CEDTECH International Journal of Environmental Science & Biotechnology
Volume 2, Number 1, March 2021
http: / /www.cedtechjournals.org
ISSN: 2756-4541

EIA AND THE PHYSICAL ENVIRONMENT: THE PROMISES AND CHALLENGES IN NATIONAL DEVELOPMENT

[1]Muhammad K. Dahiru, [2]Nasiru B. Liman,[3]M.Y Adana and [4]M.M Sani
Department of Geography,[1]Federal University of Lafia, [4]Federal University, Dutsinma.
[2]Department of Geography, [3]Department of Environmental Management, Nasarawa State University, Nasarawa.
Email: dahirumk@gmail.com

ABSTRACT

Developmental activities are spatially and temporally specific in nature, and are characterized by impact that are felt more in their areas of localization, and hence the imperative for the involvement of the locals/ indigenous people in (whose domains such projects are situated in) the impact assessment process of such projects. This is because those who live on the land and harvest its resources have closer affinity to it, and therefore have more intimate knowledge of the land, and its functioning, than the outsiders. These groups of people are therefore, on better stead to contribute to better and efficient management of their environment. This study assesses the roles, promises and challenges of the EIA tool, as well as indigenous knowledge in environmental sustainability and well being through content analysis, and recommends the incorporation of Indigenous Environmental knowledge (IEK) into the EIA processes, since most EIAs do not adequately serve their purposes lately.

Keywords: *Environment; Development; Indigenous People; Environmental Impact Assessment.*

INTRODUCTION.

The EIA Tool and Environmental Best Practice in Mining

The Environmental Impact Assessment (EIA) tool is a veritable instrument for environmental management and improved decision making globally, the genesis of which is traced to the National Environmental Policy Act of USA, and entrenched in the domestic and international laws of many nation States because of its efficacy in that regard (Bowd, Quinn, & Kotze, 2015; Espinoza and Richards, 2002). The EIA is a systematic process of identifying, predicting, and evaluating the environmental effects of proposed actions and projects in an area (UNEP 2004). It is an innovative and valid environmental protection process that is globally recommended and endorsed for environmental

management/decision that has been incorporated into the legal systems of many countries worldwide (Espinoza and Richards, 2002), Nigeria inclusive (Dahiru, 2016). It is a neccessary and mandatory process that is viewed both as the science and art of environmental management, which ensures that all developmental activities are in harmony with environmental well being and sustainability, and the most widely used environmental management tool in the mineral and other sectors (ADB, 2002; Environmental Canada, 2009; European Commission, 2000), the efficacy of which is currently enhanced with the integration of other special tools like the Cost Benefit Analysis (CBA), the Social Impact Assessment (SIA), and Strategic Environmental Assessment (SEA). The EIA is aimed at safeguarding the integrity of the physical environment which is essential in evironmental sustainability and well being (Dahiru, 2016).

Emerging realities in our developmental strides however, show that the environmental impact (EI) of activities are not only becoming moreand more intense and wide spread lately, but larger and more complex in nature, with far reaching socio-economic implications. As a result, these challenges are now more difficult to be effectively addressed by the EIA tool, and hence the need to accompany the EIA process with the local science/wisdom of host communities to compliment, fortify and enhance its efficacy. Since all developmental activities are spatially and temporally specific in nature, their impacts are also (mostly) likewise, and are felt more in their customary territories of localization, and hence the imperative for the involvement of the locals/ indigenous people in whose domains such projects are situated in the Environmental Impact Assessment (EIA) process, as the first to receive the positive and negative impacts of such developments. This suggestion is supported by the altruism that those that live on the land and harvest its resources have an intimate knowledge of the land, its resources (distribution), the functioning of the ecosystems, and the relationship between the environment and their culture. This body of knowledge will have as much important contribution to make as scientific and engineering knowledge in addressing the many questions that may arise in the normal EIA process, as well as the concerns and aspirations of the people. This study assesses the roles, promises and challenges of the EIA tool in environmental sustainability and well being through content analysis and field survey/interviews, and recommends the incorporation of Indigenous knowledge (IK) into the EIA processes. IK, whose core value

stems from its public participation nature, whch is a process of empowerment that helps to involve local people in the identification of problems, decision-making and implementation, which can contribute to sustainable development (Geneletti, 1975).

