Global Search for efficient and effective EIA and environmental governance: using advances in technology to achieve both

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1 SUMMARY

This paper describes successes and lessons from recent reforms in El Salvador and other Latin American countries, the U.S. and Asia to make environmental impact assessment (EIA) more efficient and effective through institutional and procedural reforms using information and communications technology. The author proposes a collaborative international effort to create a flexible IT platform which countries can adapt for their own use, maintain their own data sets, but which can more cost-effectively respond to changing software and hardware to avoid the current costly practice of country-by-country, function-by-function investments. The proposed platform would provide a seamless means of managing the continuum of monitoring-planning-EIA-permitting and enforcement necessary to make EIA easier and more cost-effective for countries to adopt best practices, and provide transparent and cohesive environmental governance. Also proposed is a complementary effort to create an accessible databank of measures and monitoring to avoid, prevent, minimize and compensate adverse and promote beneficial impacts.

2 INTRODUCTION

Technology is providing unprecedented opportunities for more efficient and effective EIA program implementation through improved access to information, communication, processing of and follow up to environmental review and permits, as well as to facilitate the use of predictive models. One of the main successes of the regional Program to Strengthen EIA Review -- part of environmental cooperation associated with the Central America and Dominican Republic Free Trade Agreement (CAFTA DR) with the U.S. led by U.S. EPA and supported by the US Agency for International Development (US AID) -- has involved reforms built on technological advances. In addition to training, collaborative development of EIA Technical Review Guidelines for mining, energy and tourism, and recommended reforms to Ministers, the program resulted in both deployment of the EPA developed Web-based GIS analytical tool called NEPAssist and development of web based systems for managing and accessing digital documents and tracking progress throughout the EIA process. November 11-13, 2014 inaugurated the second phase of the program hosted by the Dominican Republic with a forum on best practices for EIA and related permitting and enforcement. The Forum brought together for the first time a unique mix of participants: heads of environmental quality and evaluation, enforcement, GIS/IT, and public outreach functions from an expanded list of 14 countries and 5 international organizations. The opportunity for dialogue and exchange at a very practical program implementation level came when the countries have been making rapid progress in response to pressures to reform implementation. Table 1 is an abbreviated list of lessons shared with 14 Ministers.

In El Salvador two successive Ministers requested additional support for an entirely new platform with functions for: a) a single online application form autofilled from NEPAssist with environmental, social and economic data; b) automated screening by linking questions on the application to criteria established for categorization of projects within three levels of environmental review; c) a new format for environmental management plans to better track, analyze and support priority setting, enforcement and follow up monitoring; d) automated communications to speed and systematically communicate with project proponents and stakeholders; e) automated validation across ministries to enhance efficiency; and f) automated

permits for lower impact projects that had not previously required an EIA or EMP and f) seamless linkage to compliance monitoring and enforcement tracking systems. See Figure 1.

TABLE 1
Messages on best or better practices based on results of the DR Best Practices Forum for Environmental Impact Assessment and Related Permitting and Enforcement held November 11-14, 2015

1. Reforms of environmental review and permitting should seek both efficiency AND effectiveness.
2. Significant efficiencies are being achieved in the EIA process through automation, GIS and internet access but plans and resources are needed to fully implement and sustain them.
3. A re-orientation of EIA programs is needed to seek to enhance beneficial impacts in addition to the current focus on reducing or eliminating negative impacts on the environment.
4. EIA processes work best when full EIA studies are targeted on those actions with the potential for significant environmental impact as part of a graduated system of environmental review to ensure that all levels of environmental impact are subject to appropriate performance requirements, accountability and information for sound decision making.
5. Seamless linkages are needed between pre-construction project level environmental assessment and other functions, including operating permits, compliance monitoring and enforcement.
6. Improving the quality, context and utility of environmental impact assessment studies to support decision making is a multi-faceted problem requiring an "all of the above" set of solutions.
7. Decentralization/Deconcentration for efficiencies can be achieved when centralized programs build capacity in satellite operations, municipal or regional entities to reduce the high transaction cost of travel to the capital to conduct business related to EIA review, applications and permits.
8 . Fee based services: for financing the administration of EIA, permit, compliance monitoring and enforcement were the most attractive means of assuring the necessary investments are made for greater efficiency and effectiveness to achieve important results for the countries.
9. Shoring up program integrity through transparency, independent validation, monitoring and enforcement at every step in the process can be done efficiently and effectively with new instruments and procedures.
10. Conflict prevention and resolution needs to be a top priority. It is one of the most significant causes of delay and uncertainty for investors.
11. Collaborative high level agreements between the Ministries of environment and other Ministries and levels of government are essential for efficient and effective environmental review, monitoring, control and management of the environmental.
12. Participants want to continue informal exchanges and mutual assistance in EIA, permitting, enforcement, GIS/IT support and public outreach.

