommodate different resource and administrative conditions
  + Accommodate different views about the use and management of resources
* Demand modest changes in small increments
  + Give time to meet high standards
  + More support for changes
  + Trial and error for complexity of environment
* Often embody inconsistencies and contradictions
  + Within a policy
  + Between policies
* Limited in comprehensiveness
* Merits judged by a diverse set of standards/rules
* Represent compromises over intensely held values

## Summary

* Policy characteristics
  + Vague and ambiguous
  + Demand modest changes in small increments
  + Inconsistencies and contradictions
  + Limited in comprehensiveness
  + Judged by a diverse set of standards/rules
  + Represent compromises over intensely held values

# January 22, 2019

## Newspaper Magazine Article Review – Due Today

* [Newspaper-magazine-article-review-instructions.pdf](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Homework/Newspaper%20magazine%20article%20review%20instructions.pdf)
* [Atherton-Article-Review-1.docx](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Homework/Atherton-Article-Review-1.docx)

# January 24, 2019

## Lecture

* [agenda-setting.pdf](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/01-24_agenda-setting.pdf)

## Group Exercise: Endangered Species Act of 1973 & National Environmental Policy Act of 1969

* Highlight vague or ambiguous language, if any
* Identify inconsistency/lack of comprehensiveness within the policy, if any
* Think about how the following constituency groups may judge the merits of the policy. What would each group’s overall attitude towards the policy? Why?

### NEPA

* 101 c) “enhancement of the environment” – symbolically saying people have responsibility and rights, but doesn’t specifically outline them.
* 101 b) “practicable means”, “undesirable and unintended consequences”, “permit high standards of living and a wide sharing of life’s amenities”
* 102 b) “insure that presently unquantified environmental amenities and values may be given appropriate consideration”
* 102 c) “local short term” and “long-term productivity” not particularly defined
* 102 a) “systematic, interdisciplinary approach” – philosophical approach rather than a clear, spelled out procedure
* 102 c) “major Federal actions”, “significantly affecting the quality”, “detailed statement” terms have been litigated since the 1980s
  + “major” now means any action that costs more than $100,000
  + “significantly” now is left up to the regulating agency (EPA, Forestry, etc.)
  + “detailed” was about 50 pages in the 80s, now means 3 feet of documentation

### ESA

* Sec 4.b)1)A) “solely on the basis of the best scientific and commercial data available”
  + Loophole: “available” has been taken advantage of
  + Scientific and commercial data is sometimes contradictory
* Sec 4. b)2) “after taking into consideration environmental impact”, “exclude area from critical habitat”
  + Contradicts the best scientific data, often – internal inconsistency
  + Backtracking at the end – limited comprehensiveness
* Department of Interior, Department of Commerce have most jurisdiction
  + Department of Commerce has more power
    - In charge of economic evaluation and impact of protecting endangered species
    - Illegal trade and poaching of endangered species, animal products associated with endangered species globally

## Policy Process Model

* Policy Event 🡪 Policy Product
  + Agenda Setting 🡪 Organizational Agenda
  + Formulation 🡪 Policy Alternatives
  + Selection 🡪 Policy Decision
  + Legitimation 🡪 Validated Policy
  + Implementation 🡪 Policy Impacts
  + Evaluation 🡪 Modified Policies
  + Termination or renewed agenda setting
* Seems too streamlined, simplified
  + Actually iterative
  + Negotiations
  + Opportunity windows are narrow
  + Messy process

## Agenda Setting

* What is an agenda?
* Types of agenda
* Components of an agenda setting process
* Disposition of issues

### Agenda: Definitions and Types

* A set of issues which are of concern to someone or some organization
  + Systemic agenda – consists of issues commonly perceived by members of society as deserving of public attention
  + Formal agenda – consists of issues that are up for active and serious consideration by policy makers who have authority over the issues at a particular time
  + Challenge: move an issue from a systemic agenda to a formal agenda

### Components of an agenda setting process

* Issues
  + Issue definition
  + Issue characteristics
* Initiators
* Gatekeepers
* Triggering events
* Relevant publics
  + Use of political symbols

#### Issue

* Conflict between groups of individuals or organizations over matter concerning the distribution of power or resources
* Example: regulation of pesticide use
  + Conflict/disagreement: which agency should have the authority/power to regulate pesticide use? Which specific type of pesticide should be banned?
  + Groups involved: USDA, EPA, constituents they represent, Farming Industries, Farmers, Pesticide Industries
  + Distribution of power

##### Characteristics that make an issue more likely to be placed on the formal agenda

* Salience
  + Number of people affected
  + Magnitude of impacts
  + Social significance
  + Implications for future generations
* Technical simplicity
  + Think about this when communicating with the general public (i.e. “acid rain” rather than “low pH precipitation”)
  + No technical jargon so that more people understand the solution
* Ambiguity or abstractness
  + Attract broader interest
  + Don’t make it too broad so it isn’t un-addressable/unsolvable
* Precedence of solution
  + If it was solved somewhere else previously
  + Brand-new issues are generally avoided
  + Managing political risk of tackling issue

#### Initiators

* Who seeks to set agendas?
  + Persons or groups who
    - Perceive an unfavorable bias toward their views in the existing distribution of resources
    - Obtain satisfaction from acting in what they perceive to be the public interest without reaping any direct benefits
    - Seek their own gain
* Successful initiators are persons or groups that
  + Have some claim to an issue
  + Can invest the time and energy required to promote an issue
  + Can skillfully bring an issue to a wider audience
  + Have good group organization and representation
* Who can play an initiator role in an environmental policy making process?
  + Local residents
  + Third party that doesn’t have a personal stake (nonprofit), but represents a group that does