EIA and National Development

The EIA tool or process has the virtues of reducing overall burden of projects environmental impact and ensuring sustainable environment and well being (Dahiru, 2016*).* This role is formally recognized in principle 17 of the Rio Declaration on Environment and Development. The EIA toolhas been helpful in environmental decision-making world wide. For instance, between 1989-1993, the post apartheid Government of South Africa undertook an EIA of St. Lucia lake which contained valuable reserves of Titanium (Ti), because of which mining permission was refused on that area, and in 1999, the area was declared a world heritage site, and it is now a very important national heritage, offering monumental benefits to the country (Bell, 2001; Down & Stocks, 1977).

In Nigeria, the need for EIA is in line with the 1992 EIA Act, which defined its minimum requirements and insists that proper mitigation measures and follow-up programs be put in place for all industrialization processes (Echefo and Akpofure, 1999). Also, to gain full benefits of EIA tool, it should become part of an Environmental Management System (EMS) which seeks to integrate environmental responsibilities into everyday management practices.In spite of its roles in environmental management, the EMS is however, hampered by the limitations of its legal framework in Nigeria, because despite the vivid reference of the nation's constitution to fundamental rights and protection of the citizenry, it is (virtually) silent on issues related to local communites /indigenous environmental rights, except under the direct principles of State policy, and hence as we can see now, acts intended to protect the environment are inconsistent with the spirit of the constitution, as they fail to guarantee the right to security of tenure and healthy environment.

An Overview of the Legislation and Practice of EIA

As an innovative environmental management process, the EIA, implies greater creativity and social responsibility in the design and execution of proposed actions and projects, and measures the benefit or cost from physical development to the public and community (Marzuki, 2009). Its components, stages essentially depend upon the requirements of the

country or donor agency involved in particular development activity in an area. However, most EIA processes have common structure and modus operandi. The theoretical objectives of EIA are however, put into actions by Governments.

The EIA Process

The EIA process consists of seven basic steps, each of which is important in determining the overall performance of the project. Typically, the EIA process begins with screening and ends with some form of follow-up on the implementation of the decisions and actions taken as a result of an EIA report. The seven steps of the EIA process are as follows: screening, scoping, impact analysis, mitigation, review of the EIA, decision-making, and post-monitoring.

i) Screening

This stage is central to the EIA process that: affords the lowest level of project scrutiny; determines whether or not the proposed project requires an EIA in the first place, and determines the level of assessment required. If a project is found to have "significant" negative environmental impacts, it is submitted to a comprehensive study or panel review, both of which involve the highest degree of public participation in allowing interested parties to participate in the scoping phase and throughout the EIA process.

ii) Scoping

This is the second stage of the process, which: sets the stage for the entire EIA process; identifies the key issues and impacts that should be further investigated; defines the boundaries and time limits of the study; identifies the components of the proposed development (such as Value Ecosystem Components (VECS) that should be considered part of the project for the purposes of the EA. This stage consists in determining who is interested in the project, what their concerns are, and how they should be involved in the assessment

III) Impact Analysis

This stage of EIA identifies and predicts the likely environmental and social impacts of the proposed project and evaluates their significance. Because the decision to either proceed with or reject a project is based on the severity of the environmental impacts engendered, participation in impact analysis and determination is an important prerequisite for effective decision-making.

IV) Mitigation

This stage in the EIA recommends the actions that should be taken to reduce and avoid the potential adverse environmental consequences of development activities. The developer is expected to make concerted efforts to allay the fears or concerns of the locals by putting concrete measures to prevent, or ameliorate the possible adverse consequences of a proposed activity on an area, the people, their resources or their heritages.

V) Review of the Environmental Impact Statement

This examines the adequacy and effectiveness of the Environmental Impact Statement (EIS) report and provides the information necessary for decision-making, and hence public participation is mandatory at this stage.

VI) Decision-Making

This is the most controversial and contested phase of the entire EIA process which requires information about the values of the affected people. Such information is obtained through public participation. This should consider such issues as: the risk of impacts; development of alternative impact handling accepted by the community; political consequences of proposed activity; distribution of costs and benefits of project activities to the people. This an important stage in the EIA process, based on which the recognition, discussion and consideration of alternatives, including the alternative of no action, are necessary for determining the scope of an assessment.

