

## Teaching EIA Using Ten Basic Concepts

by Martin J. Bergoffen, Esq.  
Karen Environmental and Social Action Network  
PO Box 204 Prasing Post Office  
Chiang Mai 50205 Thailand  
[mbergoffen@gmail.com](mailto:mbergoffen@gmail.com)

### Abstract

*Environmental Impact Assessment (EIA) has become a standard tool for government agencies and private companies to assess, and prevent or mitigate, the impacts of their programs and projects. Therefore, it is essential that graduate environmental students have a solid grounding in the EIA process. However, each country, local agency and company has its own standards for determining what constitutes a valid EIA, with widely varying results in terms of data acquisition, analysis and results.*

*Marty Bergoffen, an environmental attorney from the United States, spent over 10 years practicing EIA law in the US, and has 3 years experience in Thailand teaching about EIA and working with local environmental NGOs. He has created a program to teach the EIA process using a framework of Ten Concepts. The concepts are:*

- 1. Purpose and Need, 2. Scoping, 3. Alternatives, 4. Affected Environment,*
- 5. Significance, 6. Environmental Consequences, 7. Cumulative Impacts, 8. Public Participation, 9. Mitigation and Monitoring, and 10. Enforcement.*

*Following a brief introduction to the purpose of EIA and the Ten Concepts, the EIA Program examines the legal formulation of the Ten Concepts as found in the laws and regulations of the U.S. and Southeast Asia (other countries can easily be substituted). The class is broken up into groups and given hypothetical situations applicable to each concept, sharing their insights.*

*Next, the class will read and consider actual EIAs from the U.S. and Southeast Asia, using the Ten Concepts as a framework. Each EIA will be studied for its treatment of each concept, again using small groups, and the students' analysis will be compared to an actual public comment letter from a local watchdog NGO. Finally, each concept will be reviewed comprehensively, and the class will share their outlook on an appropriate EIA process.*

*This hands-on, participatory class mirrors what the students will face when they are called upon to engage in the EIA process in their own countries. It was a great success when presented at the EarthRights International Alumni School in Thailand, and is currently being considered for the curriculum at the Graduate School of Chiang Mai University.*

*Marty Bergoffen will expand upon this program and share his materials and insights into teaching the EIA process.*

## Introduction: What is EIA? Why Prepare EIA's?

It has never been more apparent that humans are changing the environment of the world in which they evolved. Global heating from increased greenhouse gas emissions is currently the most obvious impact, but accelerating species extinctions, the decline of water quality and changes in flow, and the widespread loss of essential ecosystems like forests and prairies are also making it harder for all lifeforms to survive.

It is therefore essential that serious consideration be given to these impacts before they occur. This is the reason that Environmental Impact Assessment (EIA) is so important.

But a comprehensive EIA prepared prior to approval of development projects provides more than a catalog of impacts. It also gives us a chance to consider whether alternatives to the proposed action may provide the same benefits with fewer impacts; whether the impacts of the action outweigh the benefits of the development; and finally, a proper EIA will force us to consider what steps can be taken to prevent the impacts if the development is permitted to proceed.

The EIA process is well developed in some countries, including the USA and the European Union, where there is a long history of public participation and unfettered scientific inquiry. However, developing nations with a less educated, more subservient populace and fewer resources usually do not provide a robust EIA process. It is therefore essential that these nations, which will implement the vast majority of development projects in the 21<sup>st</sup> Century, improve their capacity to prepare EIAs. This includes documents that consider alternatives to the proposal, gather information on the full range of environmental impacts and disclose these impacts to the public, provide meaningful participation for local people affected by the projects, and minimize or mitigate the impacts so that local livelihoods are minimally affected.

Building this capacity requires a coherent framework that can be used to prepare and analyze EIAs in all countries. This paper presents just such a framework, using 10 broad concepts to guide both the preparation of EIAs by government or private officials as well as the participation of local people who seek to ensure that their concerns are adequately addressed.

One attractive aspect of this teaching model is that it is adaptable in terms of student level, and scalable for classes of varying size and time span. Whether the students are new to organized education or in a post-graduate university setting, the Ten Concepts provide a framework for learning about EIA and applying those lessons to real life development projects. Further, the concepts can be taught in as little as one day, or as long as an entire college semester of 4 months.