#### Gatekeepers

* Entry point to the political system: individuals with authority to allow the issue to be considered
  + Examples: legislators, congressional staff, judges, environmental agency officials
* Identify sympathetic gatekeepers and understand the relationship between
  + Gatekeepers and issue initiators
  + Gatekeepers and the affected population
  + Example: issue is increasing amount of funding available to farmers to adopt environmentally friendly farming practices
    - More successful to go through gatekeeper with a farming background who identifies with constituents than someone who grew up in inner city New York

#### Triggering Event

* Events that can be used to push policy solutions onto agenda
* Examples
  + Natural Catastrophes – recovery policies, climate change research
    - Fires in California – forest management, climate change policy
  + Economic crises
    - Recession – no money to give to environmental causes, but pushed for green jobs and thrived
  + Technological breakthroughs
    - After second world war, excess in labor (veterans) – auto industry, roads
  + Direct conflicts
    - Water fight between Colorado and Kansas – western Kansas dried out because Colorado diverted river to get water
* Scope, intensity, time of occurrence, resource involved

#### Relevant public

* Attentive public
  + People who are generally interested in and informed about most issues
  + Participate in local events (cleaning up environment), write to newspaper editors, more likely to be engaged
  + If they buy in, it will take issue and go back into community
* General public
  + People who are uninterested, uninformed, and inactive on most issues
  + Once they are on board, generally smooth sailing
  + Harder to

##### The use of political symbols

* Slogans, images, stories, and more
* Something people can remember
* To provoke response from public
* Spread via mass media
* Examples
  + “Only you can prevent forest fires” – Smokey Bear: fire suppression
  + “Give a hoot, don’t pollute” – Woodsy Owl: aimed toward children

# January 29, 2019

## Lecture

* [01-29-Environmental-policy-formulation.pdf](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/01-29-Environmental-policy-formulation.pdf)

## Policy Process Model – Agenda Setting

* What is an agenda?
* Types of agenda
  + Systemic vs. formal agenda
* Components of an agenda setting process
  + Issues
  + Initiators
  + Triggering events
  + Gatekeepers
  + Relevant publics
    - The use of symbols
* Disposition of Issues

### Disposition of Issues

* Resolved
* Symbolic response
* Deferred
* Completely killed
* Try again later
* Something to think about:
  + How many bills are introduced per Congressional period?
  + How many are environmentally focused bills?
  + How many actually become law?

## Policy Process Model – Formulation

* Concept of formulation
* Issue definition – again
* Community of formulators
* Ideas for policy alternatives
* The broader political, administrative, social, financial, geographic, and temporal contexts of environmental policy formulation
* The creative development of effective and acceptable policy responses to the environmental issue that has been placed on the formal agenda

### Environmental Policy Formulators

* Technical and policy specialists in relevant public agencies and private organizations
* Example: endangered species policy formulators
  + U.S. House Committee on Natural Resources
  + Department of the Interior, US Fish and Wildlife Services, Endangered Species Program
  + USDA Forest Service
  + Indiana Department of Natural Resources, Division of Fish and Wildlife
  + National Wildlife Federation, Research and Development Program

### Issue Definition

* Clearly define and carefully describe an issues’ substance
* Example: Livestock grazing on National Forest System lands
  + Conflict/disagreement: whether or not livestock grazing is an appropriate use of national forest lands
  + Groups involved: ranchers and livestock producers vs. people who are interested in recreation, water quality, and scenic beauty
  + Distribution of resources: what benefits are to be produced by public forests, and who is receive them
* What is exactly the issue to be addressed?

### Ideas for environmental policy alternatives come from…

* Creativity and imagination
* Deductive reasoning
* Knowledgeable sources
  + Legislative and executive aids, staff, and advisors
  + Legislative and executive study commissions
  + Legislative and executive support units
  + Elected and politically appointed public officials
  + Think tanks and other private non-profit research groups
  + Universities, colleges, and other public research institutions
  + Organized special-interest groups
  + Other governments

#### Different circumstances under which environmental policy is formulated

* Little research required
* Limited time between agenda setting and a policy decision
* Very little public and professional conflict
  + Vs
* Extensive research required
* Unlimited time between agenda setting and a policy decision
* Strongly held opposing views on the issue

#### Avoid environmental policy alternatives that have…

* Unrealistic goals
* Political and administrative resistance
* Economic and financial impracticalities
* Overly simplistic requirements
* Inequitable application
* Very limited political support

## Summary: Environmental policy formulation

* The process of creating policy responses to address an environmental issue on the formal agenda
* Environmental policy formulation implies the need for clear issue definition
* Environmental policy formulators
* Sources of ideas for environmental policy alternatives
* Take into account not only the environmental but also the broader political, administrative, and social, financial, geographic and temporal contexts when formulating environmental policy alternatives

## Policy brief group project

* The objectives are to improve your ability to:
  + Identify and discuss policy instruments to address environmental problems
  + Critically examine existing environmental policies and suggest well-informed alternatives
  + Develop informed opinions regarding a current environmental policy issue that is of personal interest and present opinions in a clear, logical manner
* This assignment includes four critical stages:
  + Selecting an issue
  + Preparing a briefing paper
  + Presenting to the class
  + Peer evaluation of group contribution
* Components to be included in the policy briefing paper
* Group 10