VII) Post-Monitoring and Follow-Up

This is the last stage of the EIA that comes into play once the project is commissioned. It ensures that the impacts of the project do not exceed the legal standards and that implementation of the mitigation measures is carried out in the manner described in the EIA report. Generally, post-approval follow-up is the proponent's responsibility. The direct involvement of local communities in the carrying out of the mitigation depends on the provisions made in the EIA Directives, the EIS, and/or the authorizations, and the general organization and resources committed.

EIA, Development and the People

The purpose of EIA is to minimize or avoid adverse environmental effects due to the execution of developmental activities in an area before they occur and incorporate environmental factors into decision making (Dahiru, 2016). Most importantly, EIA encourages and promotes economic development that conserves and enhances the environment, which is compatible with the high value and reverence that indigenous people normally place on environmental quality, by facilitating public participation in the environmental assessment of projects (Ogwuche, 2012) Consequently, the role of EIA in environmental governance is very important, as it decides the environmental design and implementation of a project and on what terms consent is given for such development. Moreover, EIA has established deliberative decision-making parameters that have the potential to revitalize democracy at a time of diminishing citizen trust in political institutions (Atte, 2004). Environmental impacts for large-scale resource development projects like construction of Dams, Airports, Stadia, and Industries, are directly felt most by their host communities, than any others because they rely heavily on the land and natural resources to support their economies and socio- cultures. As equal stakeholders in the environment, indigenous people have strong interest in, and desire to adequately participate in Environment Assessment (EA) in order to protect their territories against projects that have the potential to infringe on their rights and negatively impact the environment on which they depend.

Limitations of the EIA tool and Process

The evolution of project-level EIA was a response to a wide range of challenges and influences in its annals, especially in the 1970s -1980s where environmental decision models and resource management issues were rudimentary in nature, and founded on the tripod of technical feasibility, financial viability, and legal feasibility, only, as against environmental and social compatibility (Smith, 1993). These challenges made it impossible for the EIA tool to adequately cope with the increasing demand on it by the increasing number of large scale and complex development activities and the needs/concerns of the locals, on whose areas such projects /programs are being executed. The period of late 1960s –early 1970s marked the onset of rising public awareness of the interactions between the environment and developmental actions, as well as the inadequacies of the existing practices/approaches to addressing the impacts of such activities. A number of factors have converged to dictate

the need for alternative approaches to the current EIA practice. These include the increasing number of large scale development schemes, with greater potentials for significant adverse environmental impact; rising tide of environmental movements which lend their voices to issues of environmental quality, and the desire for equity in governance and environmental management.

Large-scale natural resource developments around the world have had a significant and disproportionately negative impact on local Indigenous people. While being excluded from sharing the benefits of such projects, Indigenous people have experienced debilitating socioeconomic impacts that afflict their lives and weaken their societies and cultures. The evidence suggests that even though institutions and private corporations have developed participatory tools and practices on paper, the experience of Indigenous people indicate that they do not have control over the development process of large-scale projects (WCD 2002). This constitutes serious shortcoming on the part of the EIA tool, and hence the need for the incorporation of Indigenous Environmental Knowledge (IEK) as well as the integration of aboriginal people into EIA research, policy and process because of their ability to offer insights into assessing the full impacts of development activities on important ecosystem components considered as "valued ecosystem components"(VECs). (Dahiru, 2016).

The EIA tool has two fundamental limitations in environmental manegement edecision. These are lack of adequate ecological baseline data, and lack of adequate framework of linking ecological and social components of the ennvironmet(Stevenson 2005), and hence the myriads of avoidable challenges/failures of the tool in adequately serving its real purposes in developing economies like Nigeria, where it has not been able to fully elicit its mandate, for reasons that include: dubious aim of the tool to the locals; disregard for the socio-cultural beliefs and value systems of the people; tendency of the took to rely more on political considerations and ulterior motives of the operators than on sound technical scrutiny of projects, the outcome of which is increaded environmental degradation; wider social costs of large scale projects like dams and floods control schemes which are largely unaccounted for despite their significance, and inadequate or poor impact mitigation measures, among others. These limitations have significant adverse effcts on the socio-economy and well being in the polity.

