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ESSENTIALS OF MANAGEMENT SYSTEM IN ENVIRONMENTAL MONITORING

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ABSTRACT

Environment is the surrounding or neighbourhood of man. Managing the environment is a tedious task, because the environment is everything to man. There are special and specific methods used for identifying the impact of projects on the environment. Environmental impact assessment, environmental monitoring and environmental auditing are some of the procedures in place to verify environmental impact of projects. The essence of Environmental management system is to enhance better environment update and to monitor some specific environmental elements of interest, such as air, water, land, vegetation, human, etc. The monitoring of environment includes the impacts of the project on the bio-geophysical of the environment, human wellbeing, and the involvement of stakeholders within the environment to determine the type of project suitable and friendly to their environment. The key interest is to achieve sustainable development using resources available within the area and meeting the international standard of safety. Stakeholders and experts in the field of environmental management system must synergise to achieve the best for the environment, flora, fauna and human. Diligent monitoring of environment is a vital check to environmental degradation and also a check on the environmental impact assessment, therefore it should not be undermined.

Keywords: Environment; environmental management; environmental monitoring; environmental sustainability; stakeholders involvement.

1. INTRODUCTION

The term environment has a lot of definitions, one of such is that it is the component of the Earth, comprising of land, water, cryosphere and air. [1] Summarise the environment as the existing area set surroundings that affects an activity, or which an activity affect; similarly, [2] defined environment as the summation of conditions necessary for an organism to live. In the other word, it is everything that surrounds a living thing. This work considers the combination of the lithosphere, hydrosphere, atmosphere, cryosphere and biosphere in which human, other living organisms and non-living organisms coexist as an environment.

An adequate understanding of the environment is required in other to solve environmental related issues. This calls for environmental impact assessment and monitoring of the environment. Environmental impact assessment is a managerial tool designed to aid officials, managers and policy makers, who take decisions on major projects within the environment and the ability to predict the

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consequences of such projects on the environment before their implementation, besides it proffer solutions and planning to avoiding or mitigating adverse impact on the environment.

Therefore in designing impact monitoring programs, it is necessary to ensuring that technical and institutional factors are not neglected, but formulated so that monitoring meets its required objectives, since it provides the necessary and essential input in environmental audit.

This Process will enable stakeholders and scholars to easily identify the impact of a project in a said area, as abnormality is a clear identification of the project impact on the environment. The general objective is focus on the problems, conflicts, natural resources depletion, efficient discharges and others that can affect the viability of a project. Therefore, environmental monitoring seeks to improve and sustain the environment while allowing projects that are environmental friendly. The suitability of a project within an environment can lead to more effective use of resources, which can remedy a desecrated landform or check and mitigate the stressed environment.

1.1 Environmental Management System (EMS)

Environmental management is concerned or deals with the fundamental requirements, processes and techniques formulated to understand the environment, characterize its quality, and establish environmental parameters, in order to accurately quantify the impact an activity has on environment. Environmental monitoring is the observation of the presence of harmful factors such as toxins, bacteria, harmful fungi, chemicals and other pollutants in specific location.

The Environmental Management System is an operational system that seeks to establish document and maintain a procedure for the day to day operations of projects, thus providing awareness training and internal communication within projects.

[3] Pointed out that Environmental management system (EMS) establishes specific procedures for identifying environmental impact and corrective measures arising from activities of the system and services. The procedures for achieving these set objectives are documented and specific procedures followed, such that are not outside what is in the or contained in an environmental impact assessment record, which includes the following;

(i) A detail description of the content of the proposed acts and alternatives.
(ii) An analysis and projection of the nature, effects and magnitude of environmental impact, both positive and negative.
(iii) The monitoring of the impact on human and a clear observation of human reaction to the said impact.
(iv) A prediction of the magnitude of the impacts and effect of the project and alternatives.
(v) The acceptance or rejection of the project, or for the adoption of alternative projects which seems to be environmental friendly..
(vi) Recommendation for inspection procedures and continual observation of project sites for identification of any impact in the future.

To ensure that the aim and objectives Environmental management is achieved, a step by step follow-up of project planning and implementation is vital; so, effective involvement of stakeholders and experts is crucial in environmental monitoring. Though project effect and impact will be felt mostly by stakeholders and base on that their inputs and expectations will enhance a better environmental management that will be sustainable over time. However, the experts' reputation and cost on the firms that hire them are also important factor. Therefore they putting their expertise to minimize negative impact on the environment, were it is inevitable, solution are proffered by experts in form of mitigation.