# January 31, 2019

## Lecture

* [01-31-Environmental-policy-selection-I.pdf](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/01-31-Environmental-policy-selection-I.pdf)

## Policy Process Model – Formulation

### Environmental Policy Formulation

* Concept of formulation
* Issue definition – again
* Community of formulators
* Ideas for policy alternatives
* The broader political, administrative, social, financial, geographic, and temporal contexts of environmental policy formulation

## Group Exercise

### Invading Species: Asian carp take over American lakes and rivers

* Introduced from Asia as a management tool for aquaculture farms and sewage treatment plants
* Escaped and spread rapidly into the Mississippi River and tributaries
* Consume large quantities of phytoplankton
* Can outcompete and eventually displace native fish species and damage aquatic ecosystem

#### Policy Alternatives

* Industry
  + export
* Environment
  + Isolate
  + Kill eggs
  + Biological control
  + Eliminate food supply
  + Kill all fish and reintroduce desired fish
  + Relocate
* Technology and Science
  + Extract protein
  + Genetically engineer fish
* Management
  + Incentive to fish
  + Boat spikes
* Regulatory
  + Throwback laws
* Education and outreach
  + Harm of Asian carp
  + Importance of not introducing Asian carp
  + Consumer base about uses of Asian carp

### Discussion Questions

* What are the potential policy alternatives for addressing Asian carp infestation in the Mississippi River system and potential invasion in the Great Lakes?
* Who might be the proponents and opponents of these formulated policy alternatives?
* How likely do you think these alternatives would be selected to become policies in reality?

## Summary: Environmental policy formulation

* The process of creating policy responses to address an environmental policy formulation implies the need for clear issue definition
* Environmental policy formulators
* Sources of ideas for environmental policy alternatives
* Take into account not only the environment but also the broader political, administrative, and social, financial, geographic, and temporal contexts when formulating environmental policy alternatives

## Policy Development Process – Selection

### Environmental Policy Selection

* Concept
* Policy selection models

#### Concept

* Choosing a particular environmental policy alternative from the many (or few) formulated alternatives
* Art and craft of striking a balance between environmental policy alternatives developed by formulators and multiple, changing, and conflicting interests of persons or organizations having a stake in the outcome of the environmental issue

#### Alternatives Facing Policy Makers

* Good alternative
  + High probability of positive outcomes
  + High probability of negative outcomes
* Bland alternative
  + Low probability of positive outcomes
  + Low probability of negative outcomes
* Mixed alternative
  + High probability of positive outcomes
  + High probability of negative outcomes
* Poor alternative
  + Low probability of positive outcomes
  + High probability of negative outcomes
* Uncertain alternative
  + TBD probability of positive outcomes
  + TBD probability of negative outcomes
* Politics can get in the way of determining the category that alternatives fall under

#### Models of Environmental Policy Selection

* Mixed-scanning model
  + Rational-comprehensive model
  + Incremental model
* Organized anarchy model

##### Rational-comprehensive model

* A model involves a series of reasoned choices and logical decisions to
  + Clearly define policy goals
  + Canvass many (ideally, all) alternatives that might achieve these policy goals
  + Compare the alternatives systematically
  + Assessing their costs and benefits
  + Choose the alternative that would achieve the policy goals at the least cost
* Example: 1974 Farmland and Forest Land Assessment Act

###### Example

* Issue: non-point source water pollution from agricultural sources in Indiana
* Objective: reduce sediments and nutrients from farmlands in Indiana
* Formulated policy alternatives:
  + Establish an extension program to educate farmers about best management practices to minimize non-point source pollution
  + Establish a financial incentive program to encourage farmers to adopt best management practices
  + Establish a regulatory program to prohibit farming and livestock grazing in riparian areas
* Criteria for selection: efficiency – benefits vs. costs
* Decision: the choice with the highest benefit/cost ratio

###### Characteristics and criticism

* Class Ideas
  + We rarely involve scientists in policy making
  + It takes a long time to canvass policy alternatives and determine the costs
  + It is good to be rational and go through a systematic process to best be able to get support from public
  + This method does not happen as often as we would like it to
  + Be careful not to offend people – telling people they are doing something wrong
  + Just because it is the “best” option doesn’t mean it will garner support
  + Doesn’t take ethics into account (benefits and costs?)
  + Monetizable factors are hard to take into account
  + We just don’t know what the consequences of a particular policy solution
* Does not accurately describe reality
* Limited ability of human beings to process information than a comprehensive approach would prescribe
* Counterproductive to try to construct a political coalition to persuade people to agree on a specific set of goals
* The policy maker will choose the alternative to maximize the attainment of the policy goals and objectives
* Policy makers are often not solving problems, but pushing for given proposals by developing information about the environmental problem at hand and identifying ways to justify their position

## Policy brief group project

* The objectives are to improve your ability to:
  + Identify and discuss policy instruments to address environmental problems
  + Critically examine existing environmental policies and suggest well-informed alternatives
  + Develop informed opinions regarding a current environmental policy issue that is of personal interest and present opinions in a clear, logical manner
* This assignment includes four critical stages:
  + Selecting an issue
  + Preparing a briefing paper
  + Presenting to the class
  + Peer evaluation of group contribution
* Components to be included in the policy briefing paper
* Group 10

# February 5, 2019

## Lecture

* [02-05-Environmental-policy-selection-II.pdf](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/02-05-Environmental-policy-selection-II.pdf)

## Policy Development Process – Selection

### Environmental Policy Selection

#### Models of Environmental Policy Selection

##### Incremental Model

* “Instead of beginning consideration of each environmental issue afresh, policy makers take what they are currently doing as given, and make small, incremental, marginal adjustments to it. By doing so, they need not canvass a large number of alternatives or spend significant time defining policy goals, and the comparisons they make between the current state of affairs and the small adjustments to be made are more manageable. The result is that policy changes very gradually in small steps.” – Kingdon, Ch. 4
* Policy decisions arrived at by incrementalism are the product of advocacy and bargaining. They result from mutually agreeable adjustments in the values, objectives, and policy alternatives that are advocated by the various parties who are interested in a policy issue.