As a panacea for its limitations, it is now a global practice to accompany EIAs with Social and Environmental Assessments (SEAs) to ensure that full environmental consequences are taken into account early enough through mandatory legislations in order to adequately address them at the most appropriate stage on par with the socio-economic and other considerations (Dahiru, 2016).

Indigenous Environmental Knowledge (IEK) and the EIA Process

IEK is an age-old body of knowledge, wisdom or experience that is people /area specific in nature, over which scholars like Murdoch & Clark (2005), and Norgaard (2003) argue that it plays important role in the sustainable management of natural resources. It is the knowledge, experiences, wisdom and philosophies that indigenous/aboriginal people normally bring to bear on environmental issues (assessment and management) as pertain to them Though as old as human emergence on the surface of the earth, this term is only beginning to find recognition and favour with indigenous organizations and scholars, alike (ICC 1993). It is a much less contentious, more inclusive and more empowering form of knowledge than any other kind of knowledge (Gombay 1995; Stevenson 1996). This knowledge is variously known as traditional indigenous knowledge (TIK); aboriginal knowledge (AK), or local ecological knowledge (LEK) (Usher, 2002). It is a unique and specific to places and people, and it is differentiated in both form and content from other types of knowledge generally and from science specifically. It is a dynamic system that continually grows and changes with ecosystems (Grenier 1998, Battiste and Henderson 2000, Sillitoe, 2002, Mead, 2003). This knowledge is currently recognized as a vital source of information in the environmental impact assessment process in some parts of the world like the Arctic region, Canada, and the Unite State of America (USA) to gain better understanding of the consequences of predicted impacts, to reduce uncertainties in predictions, and to assist in establishing baseline conditions and monitoring programs (AEPS, 1996).

Although there is a growing body of literature on the value of IEK throughout the world, only in recent years have researchers seriously examined the potentials of using this knowledge in conjunction with western science to study projects' environmental impacts (Sallenave,1994;.Johanne, 1993) had earlier examined the potential for incorporating IEK into EIAs. He suggested that for IEK to be useful for EIAs, research on indigenous knowledge and management systems

should include four perspectives – taxonomical, spatial, temporary and social. His rationale for these showed:

i.) taxonomic perspective: Where researchers must identify and understand the significance of geological and physical resources tax on to the inhabitants of the region.

ii). spatial perspective: here, sites and routes of sensitive environments and animals should be verified and identified and these are easily known by the inhabitants.

iii). temporal perspective: where indigenous resource users know the location and timing of a host of significant geological events, and

iv). social perspective: here, EIAs require an understanding of how indigenous people perceive and use the environment.

IEK is an age long knowledge in many parts of the world, that should have informed, or been reflected in the very tool/process of EIA. or reflected been an d so we might This reality is however, not seen in many EIA legislations. For instance, the EIA legislation in Nigeria offers very little in the way of concrete involvement of indigenous knowledge in its process.

As a panacea, Spalding *et al* (1993) identifies four categories of IEK relevant to EIA. thus: Knowledge about the environment; Knowledge about the use of the environment; Values about the environment, and the knowledge system. While culturally heterogeneous and diverse, indigenous elders assert that they have a responsibility as stewards of mother earth. This position is however, in direct conflict with the modern nation states, which have assigned the responsibility 'for the good of all citizens' to its regulatory agencies. In Nigeria, the present land reform policy is aimed at solving some of these sovereignty problems between indigenous communities and the 1978 Land Use Act, which vested all lands and the resources therein, in the hands of the State, and turning citizens as mere tenants on their lands (Dahiru, 2016; Ogwuche, 2012). Sadler and Boothroyd (1994) observe that traditional perspective is holistic because environmental assessment is an integral part of daily life. It is a feedback loop of which people observe the consequences of past and present actions and consider the likely impacts of future action.