Hence the assertion of [4] that the essence of environmental monitoring is to ensure that before the actual impact of project on the environment can be determined, there is need to monitor selected variables such as air, water, soil, vegetation etc. in a systematic observation and measurement manner in time and space, which is the environmental impact study described as the effect that a development activity would have on the environment which might be adverse or beneficial.

2. OBJECTIVES OF ENVIRONMENTAL MONITORING

The aim of environmental monitoring is to manage, minimize and foresee the impacts a project activities will have on the environment, whither it is compiling with the environmental impact assessment laws and regulations and how well risk are minimize or mitigated, for the interest of man and the environment, whose live and existence are affected by unplanned or risk laden projects.

Environmental monitoring is essential to gather information about a project and to ascertain the effectiveness of the environment in which collection are kept. Therefore, to achieve the aim of

environmental monitoring, the following specific objectives are condidered.

- Establish a baseline of the exposure of the environment to danger
- Ascertain the variability levels of pollutants in the environment.
- Establishing the types, rate and gravity of pollutants from different sources.
- Suggestions toward improvement and alleviation of observed problems
- Understanding and identifying the problems and the sources of such problems within the system.

3. TYPES OF ENVIRONMENTAL MONITORING

Air Monitoring
Water Monitoring
Biodiversity Monitoring
Waste Monitoring

3.1 Air Monitoring

It is a known fact that air pollutants cause untold harm and risk to human health and the ecosystem. It can also affect the functionality of some technical infrastructure and deface many cultural monuments. Monitoring the air (atmosphere) quality and its content will enable stakeholders to known the major source of pollution, if it is internal or external.

3.2 Water Monitoring

The Convention on the Protection and Use of Trans-boundary Watercourses and International Lakes requires that the Parties introduce sustainable water management, including an ecosystem approach and the rational and fair use of trans-boundary waters. Water is very important to the environment and to individuals; however, it is obvious from the aforementioned that water is under pressure, especially so as the population increases. Since drinkable water is in high demand how it is treated from the upper course and middle course will affect countries at the lower course of the river. Overexploitation of water and pollution of water can bring a great consequence on the people that relying on such water. If the people at the upstream require more water than those at the downstream, it can even lead to crises or tension between those Nations. So the proper usage of water is vital. Dumping of toxic waste on rivers can also cause great harm to humans and marine lives. Leakage of toxic waste to a river or deliberate dumping of waste on the water can cause a major epidemic around the environment. Dumping of same on the land can also affect the underground water of the area.

3.3 Biodiversity Monitoring

Biodiversity are the various lives in the biosphere. Key to sustainable development is a robust environment, which in the other hand depends on ecosystem diversity. As a result of the importance of biodiversity, the International Union for Conservation of Nature (IUCN) created protected areas to protect some species. These are crucial for conservation and protection of biodiversity and contributing to sustainable development and environmental protection. Base on this, it is essential to monitor wanton destruction of forest the habitat of wildlife or the poaching of rare species of animals or the use of chemical in fishing.

As climate change continues to intensify the effect on the environment varies, while some flora cannot cope and new ones may emerge. Similarly lot of fauna may lose their life or force to migrate outside their immediate environment. Precisely climate change will lead to reduction in population of plant and animals or the explosion of some species in any case it will alter the stability of the environment; therefore monitoring the environment will enable stakeholders identify how human activities and climate change affects the environment.

3.4 Waste Monitoring

As human society advances in technology and population, so her generated waste increases. The need to monitor the amount of waste in a modern city and environment is crucial base on its side effect on the environment. Waste indicator enable experts to measure the pressure on the environment of the total amount of generated waste and waste by category. unece.org stated that waste represents a considerable loss of resources in form of materials and energy. The treatment and disposal of waste may cause environmental pollution and expose humans to harmful substances and infectious organisms. When product from the onset is recyclable or can be treated it will be more environmental friendly than products produce without considering the environment. It is important therefore, that waste generation and disposal, and types of waste be monitored to minimize the risk to which the society is exposed to.

Most of the waste can affect the land, air, water and the underground water sources. It is not only capable to cause harm to the people, but it also serves as host to vectors like rodents, houseflies, etc.

