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THE RELATIONSHIP BETWEEN PARTICIPATORY LEARNING AND ACTION RESEARCH AND ENVIRONMENTAL SUSTAINABILITY IN THE OIL AND GAS INDUSTRY

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ABSTRACT

Objective: The objective of this study is to establish the relationship between participatory learning and action research and environmental sustainability with the aim of understanding the correlation between participatory learning and action research on environmental sustainability.

Theoretical Framework: This study is grounded on ladder of participation theory, triple bottom line model, public participation theory and the theory of sustainability. The theories provide a foundation for understanding the importance of participatory learning and action research in enhancing environmental sustainability in the oil and gas sector.

Method: The rationale for the study was based on a pragmatic research paradigm. Knowledge, according to this paradigm (Creswell, 2012), does not originate from prior circumstances but rather from acts, situations, and consequences. This study's researchers employed a mixed-methodologies approach, which blends quantitative and qualitative methods. We were able to strengthen our study overall by combining the two methodologies in this configuration, as opposed to using each one alone (Creswell, 2012). Because this study used a mixed-method strategy, which entails using each technique in turn, the researcher hoped to expand upon or build upon the results of the previous method.

Results and Discussion: The results demonstrated a strong correlation (r=.472**) between environmental sustainability and participatory learning and action research. Assuming all other variables are held constant, a one-unit increase in participatory learning and action research would result in a 0.791-unit increase in environmental sustainability (p=.000).

Research Implications: Participatory learning and action research significantly influenced environmental sustainability, as indicated by descriptive statistics, in the case study of the oil and gas upstream project in Turkana County, Kenya.

Originality/Value: The results show that research and participatory action can help make social-ecological transformation more sustainable by enhancing individual learning and institutional adaptability. The report asserts that in order for PAR to comprehend the unique environmental difficulties and consequences of oil and gas extraction at each site, it relies on local knowledge and experience. In the end, this could lead to better, more situationally appropriate solutions.

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A RELAÇÃO ENTRE A APRENDIZAGEM PARTICIPATIVA E A PESQUISA-AÇÃO E A SUSTENTABILIDADE AMBIENTAL NO SETOR DE PETRÓLEO E GÁS

RESUMO

Objetivo: O objetivo deste estudo é estabelecer a relação entre a aprendizagem participativa e a pesquisa-ação e a sustentabilidade ambiental com o intuito de compreender a correlação entre a aprendizagem participativa e a pesquisa-ação na sustentabilidade ambiental.

Estrutura Teórica: Este estudo está fundamentado na teoria da escada da participação, no modelo do triple bottom line, na teoria da participação pública e na teoria da sustentabilidade. As teorias fornecem uma base para a compreensão da importância da aprendizagem participativa e da pesquisa-ação no aprimoramento da sustentabilidade ambiental no setor de petróleo e gás.

Método: A justificativa para o estudo baseou-se em um paradigma de pesquisa pragmática. O conhecimento, de acordo com esse paradigma (Creswell, 2012), não se origina de circunstâncias anteriores, mas sim de atos, situações e consequências. Os pesquisadores deste estudo empregaram uma abordagem de metodologia mista, que combina métodos quantitativos e qualitativos. Conseguimos fortalecer nosso estudo de modo geral combinando as duas metodologias nessa configuração, em vez de usar cada uma delas isoladamente (Creswell, 2012). Como este estudo utilizou uma estratégia de método misto, que implica o uso de cada técnica por sua vez, o pesquisador esperava ampliar ou desenvolver os resultados do método anterior.

Resultados e Discussão: Os resultados demonstraram uma forte correlação (r=.472**) entre sustentabilidade ambiental e aprendizagem participativa e pesquisa-ação. Supondo-se que todas as outras variáveis sejam mantidas constantes, um aumento de uma unidade na aprendizagem participativa e na pesquisa-ação resultaria em um aumento de 0,791 unidade na sustentabilidade ambiental (p=,000).

Implicações para a Pesquisa: A aprendizagem participativa e a pesquisa-ação influenciaram significativamente a sustentabilidade ambiental, conforme indicado pelas estatísticas descritivas, no estudo de caso do projeto upstream de petróleo e gás no Condado de Turkana, Quênia.

Originalidade/Valor: Os resultados mostram que a pesquisa e a ação participativa podem ajudar a tornar a transformação socioecológica mais sustentável, aprimorando o aprendizado individual e a adaptabilidade institucional. O relatório afirma que, para que o PAR compreenda as dificuldades e as consequências ambientais únicas da extração de petróleo e gás em cada local, ele se baseia no conhecimento e na experiência locais. No final, isso pode levar a soluções melhores e mais adequadas à situação.