Incorporating IEK into the EIA process

Currently, there is a growing realization that scientific knowledge may have contributed little to the development of local communities, rather than hastening the depletion of their social and natural resources (FAO 1999), and hence the need to complement the existing environmental management tool. The EIA process must recognize ecosystems health, histories, rights, and titles of indigenous people by affirming indigenous relationships at the interfaces within the EIA process. Although, indigenous knowledge-based environmental assessment process is more a theory than a reality, such a process could reflect what Penny (1994) terms a "sustainability paradigm". IEK contributes to all the stages of the EIA, and hence the need to be integrated in its processes (Wolfe, et., 1992).World over, ecosystems and their host areas coexist symbiotically, with the former affording certain intrinsic and valuable peculiarities or benefits to the people on the one hand, and the latter, safeguarding/maintaining the ecosystem on the other. This mutual relationship is crucial for the survival and well being of both the ecosystems and its dependants. The need for environmental sustainability and well being is becoming more acute especially now, more than ever before. This may not ne unrelated to the rapidly growing population of the world, improved technology, industrialization, and growing inadequacy of the EIA tool in ensuring environmental sustainability among others (Dahiru, 2016). These developments have increasingly shown the need for the EIA tool/process to be accompanied with the local wisdom and knowledge of the people in whose domains, developmental activities or projects are sited.

This local/aboriginal knowledge is complimentary in nature to EIA, especially in the face of the growing limitations of the conventional science methods of the south in adequately addressing environmental problems that continue to affect the indigenous people, more disproportionately(Stern 1991; Petts 1999). As the demand for reliance on EIA increases, so does that on the scrutiny of the research, process, policy, and underlying assumptions governing its aplications (Ogwuche, 2012).This is particularly so if such activities are located in rural areas where the people are much less capable of adequately coping with their resultant physical and socio-economic vagaries (Dahiru, 2016). In Agreeing with this assertion, Appiah-Opoku (2005), said that increasingly, developing countries are implementing institutional and procedural frameworks for EIA that are based more on foreign models,

than with the socio-economic and institutional conditions in their countries. As a panacea to these limitations, the EIA process should incorporate the roles of indigenous knowledge as well as integrate the aboriginal people into its decision-making in the EIA research, policy and process, as well as integrate them into its decision making process because of their ability to offer significant insights into assessing full impacts of development activities on important ecosystem components considered as "valued ecosystem components" (VECs). (Dahiru, 2016)**.**This is important as it would make the needs of the people to be in harmony with their economic, social and environmental aspirations and goals, and ensure resource democracy(Marie & Usher 2002).

The industrialized world will have much to learn from indigenous peoples about the sustainable use of natural resources: [Lifestyles of tribal and indigenous peoples] can offer modern societies many lessons in the management of resources in complex...ecosystems. (World Commission on Environment and Development [WCED], 1987).

Challenges and limitations of IEK

Although the knowledge of indigenous communities has been found to be very useful, the spread of industrialization threatens its preservation and continued development (Sherpa, 2005). Industrialization, along with its attendant processes of urbanization, exploitation of natural resources, and increased competition for employment, have significant effects on the preservation of IEK. IEK is also eroded by wider economic and social forces. Pressure on indigenous peoples to integrate with larger societies is often great and, as they become more integrated, the social structures which generate IEK and practices can break down. According to Grenier (1998), the growth of national and international markets, the imposition of educational and religious systems and the impact of various development processes are leading more and more to the "homogenisation" of the world's cultures. Consequently, indigenous beliefs, values, customs, know-how and practices may be altered and the resulting knowledge base becomes incomplete.

As with scientific knowledge, IEK has its own limitations and these must be recognized. IEK is sometimes accepted uncritically because of naive notions that whatever indigenous people do is naturally in harmony with the environment. Like scientific knowledge, sometimes the knowledge on which local people rely could be wrong or even harmful, and hence

Practices based on such knowledge that was once well-adapted and effective become inappropriate (Thrupp, 1989). Although IK systems have certain flexibility in adapting to ecological changes, when change is particularly rapid or drastic, the knowledge may be rendered unsuitable and possibly damaging.