In the first section, we will briefly examine EIA processes in a few countries, focusing on the USA where the concept originated and is best developed. Next, the 10 Concepts are presented and explained. Then the framework for teaching about EIA is presented, focusing on comparing laws, regulations and actual EIA documents using the 10 Concepts. In this regard, teaching using a participatory method is essential, because it gives the class the opportunity to learn that public participation in the process has a real effect on the outcome. This goes beyond merely producing a better

EIA: the process must produce better on-the-ground projects that provide real benefits to local people while minimizing the disruption to their livelihoods. Finally, the results of a unified framework for teaching EIA are considered.

## I. EIA Laws Exist in Many Jurisdictions: Is the Same Outcome Possible with Different Laws and Regulations?

Currently there are at least 75 countries that have adopted laws requiring EIA for development projects (Liu, D. et al. 1997 at p. 76). However, these laws are far from uniform. In Thailand, EIA is required for both public and private projects, (Staerdahl et al. 2004 at p. 9.), but in the US, an EIA must be prepared for projects that are connected to the Federal government.<sup>1</sup> Some EIA laws demand robust public participation as in the U.S.<sup>2</sup>, while others such as Malaysia have demand little or nothing (Staerdahl et al. 2004 at p. 6.). This widely variable landscape for assessing development impacts can leave the environment vulnerable to unregulated activities, leading to environmental unforeseen problems.

In order to overcome this variability in laws, regulations and implementation of EIA, this paper presents ten comprehensive, universal concepts applicable to EIAs everywhere. This framework allows the user to (a) consider the completeness and reliability of an EIA prepared in any country or jurisdiction,<sup>3</sup> and (b) compare the effectiveness of EIA implementation between two or more countries or jurisdictions.

## II. Ten EIA Concepts – Simple with Universal Application

These Ten Concepts were adopted and refined in light of the author's 20-year experience reading, drafting and commenting on hundreds of EIA documents. Each EIA has its own unique provenance, coming from a particular agency in a given country. However, all of them should seek to present, in a coherent and complete way, a picture of the proposed project that allows the reader to understand the nature of the project, as well as comparing the environmental impacts of a development proposal and any reasonable alternatives.

The Ten Concepts follow, with a brief explanation and examples of class discussion for each. In addition, citations to the U.S. Code of Federal Regulations (CFR) concerning

---

<sup>1</sup> The National Environmental Policy Act (NEPA), 42 U.S. Code Sec. 4332 (C) states that an EIA must be prepared for "proposals for legislation and other major Federal actions significantly affecting the quality of the human environment."

<sup>2</sup> Regulations implementing NEPA repeatedly require the best efforts of agencies to involve the public. For example, Code of Fed. Reg. Vol 40 Sec. 1506(a) states that "Agencies shall: make diligent efforts to involve the public in preparing and implementing their NEPA procedures." This also means that the public must have access to all available information. Sec. 1506(f) requires all agencies to "make environmental impact statements, the comments received, and any underlying documents available to the public..."

<sup>3</sup> In many countries with Federal governments, states, provinces or local governments may have their own EIA requirements for projects within their boundaries. See, e.g., the California Environmental Quality Act (CEQA), online at [http://ceres.ca.gov/topic/env\\_law/ceqa/stat/](http://ceres.ca.gov/topic/env_law/ceqa/stat/). Last accessed April 13, 2009.

each of these are given in *italics* for reference. The electronic version of the CFR is available online at <http://ecfr.gpoaccess.gov/> .

---

### **1. Purpose and Need** (*U.S. Code Fed. Reg. Title 40 §1502.13*)

- Why are we doing this project?
  - Energy production
  - Resources: Water, Minerals, Wood
  - Infrastructure: Roads, Buildings, Powerlines
  - Aesthetics: Parks or Recreational facilities
  - Maintenance/Repair of Existing facilities
  - Removing old facilities
  - Also make sure to investigate: Who gets the benefits? Who must deal with the consequences?