3 INFORMATION FOR SOUND DECISION MAKING AND RISK AVOIDANCE

Successful deployment of GIS-Web based analytical tools such as NEPAssist is making it possible for instantaneous access to distributed information, spatial integration, but more than that, analysis of key relationships whether it is proximity to natural, culturally sensitive features, or consistency with plans for land use and iinfrastructure improvement. Such information is at the heart of EIA, and when scattered among different institutions and difficult to access or aggregate, it undermines the ability of public and private development to avoid problems and unnecessarily increases EIA costs. Accessible, spatially referenced information supports more sustainable development and risk based decisions. However, metadata is needed to confirm the source, date and use of acceptable protocols. The Dominican Republic initiated a country-wide effort to ensure that future data collection by all Ministries includes geo-spatial referencing. To utilize potentially valuable data from completed EIAs -- as Indonesia and others want to do – it also means the quality and source must be known. Corrections to data errors encountered through increased use is also a benefit but requires a systematic process to gather, verify and update corrected data. Predictable data errors dictate that project proponents remain responsible for confirming their veracity and filling in gaps. It also requires the capacity of credible laboratory analysis which was also an important element of the CAFTA DR program. Pilots in both China and Indonesia to incorporate results of models into spatial mapping included other information accessed through these GIS tools will also enhance the scientific basis for decision making. An important lesson was that maintenance and updates for these advances required dedicated resources to keep up with inevitable changes in software and hardware. It also requires dedicated resources and plans to migrate older date into the new management systems.

4 GRADUATED ENVIRONMENTAL REVIEW AND PERMITTING FOR ALL ACTIVITIES

EIA programs sort proposed projects into at least three categories: those with potentially significant impacts which require a full EIA; those with a low impact for which environmental

controls are left to other practices/ policies/institutions --mainly to local governments; and those projects that require environmental measures for which an environmental management plan and/or permit may suffice without the benefit of an EIA. DR FORUM participants concluded that self-categorization lacks accountability and inadequate local capacity is the primary reason for poor environmental controls for low and moderate impact sources. Technology can improve implementation of a graduated approach. El Salvador's reform platform now offers a single application window which tiers application questions in an online process linked to criteria for categorization of project types. Depending upon local capacity, low impact projects can now receive an automated expedited permit at the national level -- assuring that drinking water, sanitation, sedimentation/erosion and waste disposal will be acceptably handled, or, a draft for local use to add features for local impacts e.g. noise, light, odor, transportation. Applications completed and shared online also have been used to provide a more efficient means of validating information through arrangements with other government agencies and the opportunity for public review. In addition, informing the applicant about information gaps and required studies through the online application helps to avoid the back and forth that often occurs when key information is missing. El Salvador already had 23 detailed sector specific application forms and used the introduction of new technology as an opportunity to integrate them, revise existing screening criteria, eliminate unnecessary data requests, and shift questions on potential impacts and mitigation measures to a more appropriate second step in the process.