###### Example

* Issue: non-point source water pollution from agricultural sources in Indiana
* Objective: reduce sediments and nutrients from farmlands in Indiana
* Formulated policy alternatives:
  + Establish an extension program to educate farmers about best management practices to minimize non-point source pollution
  + Establish a financial incentive program to encourage farmers to adopt best management practices
  + Establish a regulatory program to prohibit farming and livestock grazing in riparian areas
* Criteria for selection: agreement
* Decision: whichever alternative that all parties involved can agree on

###### Characteristics and criticism

* Class Ideas
  + Agreement doesn’t necessarily mean it’s the best idea
  + Lots of back and forth in the process
  + Politically, agreement might never be reached
* The process tends to involve many interests and favor the most powerful and organized interest in society
* Agreement is the most important policy criterion, favoring the status quo and leading to the selection of a satisfactory policy but not necessarily the most effective one
* Sometimes small-scale remedial changes are pointless and lead to frequent revisits of the same issue
* The process prohibits policy innovations
* Past experience may not be relevant under new circumstances
* The concept of “trial and error” is questionable
* Does not describe sudden agenda change particularly well
* Not only as a description of the real world but also a strategy that can be used to manipulate policy outcome

##### Mixed Scanning Model

* This model combines rational comprehensive and incremental approaches
* Policy selection is viewed as a process of browsing and scanning the horizon for potentially agreeable policy alternatives, followed by a detailed examination of those alternatives and their consequences

##### Organized Anarchy Model

* “Garbage can model”: policy selection occurs in an unorganized setting
* Policies are selected when four streams of events coincide (choice opportunities/policy windows)
  + Issues
  + Solutions (policy alternatives)
  + Participants (policy makers, administrators, specialists)

###### Example

* Choice opportunity/policy window
  + Issue: non-point source water pollution from agricultural sources in Indiana
  + Objective: reduce sediments and nutrients from farmlands in Indiana
  + Formulated policy alternatives:
    - Establish an extension program to educate farmers about best management practices to minimize non-point source pollution
    - Establish a financial incentive program to encourage farmers to adopt best management practices
    - Establish a regulatory program to prohibit farming and livestock grazing in riparian areas
  + Policy participants: Indiana Department of Environmental Management, Indiana Department of Agriculture, Indiana Association of Soil and Water Conservation Districts, USDA Natural Resources Conservation Service, EPA, Alliance for the Great Lakes

###### Characteristics and criticisms

* An opportunistic process
* Policy makers have a limited understanding of the policy making environment
* Difficult to predict policy outcomes
* The key to understand a particular policy outcome is the coupling of four streams
  + The four streams flow separately through the policy system
  + Outcomes heavily dependent on the coupling of the streams – couplings of solutions to problems, interactions among participants, the presence or absence of solutions, problems or participants – in the choices (the garbage cans) that must be made

## Environmental policy selection considerations / criteria

* Four broad categories of considerations/criteria
  + Effectiveness (ecological/environment)
  + Efficiency
  + Equity and ethical considerations
  + Procedural considerations

### Effectiveness consideration

* Decision makers may favor the environmental policy that
  + Maintains the stability of ecosystems
  + Maintains a diversity of plant and animal life
  + Prevents non-reversible changes in ecosystems
  + Results in accomplishment …

### Efficiency consideration

* Has the highest benefit-cost ratio
* Results in the greatest possible output with a given input
* Achieves a given output with the least input

### Equity and ethical considerations

* Provides environmental benefits to a wide range of people (rather than greater benefits to few people)
* Ensures the costs of implementation being borne in the same proportion as environmental benefits received
* Results in the greatest environmental benefits for the worst-off segment of society

### Procedural considerations

* All persons to be affected have been given an opportunity to express their views
* Result from a political process in which citizens preferences are given equal weight
* Developed by due process (rather than random or arbitrary process)

### Other examples of considerations in environmental policy selection

* Low risk of an unacceptable result
* Feasible within existing budgetary and personnel conditions
* Compatible with established policies
* Minimal in external impacts on public safety and health

### Example: Hypothetical net social benefits produced by three potential forest policy alternatives

* Alternative 1: low investment in timber, recreation, and water
  + Best for equity
  + Lowest overall benefit though
* Alternative 2: very low investment in timber, low investment in recreation, and very high investment in water
  + Most effective for environment overall
  + Timber will be upset with this
* Alternative 3: moderate investment in timber, recreation, and water
* May use a combination of selection criteria to make final policy

## Bargaining as part of an environmental policy selection process

* A process whereby two or more persons or organizations in a position of power adjust their goals to attain a joint agreement on a policy alternative that is acceptable to both – though may not be ideal to each
* Graph: bargaining is important
  + Win-win situations could occur
  + Point X is win-win
  + Points A and B are starting points