The most pathetic issue is how waste are handle in most developing countries, were scavengers go to waste dump to source for plastics, metals, etc. Waste bins are scattered on the streets, causing lot of health hazards to the people.

4. STAKEHOLDERS IN ENVIRONMENTAL IMPACT ASSESSMENT

[5] Opined that monitoring of the environment is an important aspect to protect and minimize human health and adverse environment condition. With an increase in population and the quest to satisfying their needs, there must be a corresponding increase in the field of science and technology which are function of industrial development. As nations aspire for industrial development, the need for more energy consumption increase, this will trigger the pollution level within the said environment even beyond, no matter the level attained in pollution control, the pollution rate will increase. The known technology still make use of products and chemicals with pollutants as its bye product, therefore the need for environmental monitoring is still crucial as it has always been.

Environmental impact assessment attempt to pre-empt or predicts the negative effect of a project on bio geophysical of the environment, it forewarned and gives a projection of what is to be expected as a result of a project in an area. So, it equip human and ensure his well-being. It also encourages participation of those whose lives and property are affected by siting a project within the environment in discussing and determining what project that will be most suiting, in order words their view being sort for before locating any project in such area. This implies that such stakeholders are somewhat partners in such projects so as to enhance their participation, environmental sustainability and maintenance of international standard while pursuing human satisfaction using local resources obtained within the said environment.

In this respect therefore, stakeholder's or concerned citizens participation includes the direct involvement of all those whose interest are affected in the outcome of a project or their representatives who can actively participate in decisions on planning and management of their environment. They share information and knowledge with the project representatives who are mainly technocrats, by so doing they will build solid understanding between the host community and the firm, besides their contribution may contribute to the success of the project.

Base on the foregoing some school of thought is of the view that community involvement in deciding how resources within their environment should be exploited or the type of project that can be situated in their area. Similarly they should also be stakeholder in resource control and environmental impacts assessment within their domain. Generally speaking many are of the opinion that the involvement of the community people (Stakeholders) is a crucial process that can unveil the harm the environment is suffering and the impact of the project on the people. This is not always the truth. There are three reasons for this, in some countries poverty is so much that majority of the people would rather accept bribe than do the right thing. Secondly, in most countries government influences even the simplest thing; therefore if the government is interest in such project, there is little anyone can do about it. The third point is that most of the stakeholders are not experts in the field of environmental monitoring, most of the actually, cannot make any contribution, and they would not want to hire experts, since the look at it as opportunity for their family or community. The firm will lodge them in hotel, feed them and give them allowance, and read out the report, which in most cases is unverifiable. Communities or stakeholders should to select trust worthy individual among them to act as environmental monitoring brigade, that is how stakeholders can check the wanton activity of project owners in their environment. However the danger is that some stakeholders may be gullible or naive that they may not give adequate representation as mentioned earlier.

It is imperative that trained civil society groups in collaboration with institutions and Non-Governmental Organizations (NGO) to educate the populace on the side effect of projects on the environment and also make them understand that they are part of the environment. That will equip them to make meaningful contribution in protecting the environment. Such training will be the best step in the right direction towards partnering with co-operation organizations in maintaining a sustainable environment.

Training of the stakeholders is another important responsibility of government, NGOs civil society, since the stakeholders will be part of the decision making organ, especially on what project is suitable in area or not, they can be part of monitoring team if trained. If such action is implemented, then they can truly check-mate project activities in relation to international standard since project impacts will be most felt by them.

This action will in a small way minimize the lack of trust between the community and co-operate organizations operating within such environment.

5. SUSTAINABLE ENVIRONMENT

Environments has a variety of definitions depending on the profession or field of study, but according to [6] he defined the environment as the component of the earth that includes land, water and air, all organic and inorganic matter and living organisms and the natural interactions within the system. Hence, the general observation is that the environment is a product of nature with man-made changes. This does not mean that nature cannot cause changes in the ecosystem, but the focus is on the anthropogenic influence which has caused or created environmental situation that can be positive or negative. A man-induced change is often referred to as the "effect", while the harmful consequences are called "impacts".

The resultant effects of man activities and his impacts have raised the awareness of an Environmental Impact Assessment (EIA), which is an attempt to evaluate the consequences of a proposed action on each of the elements that make up an environment.