### **2. Scoping** (*U.S. Code Fed. Reg. Title 40 §1501.7*)

- Preliminary inquiry into potential impacts. Look at the Big Picture.
  - Send out letters, emails, etc. to people, agencies and companies that may be affected by project.
  - Ask how they may be affected.
  - Ask if there are any alternatives to the proposal (see next concept).
  - Ask what can be done to eliminate or minimize the impacts.

### **3. Alternatives** (*U.S. Code Fed. Reg. Title 40 §1502.14*)

- What are the different ways we could fulfill the Purpose and Need? Examples:
  - Energy: Solar, Dams, Wind, Coal, Gas, Nuclear, Conservation, etc...
  - Timber: Big Clearcuts, Re-use old wood, small clearcuts (group selection), individual trees, use different materials such as steel and concrete...
  - Roads: Dirt, pave with concrete, pave with stone. One lane, two lanes, four lanes....
  - Creating Parks: Forests? Football pitch? Bicycle trail?
  - Old facilities: Maintain, Repair or Replace?

### **4. Affected Environment** (*U.S. Code Fed. Reg. Title 40 §1502.15*)

- What is the area that will be affected?
  - Specific forest, river, coral reef, township, country.
  - The area downwind from a coal burning power plant.
  - Can be an ecological or political area.

- What issues or resources will be impacted?
- Water pollution, air pollution, deforestation, soil loss, fish or animals will lose habitat, water flow changes rate or timing, etc.

**5. Significance** (*U.S. Code Fed. Reg. Title 40 §1508.27*)

- What are the biggest impacts?
- Different kinds of projects have different significant issues.
- Dams could significantly impact fisheries, water flows, and transportation.
- Grazing may involve soil conservation and vegetation retention.
- Examples of issues that can be significant: water/air pollution, endangered species, public health and safety, food production, historic or cultural sites, or precedent-setting projects.

**6. Environmental Consequences** (*U.S. Code Fed. Reg. Title 40 §1502.16*)

- How will this project affect the environment?
- This section forms the scientific and analytic basis for the EIA.
- How many hectares of forests? How many kilometers of roads? How much water? What species will be affected? Will soil erosion occur?
- Focus on Significant issues.

**7. Cumulative Effects** (*U.S. Code Fed. Reg. Title 40 §1508.7*)

- How will this project, with other related projects, CUMULATIVELY affect the environment?
- Is this (dam, road, logging, national park) part of a bigger program?
- Are there plans for a series of dams, or a highway system, or several linked parks?
- Cumulative effects are often on a larger scale.
- One mine/clearcut/dam may affect only a small place, but several can affect a large region or an entire river basin.
- Cumulative effects can be inter-related.
- A dam or a mine may include logging to clear the area.

**8. Public Participation** (*U.S. Code Fed. Reg. Title 40 §§1500.1(b), 1500.2(d), 1503.1(a)(4), 1505.3(d) and 1506.6*)

- It is essential that the people affected by a project have a say in the analysis.
- Some EIA laws demand that the public can participate.  
This must mean ANYONE: Women, children, elders, poor.
- The people living near a project have important knowledge about the area, and can predict what kinds of impacts will be important. It is crucial that the EIA make use of this knowledge.
- Public participation can take many forms:
- Public Meetings, Letters, Pictures

- Video, Phone calls, Email
- Radio or TV programs.
- Any form of communication will do.

**9. Mitigation and Monitoring** (*U.S. Code Fed. Reg. Title 40 §1505.2(c)*)

- After a project is approved and construction has started, the builder must do his best to prevent or fix (**MITIGATE**) the impacts, and the public must make sure that the impacts predicted in the EIA are near those that are actually occurring.
- The project developer must **MONITOR** the impacts (i.e. pollution levels, amount of logging, count fish species in the river) to see if the predictions in the EIA are correct.
- If some impacts are worse than the EIA predicted, the mitigation should be adjusted to ameliorate those impacts. This is known as **ADAPTIVE MANAGEMENT**.
- What should be monitored? Look at Significant Issues.
  - Dams – water flow and quality, fish populations.
  - Logging – top soil, tree cover, wildlife.
  - Mines: Chemicals, heavy metal pollution, sediment.