CONCLUSION AND RECOMMENDATIONS

Environmental resource management has grown in stature with the rising concerns, especially by the indigenous people, who have a special relationship with the land, its resources and the environments, arising from the disproportionate adverse impact of projects activities in their domains, which are currently being exacerbated by the global challenges of climate change, poverty and hunger. Within this context, participatory development and knowledge management have been identified as important factors in environmental sustainability, socio-economic development, and well being. The indigenous people are therefore of the view that IEK can contribute substantially to the quality of their life when incorporated into the EIA process by providing relevant biophysical and historical information, identifying potential environmental impacts, improvement of project design, strengthening of mitigation measures, and above all, building of enhanced long-term relationships between proponents, aboriginal groups, and/or responsible authority.

Although Indigenous knowledge (IK) differs from scientific knowledge in many respects, not the least of which is that it is not systematically recorded, IK is however, not necessarily inferior or superior to scientific knowledge. Combining the two knowledge systems is advantageous, and germane for environmental sustainability and well being, especially because of the increasing sizes and complex nature of large scale development projects; the gaps between EIA legislation and its implementation; the self-assessment nature of the EIA process (which creates conflicts of interest and negatively impacts the public's perceptions of the process); and the growing belief that IK offer potential benefits for sustainable natural resource management, and hence the strong argument for its preservation and incorporation / utilization in the EIA process lately even as it is being increasingly threatened by the forces of globalisation and modernisation.

This paper recommends as follows:

i) The integration of the IEK into the EIA process, if indigenous people are to have faith in the EIA process at all.

ii) IEK should be properly documented and managed by the State and environmental stakeholders

iii) The incorporation of IEK into the EIA process should be backed up by law.

iv) IEK should be well preserved, continuously developed, and be held in pride of place by the locals, or the aborigines.

REFERENCES

A.D.B. (2002). *Reports on Environmental Impact Assessment.* American Development Board. Washington D.C. Pp 13-19.

AEPS. (1996). The Arctic Environmental Protection Strategy,

Akpofure, E. & Echonu, N. (1995). Environmental Impact in Nigeria. *International Journal of Science and Technological Research.* 3(1). Pp. 23-29.

Amare, D.& Steve, S. (2010). Indigenous Knowledge in the Context of Natural Resource Management: An Information Systems Perspective. London.

Annunziata JW, Haudenosaunee Environmental Task Force, Uradyn EB (1995). *Haudenosaunee Environmental Restoration: An Indigenous Strategy for Human Sustainability*, Indigenous Development International, Cambridge, England.

Appiah-Opoku (2005). *The Need for Indigenous Knowledge in Environmental Impact Assessment: The Case of Ghana*, Edwin Mallen Press.

Battiste M, Henderson J (2000). *Protecting Indigenous Knowledge as Heritage: A Global Challenge*. Saskatoon, Purich Publishing Ltd.

Berkes, F. & Berkes, M.K. (2009) Ecological Complexity, Fuzzy Logic, and Holism in Indigenous Knowledge. *Futures*, 41, 6-12.

Bowd, R.. Quinn, W.Q., & Kotze, D.C. (2015). Towards an Analytical Framework for Understanding Complex Social-Geological Systems when Conducting Environmental Impact Assessments in South Africa. *Ecology and Society, 20 (1): 41.*

Dahiru, M.K. (2016).Impact of Barytes Minig on the Environment of Azara Area of Nasarawa State. Ph.D. Thesis, Department of Geography and Planning, University of Jos-Nigeria.

Echefu, A.E & Akpofure, E. (1995).Environmental impact Assessment in Nigeria.In UNEP, *Studies of Environmental Impact Practices in Developing Countries*.

Espinoza G, Richards B (2002). *Fundamentals of Environmental Impact Assessment*, IADB Training Programme.

FAO (1999) Environment Report Series 2 - Report No. 99/023 IFAD-RAF

Geneletti, C. (1975). The Concept of Participation: An Evaluation. ECLA/DRAFT/DA. Santiago, Chile.

Gombay, N. (1995). *Bowheads and Bureaucrats: Indigenous Knowledge and Natural Resource Management in Nunavut*. Unpublished M.Sc Dissertation, Environmental and Resource Studies, University of Waterloo.

Grenier, L (1998). *Working with Indigenous Knowledge: A Guide for Researchers.* IDRCA, Ottawa.

ICC (1993). The Participation of Indigenous People and the Application of their Environmental and Ecological Knowledge in the Arctic Environmental and Ecological Protection Strategy: Report on Findings, Ottawa, Canada.