[7] Emphasized that sustainable environment development is the ability to use the environmental resources available to a group of people, without exhausting for the future use of upcoming generation. It is a judicious way of using the gift of a country, without undermining that future generation will also benefit from such gift. The importance of sustainable development lays on the fact that it is environmental friendly; it is considerate of future generation. It is based on this that environmentalist are constantly preaching about. This explains why sustainability of the environment has become a topical issue in today world. [8].

Hence, [9] defines Environmental Impact Assessment (EIA) as an activity designed to identify and predict the impact on the biogeophysical environment and on man's health and well-being of legislative proposals, policies, programmes, projects and operational procedures, and to interpret and communicate about the impact.

6. CONCLUSION

Environmental monitoring are various methods and techniques designed to observe the environment, characterize its qualities, and maintain environmental parameters, for the purpose of accurately quantifying the impacts an activity has on the environment. This is essential to gather information about and assess the effectiveness of the environment in which collection are kept.

Environmental monitoring is inevitable, because most of the human developmental activities are such that causes pollution and inimical to the environment. As cities grow and technology advances so waste, and toxic outputs are produced. To cut tail and manage the effect of these anthropogenic harmful substances, there is need to monitor human activities on the environment.

The focal point of Environmental monitoring is to control, mitigate and minimize the impact of a project have on the environment, either to ensure compliance with laws and regulations or to mitigate risk on harmful effects on the natural environment and to protect the health of human beings.

To achieve the goal of environmental monitoring all hand must be on deck,the stakeholders must be involved in determining the wellbeing of their environment. The stakeholders are all those that have interest in the successful design, implementation and the sustainability of a project. We can also say that they are those that the impact of a project will directly or indirectly affect. Therefore such people whose lives are affected as a result of a project should be made stakeholders in determining the future.

Environmental monitoring provides robust dependable data that ensure the detecting of long-term changes in monitored environment over time. It allows the early and fast identification of potentially significant effects (i.e., early trends which could become serious) in the future. The protection of human health and life and progressively improving the state of the environment is the focus of Environmental monitoring.

7. RECOMMENDATIONS

- This paper recommends that government and her agencies should not undermined or water down the importance of Environmental monitoring (EM) in project planning, implementation and execution, and continuous monitoring years after the projects.
- Stakeholders be integrated and not be neglected in both environmental impact assessment and environmental monitoring; besides some local solutions need to be incorporated to solving the observed problems.
- Strict legislation and effective enforcement should be put in place. Law enforcement agents or any persons that want to water than the standard by means of accepting or giving bribe should be punished.
- Orientations and public enlightenment should be giving to the people so that they will not ruin their environment, and can check others from ruining the environment.

- Environmental monitoring should be everybody business. Hot lines should be made available for emergency call regarding environmental issues.
- Portable water should be provided for the people when observation shows that the environment has been polluted.
- The level of pollutants should be regularly checked to ascertain if the environment is conducive or not for leaving.
- The biodiversity is vital member of the ecosystem, and therefore must be protected. Poaching, indiscriminate destruction of the vegetation's and the use of chemical should be checked.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Aloni C, Daminabo I, Alexander BC, Bakpo MT. The importance of stakeholders involvement in environmental impact assessment. Resource and Environment. 2015;5(5):146-151.
2. Aloni C, Alexander CB. "The Human Environment" Ugwuorah, A.N., Aloni, C., Tubobereni, I.F., and Amadi, D.E. (eds). Environmental Sciences and Human Development. Happyvent Publication, Port Harcourt; 2020.
3. Artiola JF, Brusseau ML. Environmental and Pollution Science.(3rd Edition). Publisher, Elsevier; 2019.
4. Godwill Q. Environmental impacts and studies. Journal of Nigerian Environmental. Society. 2006;3(3):65 -72.
5. McCarthy M. Downing out the Alarm Bells of a Global Warning. The Times, Weekend Review May, 30; 1992.
6. Paleowei ZC, Aduba F, Aloni C. An evaluation of community relations impact in managing environmental related crisis in the Niger Delta. European Journal of Business and Management. 2014;6(12):55-61.
7. Uchegbu SN. Environmental management and protection. Precision printers and Publisher, Enugu Nigeria; 1998.
8. Ukpong IE. Perspective on environmental management. Immaculate Publications Limited (Press Divian) Enugu, Nigeria; 2009.
9. Umeh LC, Uchegbu SN. Principles and procedures of environmental impact assessment (EIA). Computer Edge Publishers, Lagos, Nigeria; 1997.