5   PERMITS FOR CONSTRUCTION, OPERATION, MODIFICATION

Mitigation and project descriptions need to be incorporated from the EIA through the environmental governance process into legally binding conditions in both pre-construction and operating permits. However, different institutions at different levels of government are often responsible for permits to construct and permits to operate. Information and communications technologies can help bridge these gaps with: a) electronic submission of the EIA document in a form easily shared across institutions; b) drafting of all permits simultaneous with the EIA review, even if not finalized; c) use of more enforceable EMP formats and example language to autofill environmental permits; d) alignment of promised mitigation with monitoring and performance; e) quantification of obligations wherever possible with measurable performance expectations; and f) contingency plans for failure to implement or achieve desired performance. The proposed format and databank in Figure 2 in trial in El Salvador is an example of how these techniques might be used to enhance both the effectiveness and the outcomes of the EIA process. Further, an automated system offers program managers "resiliency" to better respond to proposed changes in projects or permits. Both the public and officials have ready access to records and justifications to provide confidence that important concerns are not overlooked and changes monitored.

6   COMPLIANCE MONITORING AND ENFORCEMENT FOLLOW UP

Monitoring and follow up to commitments in the EIA process are well documented challenges. Gaps occur when EIA-related enforcement ceases once construction is completed or the EIA is inaccessible to inspectors in the field. Due to the broad nature and scope of the EIA the authorities and resources of many different institutions might be needed to follow up on proposed mitigation and avoidance plans. Web based platforms can facilitate linking EIA commitments to both permits to construct and operate and to other institutions. The format in FIGURE 2 can facilitate drafting of the EIA EMPs to enforceable language often lacking given that language is typically drawn directly from an impact statement which may not provide sufficient detail i.e. capacity, efficiency, size of pollution control equipment and can also ensure for each measure, that there is associated monitoring and reporting and identification of institutions responsible for follow up, including the role of citizen monitoring.

7 GOVERNMENT WIDE COMMITMENT TO ENVIRONMENTAL PROTECTION, PUBLIC INVOLVEMENT AND THE EIA PROCESS

Although within reach from a technological standpoint, leadership at the highest levels of government ultimately is needed to create commitments to share information and expertise across institutions and hold them accountable for clearly defined aspects of the process. El Salvador's Minister wisely arranged for the President and all the Ministers to be present and to help launch the new platform. Equally important is a commitment to transparency and opportunities for meaningful stakeholder engagement. In the absence of public review of land use and resource management plans, permits, compliance monitoring and enforcement, the EIA process might be the only context for citizen participation, resulting in pressures to resolve issues too great or too late to adequately address. An integrated platform for the entire environmental governance process facilitates confidence and involvement, and reduces the cost of engaging the public. Access to the information internally also improves handoff of one function to the next.

8 CONCLUSIONS AND PROPOSAL

Globally, the EIA process itself and the broader system of environmental governance have the possibility of becoming far more efficient and effective with the application of advances in information and communications technology but this needs to be cost-effectively harnessed. The author suggests that this be accomplished not in a piece-meal fashion but rather in a manner which connects each function in environmental governance, provides transparency and access, and is resilient to adapt to predictable changes and advances in technology and software. A collaborative international effort is proposed to test the feasibility of an internet based platform with flexible features that can be adapted to an individual country's circumstances while preserving sovereignty, ownership and protection of data. A parallel effort is proposed to develop and maintain a databank of potential measures in accountable and enforceable terms that can serve to highlight for each phase of a project a range of potential types of measures (i.e. within the hierarchy from avoidance, prevention, minimization, control or compensation), with descriptions that quantify efficiency, effectiveness, required performance, associated monitoring and reporting.

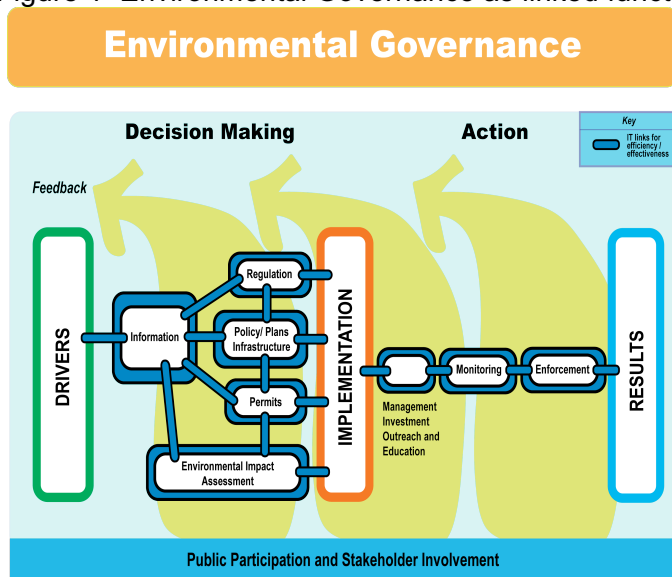Figure 1 Environmental Governance as linked functions supported by IT