### Strategies for bargaining

#### Compromise

* A fundamental approach to securing agreement
* You want X; I want Y; let’s settle on Z
* Requires
  + Flexibility on part of bargainers
  + Wide range of policy alternatives
  + Accurate communication of interests
* “One of the things that makes the political arena so unpleasant for the people that work there is the abuse heaped on them when they compromise. Compromise is the oil that keeps the political process going, the balm that allows accommodation of widely divergent views … One would think compromise would be valued. Mostly it is hated.” – Rep. Otis Pike, D-NY
* “Compromise is the key because it is the means by which legitimate interests in a democracy come to understand that they are being given fair consideration. Accommodations among contending interests build confidence that our institutions are listening. If we want these considerations for ourselves, we must accord them to others.” – Sierra Club

#### Logrolling

* You give me what I want, and I will give you what you want
* Requires
  + Knowing each other’s demands
  + Supporting each other after agreement
  + Considering the timing of payoffs

#### Side Payments

* You give me what I want, and I will reward you
* If you do not give me what I want, I will punish you
* Requires
  + Bargainers have access to resources

## Review of the environmental policy selection process

* Concept
* Models of environmental policy selection (rational comprehensive, incremental, mixed scanning, organized anarchy)
* Considerations for selection (ecologically or environmentally effective, efficient, equitable and ethical, procedural, and others)
* Bargaining as part of an environmental policy selection process

# February 7, 2019

## Lecture

[02-07-Environmental-policy-legitimization-and-implementation.pdf](https://d.docs.live.net/a6815758e2b5dbf9/FNR%2022310/Lectures/02-07-Environmental-policy-legitimization-and-implementation.pdf)

## Review of Environmental Policy Selection

* Concept
* Models of environmental policy selection (rational comprehensive, incremental, mixed scanning, organized anarchy)
* Considerations for selection (ecologically or environmentally effective, economically efficient, equitable and ethical, procedural, and others)
* Bargaining as part of an environmental policy selection process and strategies for bargaining (compromise, logrolling, side payments

## Policy Development Process

* Policy Event 🡪 Policy Product
  + Legitimation 🡪 validated policy
  + Implementation 🡪 policy impacts

### Environmental policy legitimization

* Selection of an environmental policy is not a guarantee of implementation
* Legitimization gives the selected environmental policy an official status (formally approved, confirmed, or authenticated)
* An environmental policy must be legitimized before it can be implemented
* It is important to recognize and address political feasibility early in the process of policy formulation and selection

#### Ways to Legitimize Policy

* Legislative legitimization: laws, statutes, acts
  + Indiana Code, Title 13 Environment, Article 18 Water Pollution Control, Chapter 17 Groundwater Protection
  + Public Law 91-190, 42 U.S.C. 4321-4347, National Environmental Policy Act of 1969
* Judicial legitimization: court rulings
  + West Virginia Division of the Izaak Walton League of America vs. The U.S. Secretary of Agriculture in 1975: a revised timber management policy
  + State of Kansas vs. State of Colorado in 2009: settlement of the Arkansas River Compact
* Administrative legitimization: codes, regulations, rules, manuals, pans, guidelines, directives
  + Indiana Division of Fish and Wildlife Administrative Rules (Reguations)
  + Idaho Wolf Population and Management Plan
  + Consideration of Cumulative Impacts in EPA Review of NEPA Documents, Environmental Protection Agency, Office of Federal Activities (2252A), EPA 315-R-99-002, May 1999
* Executive orders
  + New Jersey Executive Order No. 215 of 1989, Environmental Assessment
* Citizen referenda or initiatives
  + California Proposition 8 (November 2008): ban on same-sex marriage

### Environmental policy implementation

* A process that translates
  + Legitimized environmental policies into operational programs
  + Broad statements in an environmental policy into specific actions and activities

#### Three major stages/activities

* XXX
  + Translating vague and ambiguous policy language into acceptable and workable directives
* XXX
  + Identifying or creating administrative units to carry out the interpreted directives
* XXX
  + Applying actual management activities or other agreed-upon actions called for by the interpreted directives

#### Factors affecting environmental policy implementation success

* Clarity of intent
  + Easier for vague issues to gain agenda status than specific proposals
* Cause-and-effect linkage
  + If fundamentally flawed, policy mechanisms need change
* Active program monitoring
  + Tracking progress in order to make modifications
* Measurable criteria/indicators
  + Standards used to measure/evaluate progress and success
* Administrative support and compliance
  + Administering agencies and personnel will always carry out the required tasks
  + A big misleading assumption
* Administrative simplicity
  + The more units that are involved in the implementation of a policy, the more difficult the implementing task becomes
* Executive and legislative commitment
  + Continuity of leadership priorities
  + Sufficient resources for program execution
* Sufficient resources
  + Time, finances, machinery, professional talent, etc.
* Direct federal involvement?
  + Increased resources for program implementation
  + More rigorous enforcement
  + Allows for uniform standards
* Communication with the policy clients

## A case study: Superfund Program

* An environmental program to address abandoned hazardous waste sites, established by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 19880
* Allows the EPA to clean up abandoned hazardous waste sites and to compel responsible parties to perform cleanups or reimburse for EPA-lead cleanups
* Process
  + Assessment 🡪 National Priorities List
  + Establish and implement appropriate cleanup plans
  + Enforcement and removal actions
  + Community involvement

### Major Environmental Laws Administered by the EPA

* Food Quality Protection Act of 1996
* Asbestos Hazard Emergency Response Act of 1986
* Emergency Planning and Community Right-to-Know Act of 1986
* Comprehensive Environmental Response, Compensation, and Liability Act (Superfund) of 1980
* Resource Conservation and Recovery Act of 1976
* Toxic Substances Control Act of 1976
* Safe Drinking Water Act of 1974
* Clean Water Act of 1972
* Marine Protection, Research, and Sanctuaries Act of 1972
* Clean Air Act of 1963
* Federal Insecticide, Fungicide, and Rodenticide Act of 1947
* Federal Food, Drug, and Cosmetic Act of 1938