Johannes R. E (1993). "Integrating Traditional Ecological Knowledge and Management with Environmental Impact Assessment", in Inglis J (ed) *Traditional Ecological Knowledge: Concepts and Cases,* IDRCA, Ottawa.

Johnson, M. (1992). *Lore: Capturing Traditional Environmental Knowledge,* Hay River, Dene Cultural Institute and IDRC.

Keith, I. (1983). *Man and the Natural World*, Oxford, UP.

Mead, H.M. (2003). *Tikanga Maori: Living by Maori Values.* Wellington, Huia Publishers.

Marie, R. (2002). *Indigenous Knowledge and Foresight: A Cree Elder's Environmental Impact Assessment.* Paper Presented at the World Summit on Sustainable Development, Ubuntu Village, Johannesburg.

Marzuki, A. (2009). A Review on Public Participation in Environmental Impact Assessment in Malaysia. Theoretical and Empirical Researches in Urban Management.3(12), August.

Murdoch, J. and Clark, J.. (2005) Sustainable Knowledge, *Geoforum,* New York, 25.2:(115-132)

Norgaard, R. (2003) Co-evolution of Economy, Society and Environment. Real Life Economics. *Routledge:* London

Penny, S. (1994). Assessing CEAA: Environmental Assessment Theory and the Canadian Environmental Assessment Act. *J. Environ. Law Pract*. 4: 243-269.

Sherpa, N.S. (2005) *International Workshop on Traditional Knowledge*. Organized by United Nations held in Panama City, 21-23 Sep. 2005.

Smith, L., Morgan, A. & Vandermeer, A. (2003) 'Community-driven Research in Cultural Heritage Management: the International Journal of Heritage Studies 9, Pp. 65-80.

Stern, P.C. (1991) 'Learning through Conflict: A Realistic Strategy for Risk Communication', Policy Sciences 24, Pp. 99-119..

Ruddle, K. (1993). "The Transmission of Traditional Ecological Knowledge", In Inglis J.(ed) *Traditional Ecological Knowledge: Concept and Cases*. IDRC, Ottawa.

Sadler, B., & Boothroyd, P. (1994). *Traditional Ecological Knowledge and Modern Environmental Assessment*. Centre for Human Settlements, University of British Columbia, UBC Press.

Sallenave. J. (1994). Giving Traditional Ecological Knowledge Its Rightful Place in Environmental Impact Assessment. *North Perspect*. 22(1):16-19.

Sillitoe, P. (2002). "Participant Observation to Participatory Development: Making Anthropology Work", In Sillitoe, Bicker and

Pottier (eds) *Participating in Development: Approaches to Indigenous Knowledge,* Routledge, London.

Spalding, H., Smith, B., Kreutzwiser, R. (1993). Evaluating Environmental Impact Assessment: Approaches, Lessons and Prospects. *Environ.* 22(1): 63 – 74

Stevenson, M. G. (1996). Indigenous Knowledge in Environmental Assessment*. ARCTIC*, 49(3). UNCED (1992). *Agenda 21*. New York.

Thrupp, L.A. (1989) Legitimizing Local Knowledge: from displacement to Empowerment for Third World People. Agriculture and Human Values, 6(3), 13–24.

UNEP (2004). *EIA Training Manual,* 2nd Ed. UN, Department of Technology, Industry, and Economics; Economy and Trade Branch.

Usher, P.(2002). Traditional Ecological Knowledge in Environmental Impact Assessment and Management. *ARCTIC,* 53 (2):183-193.

Solomons, W. (1995). Environmental Impacts of Metals Derived from Mining Activities: Processes, Predictions, and Prevention. *Journal of Geochemical Exploration*, 5, 5-23. New Age, UK

Warren, D.M. (2004) *Indigenous Knowledge, Biodiversity Conservation and Development*. Keynote Address at the International Conference on Conservation of Biodiversity in Africa: Local Initiatives and Institutional roles. Nairobi, Kenya, 30 August-3 September.

Wolfe, J., Bechard, C., Cizek, P., Cole, D. (1992). *Indigenous and Western Knowledge and Resource Management System.* Guelph, Ontario, University of Guelph.