Palavras-chave: Aprendizagem Participativa e Pesquisa-Ação, Sustentabilidade Ambiental, Descarga de Efluentes, Atividades de Perfuração, Derramamentos de Óleo.

LA RELACIÓN ENTRE EL APRENDIZAJE PARTICIPATIVO Y LA INVESTIGACIÓN-ACCIÓN Y LA SOSTENIBILIDAD MEDIOAMBIENTAL EN LA INDUSTRIA DEL PETRÓLEO Y EL GAS

RESUMEN

Objetivo: El objetivo de este estudio es establecer la relación entre el aprendizaje participativo y la investigación-acción y la sostenibilidad ambiental con el fin de comprender la correlación entre el aprendizaje participativo y la investigación-acción sobre la sostenibilidad ambiental.

Marco Teórico: Este estudio se fundamenta en la teoría de la escalera de la participación, el modelo de la triple cuenta de resultados, la teoría de la participación pública y la teoría de la sostenibilidad. Estas teorías proporcionan una base para comprender la importancia del aprendizaje participativo y la investigación-acción en la mejora de la sostenibilidad medioambiental en el sector del petróleo y el gas.

Método: La justificación del estudio se basó en un paradigma de investigación pragmática. El conocimiento, según este paradigma (Creswell, 2012), no se origina en circunstancias previas, sino en actos, situaciones y consecuencias. Los investigadores de este estudio emplearon un enfoque de metodologías mixtas, que combina métodos cuantitativos y cualitativos. Pudimos fortalecer nuestro estudio en general combinando las dos metodologías en esta configuración, en lugar de utilizar cada una por separado (Creswell, 2012). Debido a que este estudio utilizó una estrategia de métodos mixtos, que implica el uso de cada técnica a su vez, el investigador esperaba ampliar o construir sobre los resultados del método anterior.

Resultados y Discusión: Los resultados demostraron una fuerte correlación (r=.472**) entre la sostenibilidad medioambiental y el aprendizaje participativo y la investigación-acción. Suponiendo que todas las demás variables se mantengan constantes, un aumento de una unidad en el aprendizaje participativo y la investigación-acción se traduciría en un aumento de 0,791 unidades en la sostenibilidad medioambiental (p=0,000).

Implicaciones de la Investigación: El aprendizaje participativo y la investigación-acción influyeron significativamente en la sostenibilidad ambiental, según indican las estadísticas descriptivas, en el estudio de caso del proyecto de extracción de petróleo y gas en el condado de Turkana, Kenia.

Originalidad/Valor: Los resultados muestran que la investigación y la acción participativa pueden contribuir a que la transformación socioecológica sea más sostenible al mejorar el aprendizaje individual y la adaptabilidad institucional. El informe afirma que para que la IAP comprenda las dificultades y consecuencias medioambientales únicas de la extracción de petróleo y gas en cada lugar, se basa en el conocimiento y la experiencia locales. Al final, esto podría conducir a soluciones mejores y más adecuadas a cada situación.

Palabras clave: Aprendizaje Participativo e Investigación-Acción, Sostenibilidad Ambiental, Vertido de Efluentes, Actividades de Perforación, Vertidos de Petróleo.

1 BACKGROUND STUDY

Participatory learning and action research offers an effective way to learn about and engage with local communities. By integrating natural interviewing techniques with an expanding toolbox of interactive and visual methods, this approach promotes a collaborative process of analysis and learning (Hickey & Mohan, 2014). It enables projects and programs to be assessed, planned, monitored, and evaluated while also offering communities a meaningful role in decisions that directly impact them.

The methodological strategy of participatory learning and action research involves several key steps: identifying a problem or prerequisite for growth; developing an intervention strategy; implementing the intervention; monitoring its effectiveness; evaluating the outcomes in the newly created context; and, finally, reapplying the process as needed based on the evaluation results (Arends, 1999; Strode, 2013). This process impacts everyone involved from researchers and technologists to the organizations, institutions, and communities studied, as well as the broader network of bureaucratic institutions by establishing new norms of collaborative action. According to McNiff and Whitehead (2011), action research seeks to generate knowledge about reality, drive innovation through change, and enhance participants' competencies via their social learning process.

Similarly, actively involving community members in a collaborative data-generation process, participatory learning and action research dissolves the traditional boundaries between researchers and those being researched. It emphasizes learning by doing and goes further by aiming to redistribute power and address inequality (Bradbury-Huang, 2010; Bookman & Morgen, 2008). This method is considered a particularly effective strategy for achieving sustainable change.

Furthermore, when action research techniques engage community members in managing knowledge development and transformation, there is a lower chance of resistance and a higher likelihood of long-term social and behavioral change (Chambers, 2008; Gutierrez,

1990). As Hickey and Mohan (2014) note, individuals who participate in identifying issues are more inclined to contribute to developing effective solutions. Likewise, those involved in formulating solutions are more motivated to implement them and ensure that the intervention becomes a lasting part of the system. In contrast, research that excludes active and ongoing participant engagement tends to face significant resistance to change, often resulting in low levels of compliance with planned interventions (Klocker, 2013).