### By law, EPA is required to:

* Obtain water quality information. So far, data is available on the condition of:
  + 10% or more of the nation’s ocean shorelines
  + 20% of river and stream miles
  + 40% of lake acreage
* Obtain data about human exposure to potentially harmful chemicals. So far, data is available for:
  + 2% of 476 priority chemicals regulated
  + 13% of 243 pesticides of most concern to the EPA
* Clean up 3,700 solid waste treatment and storage facilities. So far, about 8% have been completed.

## Back to CERCLA and Love Canal

* Hundreds of toxic sites await cleanup under Superfund program
* Residents say Love Canal chemicals continue to make them sick
* How do we judge how well an environmental policy/program has been implemented?

# February 12, 2019

## Back to CERCLA and Love Canal

* Hundreds of toxic sites await cleanup under Superfund program
* Residents say Love Canal chemicals continue to make them sick
* How do we judge how well an environmental policy/program has been implemented?
  + Accounting for improvements in technology in policy
  + Define what is “safe”
  + Think about long-term effects: continual investment

## Participants of the Implementation Process

* Administrative agencies
* Legislatures
* Judicial systems
* Special interest groups
* Policy beneficiaries or targets
* General public

## Review

* Environmental policy legitimization
  + Ways to legitimize
* Environmental policy implementation
  + Major implementation activities
  + Factors affecting implementation success
  + Participants

## Environmental Policy Evaluation

* Process of determining whether implemented policies and programs are accomplishing the agreed-to goals in an acceptable manner
* Evaluation involves
  + Measurement
    - Science-based
  + Analysis
    - Science-based
  + Judgment
    - Environmental effects
    - Public opinion
    - Value-based

## Reasons to evaluate an environmental policy/program

* Class ideas
  + Effectiveness
  + Up-to-date
  + Necessity
  + More funding
  + Eliminate
  + Comparing alternatives
* Ensuring accountability
* Maintaining control
* Fostering change
* Reassuring clients
* Fulfilling legal mandates

## Reasons to not evaluate an environmental policy/program

* Class ideas
  + Time
  + Money
  + Environmental effect
  + Inappropriate/inaccurate evaluation that is detrimental to program
* Expensive both financially and professionally
* Disruptive and stressful
* Not always conducted in a technically correct and bias-free manner
* The truth may get in the way of a political motivation

## Evaluation outcomes

* Moderate revision of a policy or program
* Extensive revision of a policy or program
* Additional policy or program is needed
* Termination of a policy or program

## Two types of evaluation

* Process evaluation
* Impact evaluation

### Process Evaluation

* Assessing the delivery of a policy or program
* Focusing on what services were provided to whom and how
* Ask three questions?
  + Wat is the program intended to be?
  + What is delivered, in reality?
  + Where are the gaps between program design and delivery?

### Impact Evaluation

* Assessing a policy or program’s ability to achieve previously agreed-to goals, objectives, or targets
* Focusing on measuring the impacts/effects
* Ask two questions
  + What are the changes in the wellbeing of people and/or the natural environment that can be attributed to a particular policy or program?
  + What can be done to maximize the impact?

### General approaches and specific methods

* To evaluate the delivery of an environmental policy/program (process evaluation)
  + Qualitative
  + Quantitative
* To evaluate the effectiveness of an environmental policy/program (impact evaluation)
  + Xxx
  + Design 1
    - Before versus after program
    - A2 – A1 = estimated program effect
    - Problems:
      * Time between measurement
      * Attributed to implementation of policy?
      * How representative of the area are the measurements
  + Design 2
    - Projected versus post program
    - A2 – A1 = estimated program effect
  + Design 3
    - With versus without program
    - (A­2 – A1) – (B2 – B1) = estimated program effect
  + Design 4
    - Experimental design
    - A2 – B2 = estimated program effect

# February 14, 2019

## Exam I Today

# February 19, 2019

## Policy Instruments for Addressing Environmental Problems

* Education, research, and service programs
* Fiscal incentives and disincentives
* Regulatory programs
* Public ownership

## Limited Funds … Where to Spend?

* Regulatory programs
* Cost-share programs
* Tax incentives
* Research
* Technical assistance
* Extension services
* Conservation easements
* Land trusts
* Government Ownership
* Education

## Instruments of Public Policy

* Education, research, and service programs
* Fiscal incentives and disincentives
* Regulatory programs
* Public ownership

### Education, research, and service programs

* Public education programs
  + Curriculum development
  + Public service announcements (PSA) on radio and TV
  + Public agency environmental educators
* Research
  + Colleges and universities
  + National research laboratories
  + Public agency scientists
* Technical assistance and extension services
  + Informational brochures and interpretive pamphlets
  + Short course, field tours, workshops
  + Demonstration projects

#### Public Education Programs

* Example: Environmental Protection Agency, Environmental Education Program

#### Research

* Example: The National Renewable Energy Laboratory
  + The National Renewable Energy Laboratory (NREL) is the nation’s primary laboratory for renewable energy and energy efficiency research and development. Established in 1974, the NREL is the principal research laboratory for the Department of Energy, Office of Energy Efficiency and Renewable Energy

#### Technical assistance and extension services

* Example: Purdue Extension

#### Questions and Challenges

* Does private or public sector provide these programs?
* How could the adoption of education, research, and service programs reflect the environmental policy process?
* How would the adoption of education, research, and service programs influence future environmental policy process?
  + New issue
  + Issue that is unknown to target population
* Are education, research, and service programs the most effective way of changing people’s environmental attitudes and behaviors?
* How are education, research, and service programs linked with other environmental programs (e.g., cost-sharing initiatives)?