Figure 2 Proposed Environmental Measures Format and Databank

FORMAT proposed for Environmental Management Plan

Permit application number

Environmental Concern	Phase/timing	Environmental Measure type:	Measure description	Capacity, efficiency, size and other attributes	Performance Required	Feasibility/Validation	Monitoring	Reporting	OTHER e.g. Est. $ Guarantee Monitor/Enforcer
		P= Prevent/Avoid C= Control Cm= compensation							
Menu: wastewater discharge, sanitation, drainage and runoff, solid waste collection and disposal, hazardous waste, toxic chemicals management, air emissions, air fugitive dust, hydrological impacts (water consumption, aquifer recharge impacts), ecosystems/vegetation/wildlife, infrastructure capacity, contingency plans, disturbance of local economic and living conditions, risks address, noise, odor light etc	S= Site design/preparation C= Construction O= Operation (O) Cl= Closure					Studies or certifications of adequacy			

EXAMPLES DATA BANK

Environmental Concern	Phase/timing	Environmental Measure type:	Measure description	Capacity, efficiency, size and other attributes	Performance Required	Feasibility/Validation	Monitoring	Reporting	OTHER
Drainage and Runoff/sediment/erosion	Site Preparation	P	Buffer zone around water body	25 meters/original vegetation	Prevent runoff				
Drainage and Runoff/sediment/erosion	Operations	C	Retaining wall		Sufficient to prevent runoff into waterbody				
Drainage and Runoff/sediment/erosion	Site Preparation	Cm	Tree Removal						
Drainage and Runoff/sediment/erosion	Site prep and Construction	P	cover exposed areas		Sufficient to cover/reduce opportunity for soil erosion and runoff				
Drainage and Runoff/sediment/erosion	Site design	P	Minimize non permeable surface						
Drainage and Runoff/sediment/erosion	Site design		Catchment basins						
Drainage and Runoff/sediment/erosion	Construction/Operation		controlled release of rainwater						
Drainage and Runoff/sediment/erosion			ground cover of exposed surface						
Drainage and Runoff/sediment/erosion			replanting and regrading to original contours						
Drainage and Runoff/sediment/erosion			NO Rechanneling of water bodies						
Drainage and Runoff/sediment/erosion	Construction/Operation	C	Channels to collect runoff	X meters, design, materials	Sufficient to collect runoff and ensure measured release				
			Dry wells						
SANITATION	O	C	ANDA or municipal connection i	Connect already exists	Connection at time of operation	Validation from ANDA/Municipality			
SANITATION	S/C	C	Portable John	4 on site	No disposal on site,....				
SANITATION	O/O	C	Septic Tank			Special Study			
SANITATION	SC	C	NEW WWT Plant						
Hydrology: water consumption	O		Reuse of grey water to water vegetation						
Hydrology: water consumption		P	x gallons withdrawn per day			Well capacity calculation and recharge calculation demonstrates no net loss and management plan for daily withdrawal and reassessment based upon measurement of levels	Measurement of water table levels method, frequency		
Hydrology: water consumption	O	C	# Trees Removed greater than					medicion de nivel de agua subterranea	
Ecosystem flora and fauna	Site preparation	Compensation	20 cm	Replanting 10 for 1:					
Air Emissions	O	P	Boiler Fuel	Natural Gas per day					
Air Emissions	C	P	Stack height						
Air Emissions	O	C	Baghouse/Filter	capacity and efficiency	Particulate standard	Engineering??	Stack test x method y frequency		
Air Emissions			Flue gas desulfurization		Sulfur dioxide				
Air Emissions					Nitrogen Oxides				
Air Emissions	O	C	Flaring		Volatile Organic Compounds (VOC)				
Air Emissions					Toxi air releases				
Air Pollution: Fugitive Dust	S/C		cover exposed surfaces	apply water daily?					

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