2 STATEMENT OF THE PROBLEM

Researchers, non-governmental organizations (NGOs), and environmentalists have long held the view that the petroleum industry is to blame for the sector's disproportionately harmful impacts on human and environmental health as a result of its ineffective sustainability management and practices (Kraupnick and Gordon, 2015). Improving petroleum operations; reducing emissions of CO2, CH4, and NOx; and increasing social, economic, and environmental advantages are at the core of their knowledge of sustainability methods and systems. Fuchs argues that environmental sustainability has been long-ignored despite the fact that technical and engineering developments have increased the production and sales efficiency of petroleum operations (2017).

It is particularly common for choices to be taken in Africa, a continent with a flourishing oil drilling industry, without thoroughly considering the opinions or involvement of the people whose livelihoods are at risk. As a result, participatory learning and action research is frequently neglected in this region. Most of the time, this kind of development has led to political instability and wars, particularly in emerging nations. According to research by Barasa and Jelagat (2013), locals in areas where oil and gas are found often lack knowledge about the resources, the exploration processes, and the potential impacts on their environment and community.

Since the industrial revolution which included the finding, extraction, and exploitation of crude oil and oil spills has been a worldwide scourge (Kadafa, 2012). One research that compared sustainable oil and gas extraction in two case study regions, Nigeria and the UK, including thirteen focus groups, eighty-six questionnaires, and seven interviews (Inomiesa, 2015). Research on the oil and gas industry in Nigeria differs from its British counterpart, according to this data research. Niger Delta oil companies erred in their assessment of the importance of capacity building, community engagement, and environmental impact

management (Morakinyo and Odigha, 2009). They also failed to appreciate the link between the environment and people.

One study that examined the effects of participatory monitoring and evaluation on stakeholder engagement, project impacts, and learning and change in Ugandan institutions and communities was that of Njuki, Kaata, Chitike, and Sanginga (2006). To find out why PME was instituted in the management of public secondary schools in the Kisumu East District of Kenya, Oyuga (2012) conducted an investigation. Kimweli (2013) looked at how PME affected the effectiveness of food security intervention projects supported by donors. Mburu (2018) evaluated PME in relation to stakeholder capacity building, fish farming project performance, and effective external stakeholder engagement. Mwangi (2018) evaluated PME in the context of Kenya's upstream oil and gas sector.

Few prior research has been conducted on the relationship between participatory learning and action research and environmental sustainability. More so, little is seen to focus on the oil and gas upstream project in Turkana County. Accordingly, the study's foundational oil and gas upstream project lacks information on how participatory learning and action research relates to environmental sustainability.

3 LITERATURE REVIEW

Scientists as detached spectators and agents in participatory learning and action research no longer fulfill science's duty of creating knowledge on behalf of the public. According to Fortmann (2008), research should focus on assisting individuals at various social aggregation levels in expanding their knowledge and improving their adaptive management abilities. From a practical standpoint, this means that community level and service providers work together to promote farmers' exposure to new ideas and technology, their experimentation, and venues for negotiation and action learning (Cullen, & Coryn 2011). Incorporating participatory research functions into continuing social or socio-technical development initiatives and methodically examining the "how" and "why" of particular developments are the goals of participatory monitoring and evaluation (PM&E).

Optimal ignorance and acceptable imprecision are two key ideas in participatory learning and action research (Chambers 1983). What this means is that in order for participatory learning and action research to be effective, participants must only gather and evaluate data that is absolutely necessary for informing community decision-making and action. In contrast, many

methods of monitoring and evaluation and research strive for extremely precise results to satisfy the expectations of academic audiences. After the community reaches the optimal ignorance point, they should formulate a plan of action or act specifically in response to the analysis. Chapman, Paterson, and Medves (2011) note that this often entails adapting one's presentation style depending on the audience, whether it be community leaders, CBOs, local government agencies, or other possible service providers. Presenting results for M&E (monitoring and evaluation) reasons could also be a part of this.

Within PAR, one may find a veritable treasure trove of tools and techniques. You may find descriptions of several of these common data collecting technologies elsewhere in the M&E Universe. Among these methods include photography, video, case studies, focus groups, interviews (both organized and unstructured), case studies, and secondary data sources. Conversely, several methods and resources have been developed as a result of participatory learning and action research. The use of local resources is the basis of a number of these visual aids, which include images, maps, diagrams, and charts. These resources will be invaluable to participants who lack literacy skills or are just learning to read and write. Among the tools and techniques used for pattern and change evaluation are transect walks, analytical diagrams, matrix scoring seasonal calendars, mapping and modeling, and the ranking and grouping of wealth and wellbeing (Slocum et al., 1995; Mikkelsen, 1995; Gosling and Edwards, 2003).