**10. Enforcement** (*U.S. Code Fed. Reg. Title 40 §1500.1(a), and U.S. Code Title V Sec. 701*)

- Who makes sure the EIA laws are followed? Three options.
  - The Government – field checks, with fines or jail for egregious activities.
  - The public – affected people sue the Government or developer for violations of EIA terms.
  - Maybe no one – with no accountability, the EIA process is merely a game.

These concepts are meant to provide comprehensive analysis tools for drafting and considering EIAs. If properly addressed, the EIA process will:

- Cover the project timeline from idea to final implementation and operation, while minimizing or mitigating short and long term environmental impacts.
- Prioritize impacts: the most significant issues receive the most analysis, mitigation and monitoring, while lesser impacts will also be addressed.
- Ensure that the people who will feel the effects of the project, whether positive or negative, will have free and informed input into the project decision. The importance of public participation can be seen in its repeated occurrence in the U.S. EIA implementation regulations.

### III. Using the Ten Concepts to Examine an EIA from the United States

The Ten Concepts EIA program begins with a brief examination of the need for EIA, which follows with the above first look at the concepts themselves with preliminary class discussion. Then, in order to solidify the students' understanding of the concepts, an in depth study of the underlying U.S. regulations provides a second-order look at the structure and functions of a proper EIA process. The U.S. EIA law, NEPA, is used as a basis because it is the first law in the world to require analysis of environmental impacts, and interpretation of the law and regulations is well developed in all three branches of government: legislative, judicial and executive.

After examining US law, students spend an entire day examining a real EIA from the United States, taking it apart using the 10 concepts. The first presentation of this program was given to Karen refugees on the Thai-Burma border who are facing impacts from large dams on the Salween River. Thus the author chose an EIA for a dam in Angoon, Alaska, proposed by the U.S. Forest Service to provide electricity for ethnic natives who were relying on diesel generators (U.S. Forest Service, 2009).

The Angoon EIA provides many similarities and differences that give the students the opportunity to compare their personal experiences with those of people around the world. For example, both the students from Burma and the Angoon residents are native ethnics who are contemplating vast changes to their livelihoods in the conversion from diesel electricity to hydroelectric. On the other hand, the cold, maritime island environment in Angoon, Alaska could not be more different from the tropical rainforests of the Salween River basin. By comparing these factors, the students go beyond mere memorization to internalize the various development impacts and build their own experience in EIA.

In addition to the Angoon Dam EIA itself, students are given the opportunity to read and absorb comments submitted by a local NGO, the Southeast Alaska Conservation Council. These comments allow students to see the breadth and depth of environmental analysis than can come from a free and educated populace.

The Angoon EIA analyzes many of the environmental subjects that will be faced by students in the real world: water quality, construction impacts, endangered species, creation and analysis of alternatives, cumulative impacts, etc. Furthermore, the Angoon EIA was subject to a robust public participation process with comments from several concerned parties. It therefore encapsulates a complete EIA record and provides a good example for students' first exposure to EIA.

### IV. Examining EIA laws and reports from different countries using 10 concepts.

After taking a hard look at the well-developed EIA process in the United States, the Ten Concepts program then turns to foreign EIA laws and regulations. In its first presentation in Thailand, the class studied EIA laws and processes from the Thai perspective (Staerdahl 2004; see also Briffett 1999 and 2007 Constitution of Thailand) and the Chinese EIA experience (Moorman and Zhang 2007). This is because the class was made up of ethnic refugees from Burma who are confronted by the prospect of large dams on the Salween River and other Burmese waterways, financed and built by Thai and Chinese government agencies and companies (Salween Watch 2009).

The discussion of Thai EIA law includes a brief history of Thai environmental laws, as well as looking into the bureaucratic maze of agencies involved in final approval. The Ten Concepts are examined using an available case study, and Thailand's experience is also considered within the broader context of Southeast Asia. Finally, the new and untested Thai constitution adopted in 2007 includes guaranteed rights for citizens involving access to information, public participation and environmental protection. These provisions must be developed through legislation, which the Thai government has been slow to adopt and reticent to enforce. These shortcomings parallel the early experience in the U.S., allowing students to see how different cultures adapt to a new environmental paradigm.