### Fiscal incentives and disincentives

* Payment for environmental services (PES)
* Cost-share programs: government shares costs of producing environmental goods and services for society
* Tax incentives and disincentives
* Tradable discharge permits (cap-and-trade systems)

#### PES Program Example

* New York City Watershed Agreement
  + In the late 1990s, New York City adopted a direct-payment-for-environmental-services program to protect its drinking water sources, instead of constructing a filtration plant
  + New York City increased water fees by 9% to invest in an agreement with a coalition of towns in the Catskill/Delaware and Croton Watersheds
  + Farmers and forest landowners received compensation to remove environmentally sensitive lands from production and to improve forest and land management practices
  + New York City protected 121,500 hectares of watershed that are still providing clean water to its residents today

#### Cost-share program example

* Forest Land Enhancement Program (FLEP)
  + The federal government reimburse non-industrial private landowners up to 75% of approved expenses in exchange for sustainable forest and land management practices for a minimum of 10 years
  + National priorities
    - To reduce the risk of wildfire
    - To increase the overall health of the forests including control of invasive species
    - To manage forests for ecosystem sustainability
    - To decrease unmanaged recreation and forest fragmentation

#### Tax incentive and disincentive examples

* Incentives: tax deduction, tax credit, tax exemption
* Disincentives: “pollution tax”
* Examples
  + Brownfields Tax Incentives program (1997 – 2009) – The costs of environmental cleanup of toxic sites are fully deductible in the year incurred
  + The Energy Policy Act of 2005 – Tax credit for investment in the purchase of hybrid cars, energy star appliances, and home energy savings

#### Tradable discharge permit example

* Cap-and-trade system
  + Establish a cap on the amount of allowable discharge units for a defined region
  + Establish a system whereby discharge permits are distributed to polluters and traded among them

#### Challenges

* How to determine how many permits are allowed for a defined region?
* How much should each permit cost?
* Expensive? Stable funding?
* Political bias against taxes
* Subsidies distort markets
* People may not always be economically driven

# February 21, 2019

## Regulatory Programs

* Rationale: protect public interests in matters of safety, pubic health, and environmental quality
* Legal-constitutional basis
  + Land ownership is a bundle of rights and society retains an interest in this bundle of rights via power to tax, power to condemn, and power to police
  + Society can restrict individual activities based on two doctrines:
    - Doctrine of private nuisance prohibits the use of property in a manner that injures the property of others
    - Doctrine of waste prohibits the use of property in a manner that future generations will receive property in an impaired state
  + Private property shall not be taken for public use without just compensation

### Example: Wild and Scenic Rivers Act of 1968

* “It is hereby declared to be the policy of the United States that certain selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geological, fish and wildlife, historic, cultural, or other similar values, shall be preserved in free-flowing condition, and that they and their immediate environments shall be protected for the benefit and enjoyment of present and future generations.”
* The administering agency is authorized to
  + Regulate timing of timber harvest, location of road construction, dam construction, and development intensity
  + Impose land-use restrictions on private landowners who property falls within the boundary of a designated river

### Challenges

* F

## Public Ownership

* Fee simple: total and complete rights
* Easement: part of the property rights (e.g., development rights)
* Deed restriction and covenant

### Example: Land and Water Conservation Fund

* Created by Congress in 1965, the Land and Water Conservation Fund (LWCF) was a bipartisan commitment to safeguard natural areas, water resources and our cultural heritage, and to provide recreation opportunities to all Americans
* Every year, $900 million in royalties paid by energy companies drilling for oil and gas on the Outer Continental Shelf (OCS) are put into the LWCF. The money is intended to create and protect national parks, areas around rivers and lakes, national forests, and national wildlife refuges from development, and to provide matching grants for state and local parks and recreation projects
  + The principal funding source used by the Departments of Interior and Agriculture to acquire lands for outdoor recreation
  + It also funds land acquisition and recreational development by state and local governments

### Example: Forest Legacy Program

* The FLP is a conservation easement program, administered by the USDA Forest Service in cooperation with State partners
* The FLP focuses on conservation in two ways:
  + Directly supports property acquisition
  + Support efforts to acquire donated conservation easements
* Eligibility
  + Private forest landowners
  + Landowners are required to prepare a management plan as part of the conservation easement acquisition
  + The federal government fund up to 75% of project cost, with at least 25% coming from private, State or local sources
  + Landowners benefit from the sale or donation of property rights and reduced taxes associated with limits placed on land use

### Challenges

## Summary

* Education, research, and service programs
* Fiscal initiatives and disincentives
* Regulatory programs
* Public ownership
* Remember
  + It does not have to be one or another. Different public policy instruments are often used simultaneously to address an environmental or natural resource issue.
  + In addition to public policy instruments, private mechanisms are also available for addressing environmental or natural resource issues

## Revisit the beginning of the semester

* Four basic types of environmental good/quality
* Why do we need environmental policy?
* What is the tragedy of the Commons?
* What are Hardin’s solutions to address the Tragedy of the Commons?