The Chinese EIA law is also placed in a historical perspective, and the focus is on the lack of open and free public participation, which has been a significant problem in China since the inception of the Communist regime. In one particularly egregious situation during the 2008 Beijing Olympics, after inviting the public to voice their concerns, the Chinese government arrested and "re-educated" two elderly women who applied for a permit to protest the seizure of their homes (MSNBC.com 2008). The other concepts are also discussed within the framework of China's proposed (but unapproved) EIA regulations. Furthermore, given China's preference for mega-scale overseas development (Xinhua 2009), there is a section on the application of China's EIA laws to Chinese corporations operating internationally.

While the language differences between English and Thai/Chinese present a formidable barrier to examining the EIA process of those countries, there is sufficient material available to allow an in depth examination and comparison to the U.S. situation. However, many students will probably come from other countries and face different environmental issues. In that case it is quite simple to develop and insert an analysis of their home country using the Ten Concepts.

The final section of the program looks at an EIA from a country other than the U.S. To date, there have been no publicly released EIAs for any of the dams on the Salween River. Therefore, an EIA for the Srepok Dam in Cambodia was chosen (SWECO Groner 2006). The Srepok study provides a good example of analyzing the impacts that can occur in a setting close to the students' home on the Salween River.

As with the Angoon EIA from Alaska, the Srepok EIA considers the impacts of hydropower development on local ethnic people, again providing subject matter relevant to the students. Furthermore, the impacts (both positive and negative) can be considered from both a local, small scale reference frame as well as from regional and international scales in terms of affects on aquatic ecology. One difference that students brought to light is that while the Angoon project is funded and implemented by the U.S. government on National Forest land, the dams on the Srepok river are in Vietnam while the impacts are felt downstream in Cambodia on privately owned lands, raising questions of public participation and accountability.

## V. Class Participation, Adaptability and Scalability, and Repetition

When preparing an EIA, a government agency or developer must utilize the expertise of a wide variety of professionals. This group of experts is known as an Interdisciplinary Team (IDT). For example, an EIA for a dam may require the input of construction



engineers, hydrologists, aquatic and terrestrial biologists, historians, foresters, and a host of others. The IDT must work together harmoniously to produce a comprehensive, integrated report.

For that reason, the Ten Concepts program relies significantly on class participation. After each of the concepts is explained and discussed, the class divides into small teams to consider part of an EIA applicable to that concept. For example, when considering cumulative effects (Concept #7) one team may be asked to prepare an outline of impacts concerning the loss of forests related to dam construction, while another analyzes the effects of a new superhighway in an urban setting.

By operating as a team, the students learn several lessons. First, they will undertake their part of the EIA alone, but then they must discuss their results with other team members and integrate their findings. Furthermore, they can learn how to seek information from others and share what they know in order to generate new information. They will also be exposed to competing ideas, which has important lessons in terms of intellectual curiosity, honesty and peaceful conflict resolution.

Another important aspect of the Ten Concepts program is its adaptability. The program was originally devised for Burmese ethnic refugees with little formal education; therefore, facts and ideas were presented in a simple manner with little in the way of outside references, and class participation was highlighted. For a high school or undergraduate class, the Ten Concepts EIA class could rely on small-scale projects with a more compact analysis. Finally, for a more advanced class that might be taught in law school or Masters program, reliance on citations to laws and regulations that the students find for themselves can be combined with in-depth review of legal precedents in order to tease out the more subtle interpretations of EIA implementation.

One more important aspect of the Ten Concepts is its scalability. The first class was given over a five day period. This involved a one-day introduction to the concepts, and then daily lessons on U.S. law, Thai/Chinese law, U.S. EIA analysis and Southeast Asian EIA. The total class time was about 40 hours, so a full college program that provides 3 university credits over 13 weeks (a total of 39 hours of class) is also eminently possible. Subsequent presentations in a variety of contexts have occupied anywhere from one hour to several days.

Finally, the strength of the Ten Concepts model is the repetition of the concepts themselves. Students will be exposed to the concepts several times from different points of view: U.S. laws and regulations, a U.S. EIA, and the same treatment for foreign EIAs. With several different approaches to understanding the concepts and classroom exercises that require creativity and thoughtfulness, students will gain a multi-dimensional insight into what constitutes a well-prepared and comprehensive EIA.

## VI. Conclusion – Better EIA's and Better Public Participation

One of the most significant problems agencies and developers confront is how to undertake the EIA process. Competing interests on one side call for transparency in protecting the environment and public health, while the other side seeks minimal regulation and maximum profits. Balancing these two sides is the purpose of EIA (Swaminathan Research Foundation 1977).

One reason that EIA is necessary is that the needs, knowledge and experience of local people are often overlooked by agency personnel who are under pressure to approve projects. In order to overcome this recurrent pattern, it is necessary to establish a comprehensive framework for undertaking EIA regardless of time or place. The Ten Concepts provides such a framework.

For agency personnel, understanding and adhering to a proper EIA process gives all parties reassurance that their interests have been considered. The Ten Concepts provide such a process, within the given legal framework of any country's EIA laws. When more accurate and comprehensive EIAs are produced, the government and its agencies, developers and local people will all have more confidence in the process and the result, and future projects will also benefit from this confidence.

Moreover, when local people understand and fully engage in the EIA process, their needs are also being considered. While their knowledge of local ecosystems may be substantial, however, their experience with government agencies and bureaucratic processes may be wanting. Therefore, it is essential that they be educated in the EIA process, and the Ten Concepts provide a framework for that education. Once the local people understand EIA, they can then share their knowledge and experience, to the benefit of all parties engaged in the process. Once the agencies and local people understand what drives the EIA process and the tools available for engaging in it, the quality of information in used EIAs and available to the public will undoubtedly improve. And with better information comes better decisions, and better outcomes for everyone.

## References

- Briffett, C. 1999. Environmental impact assessment in Southeast Asia: fact and fiction? *GeoJournal* 49:3(333-338).
- Liu, D. et al. 1997. *Environmental Engineers Handbook*, Lewis Publishers.
- Moorman, J. and Zhang Ge. 2007. Promoting and Strengthening Public Participation in China's EIA Law and U.S. NEPA. *Vt. J. Env'tl. L.* vol. 8 p. 277.
- MSNBC.com. 2008. Elderly women face 'reeducation' for protest bid. Available online at <http://www.msnbc.msn.com/id/26305623/>. Last accessed April 7, 2009.
- Salween Watch website. [www.salweenwatch.org](http://www.salweenwatch.org). Last accessed April 9, 2009.
- Staerdahl et al. 2004. Environmental Impact Assessment in Malaysia, South Africa, Thailand, and Denmark: Background, layout, context, public participation and environmental scope. *The Journal of Transdisciplinary Environmental Studies* 3(1).
- Swaminathan Research Foundation. 1977. *Environmental Impact Assessment - Principles and Procedures*, Chapter 1. Available online at <http://www.icsu-scope.org/downloadpubs/scope5/chapter01.html>. Last accessed April 10, 2009.

SWECO Groner. 2006. Environmental Impact Assessment on the Cambodian Side of the Srepok River due to Hydropower Development in Vietnam. Available online at [http://www.ngoforum.org.kh/Environment/Docs/Final\\_Report\\_Srepok\\_EIA\\_061108\\_email\\_version%202.pdf](http://www.ngoforum.org.kh/Environment/Docs/Final_Report_Srepok_EIA_061108_email_version%202.pdf). Last accessed April 7, 2009.

Thai Constitution 2007, Unofficial English translation, available online at <http://www.asianlii.org/th/legis/const/2007/1.html>. Last accessed April 6, 2009.

U.S. Forest Service. 2009. Angoon Hydroelectric Project Final Environmental Impact Statement. Available online at [http://www.fs.fed.us/r10/tongass/projects/angoon\\_hydro/index.shtml](http://www.fs.fed.us/r10/tongass/projects/angoon_hydro/index.shtml), last accessed April 2, 2009.

Xinhua. 2009. China Industrial Overseas Development & Planning Association Announcement of the First China Overseas Development Fair. Available online at [http://news.xinhuanet.com/english/2009-04/06/content\\_11137757.htm](http://news.xinhuanet.com/english/2009-04/06/content_11137757.htm). Last accessed April 7, 2009.