### Four basic types of environmental good / quality and natural resource

* High excludability/high subtractability
  + Private goods
* High excludability/low subtractability
  + Club or toll goods
* Low excludability/high subtractability
  + Common-pool resources
* Low excludability/low subtractability
  + Public goods
* Misuse or mismanagement of common-pool resources or public goods generates negative environmental externalities, leading to market failure

### Why do we need environmental policy?

* In terms of the environment, market failure occurs when public environmental goods or common-pool resources are not or insufficiently valued in the marketplace, resulting in negative externalities
* Environmental policy is a way to address market failure
  + Different types of environmental policy (i.e., different policy instruments/tools to address environmental problems)
* We need environmental policy because the marketplace cannot provide public goods, protect common-pool resources, or handle negative externalities.

### The Tragedy of the Commons

* Garrett Hardin’s fundamental arguments
  + “A finite world can support only a finite population.”
  + The goal of “the greatest good for the greatest number” cannot be realized
  + “The tendency to assume that decisions reached individually will, in fact, be the best decisions for an entire society” is ill founded
  + Conscience or altruism is not sufficient for preventing the tragedy of the commons

### Hardin’s solutions

* “mutual coercion, mutually agreed upon”
  + Assigning property rights to the commons
    - 1
    - 2

#### Problems with ??

* Expensive to acquire land
  + Land price
  + Holdout problem?
* Requiring monitoring of resource users’ behaviors – limited government capacity? Too expensive?
  + Patrolling the national parks
* Will the government become “too big”?

#### Problems with ??

##### Unintended policy consequences and the precautionary principle

* China’s one child policy
* An example of a controversial policy

###### Background of China’s One Child Policy

* The political system in China: communist state with eight registered small political parties controlled by the Communist Party.
* In 1970’s, China’s population counted for nearly one quarter of the world population.
* China owns 7% of the world’s arable land
* In 1970’s, two-thirds of the population were under 30 years old
* The baby boomers of the 1950s and 1960s were entering their reproductive years.
* By 1963, the total fertility rate was 7.5 children born/woman

###### Basics of China’s One child policy

* Enacted in 1979
* Interpretation
  + Consists of a set of regulations including
    - Restriction on family size
    - Established in the late marriage and childbearing
    - Spacing of children in cases in which more than one are permitted
* Organization
  + State Family Planning Bureau and family planning committees at provincial and county levels
* Application
  + Application to urban residents and government employees with exceptions of families in which
    - First child has a disability
    - Both parents work in high-risk occupations (e.g., mining)
    - Both parents are themselves from one-child families (in some areas), or
    - Pregnancy after adopting a child
  + Application in rural areas: second child allowed after 5 years of first child
  + Application to ethnic minorities: two or more children allowed
  + Implementation: both incentive and penalty programs
    - Incentive programs for having one child
      * Salary bonus (urban)
      * Bigger land allocation (rural)
      * Extended maternity leave
      * Paid medical and hospital expenses
      * Priority access to housing, employment and schooling for the child
    - Penalty programs for having more than one child
      * Withdrawal of family allowance and medical benefits
      * Fines
      * Discharge from a government job
      * Restricted access to primary education and healthcare of “illegal” children

###### Current Demographics

* Mainland China
  + Population: 1.31 billion
  + Age structure:
    - 14 years: 20.8%
    - 15 – 64 years: 71.4%
    - 65 years and over: 7.7%
  + Birth rate: 13.25 births/1000 population
  + Death rate: 6.97 deaths/1000 population
  + Population growth rate: 0.59%
  + Infant mortality rate:
    - Total: 23.12 deaths/1000 live births
    - Male: 20.6 deaths/1000 live births
    - Female: 25.9 deaths/1000 live births
  + Total fertility rate: 1.73 children born/woman
  + Life expectancy:
    - Total: 72.6 years
    - Male: 70.9 years
    - Female: 74.5 years
* United States
  + Population: 298 million
  + Age structure:
    - 14 years: 20.4%
    - 15 – 64 years: 67.2%
    - 65 years and over: 12.5%
  + Birth rate: 14.14 births/1000 population
  + Death rate: 8.26 deaths/1000 population
  + Population growth rate: 0.91%
  + Infant mortality rate:
    - Total: 6.43 deaths/1000 live births
    - Male: 7.09 deaths/1000 live births
    - Female: 5.74 deaths/1000 live births
  + Total fertility rate: 2.09 children born/woman
  + Life expectancy:
    - Total: 77.9 years
    - Male: 75.0 years
    - Female: 80.8 years

Consequences/Impacts of the policy

### Merit of the story

* How to evaluate a policy? How to judge if a policy is successful? How to define success?
  + Think about the broader picture (environmental/ecological, biophysical, social, economic, political, cultural)
  + Multidisciplinary teams are needed to help model, project, and envision the future
  + Close monitoring to help identify unintended consequences is crucial
  + Carefully designed and implemented evaluations are key
* How to minimize unintended policy consequences?
* Precautionary principle
  + Kriebel, D., Tickner, J., Epstein, P., Lemons, J., Levins, R., Loechler, E.L., Quinn, M., rudel, R., Schettler, T., Stoto, M. 2001. The precautionary principle in environmental science. *Environmental Health Perspectives* 109(9): 871-876.
    - What is the precautionary principle?
    - Why do we need the precautionary principle in environmental policy making?
    - How is the precautionary principle being implemented in environmental policy making?

## Summary

* Be able to critically analyze potential unintended consequences of environmental policy
* Be able to describe the concept of precautionary principle and explain why it is important and how it is used in environmental policy making