The intricate nature of managing natural resources typically results in a great number of diverse (and often conflicting) stakeholders, each with its own unique set of perspectives, interests, tactics, and body of knowledge. Stakeholders often need "platforms" like community forums to take part in participatory learning and action research and collaborative learning, according to Hagmann et al. (2002). This type of learning involves the "de-construction" and "re-construction" of people's reality. Thus, while generating a single technical invention may only require "local expert" involvement, comprehensive stakeholder participation is essential when addressing collective action, conflict management, and social learning.

Numerous studies have demonstrated that the participatory research (PAR) method, which encourages group problem-solving and self-reflection, can strengthen social-ecological change resilience (Finger and Verlaan 1995; Park, Brydon-Miller and Hall 1993; Reason and Bradbury 2006). Researchers in resilience and PAR also hold the view that traditional ecological wisdom, when combined with scientific knowledge, may help manage complex social and ecological systems. Many scholars have emphasized the significance of considering the political environment when discussing the creation and utilization of knowledge. This

encompasses works by authors such as Berkes, Colding, and Folke (2003), Calheiros, Seidl, and Ferreira (2000), Nelson and Wright (1995), and Rocheleau (1994). In order to tackle the multi-faceted problems of natural resource management, include local people, and advance fair and sustainable systems of management, the study concludes that participatory action and research methodologies are necessary.

Participatory research has unique contextual obstacles when dealing with topics related to natural resource management. Traditional norms and social entitlements (such as tree versus land tenure, differing degrees of security of tenure and usage rights, etc.) manage natural resources at the community level, and these norms and entitlements can be complicated, overlapped, and even competing. Various social identities, connections, and roles are influenced by and changed by the utilization and access to natural resources. These factors include gender, kinship, ethnicity, socioeconomic position, age, occupation, and more. Compatibility issues between rules and management practices at higher governmental levels and local resource claims further complicate matters. According to Fals-Borda (2011), there has to be cooperation between many tiers of government and the participation of numerous stakeholders for participatory research methods to be useful in managing natural resources.

Environments, both social and natural, are dynamic and ever-changing. To manage their natural resources in a sustainable way, locals need to know how their activities impact the environment, and they should learn to track and evaluate the social and ecological impacts of their decisions so they can change their ways of doing things (Wilmsen, Elmendorf, Fisher, Ross, Sarathy & Wells 2008). Hence, PRPs should advocate for the establishment of participatory, locally-based evaluation and monitoring systems; these systems should also inspire people to devise change and sustainability indicators that are both readily assessed and sufficiently accurate.

4 METHODOLOGY

The rationale for the study was based on a pragmatic research paradigm. Knowledge, according to this paradigm (Creswell, 2012), does not originate from prior circumstances but rather from acts, situations, and consequences. This study's researchers employed a mixed-methodologies approach, which blends quantitative and qualitative methods. We were able to strengthen our study overall by combining the two methodologies in this configuration, as opposed to using each one alone (Creswell, 2012). Because this study used a mixed-method

strategy, which entails using each technique in turn, the researcher hoped to expand upon or build upon the results of the previous method.

5 DATA ANALYSIS FINDINGS AND DISCUSSION

While conducting this study in Turkana County, Kenya, for an oil and gas upstream project, the researcher sought to gauge respondents' thoughts on several assertions pertaining to participatory learning and action research and environmental sustainability. Table 1 below displays the results obtained from the participants.

Table1

Participatory learning and action research on Environmental Sustainability

	N	Minimum	Maximum	Mean	Std. Deviation
Collective actions in participatory monitoring and evaluation aids in enhancing projects sustainability.	186	3.00	5.00	4.0269	.80829
Collective mindsets of communities may improve environmental sustainability in the oil and gas sector	186	3.00	5.00	4.0914	.84292
Collective analysis provides a cultural repertoire of how to perceive environmental problems and how to solve them	186	3.00	5.00	3.9731	.80829
Learning and action research through collective analysis seeks to empower participants by amplifying their views and including them in the transformation of the oil and gas sector.	186	3.00	5.00	3.8548	.80230
Collective analysis gives the communities a single voice to addressing environmental issues in the oil and gas sector	186	3.00	5.00	3.9677	.80474
Participatory learning and action research has an influence on the stakeholders knowledge of the detrimental effect of oil and gas exploration	186	3.00	5.00	4.0215	.81178
Participatory learning and action research is an approach for learning about and engaging with communities	186	3.00	5.00	4.0430	.81093
Existence of knowledge on environmental sustainability is inverse proportional to environmental degradation	186	3.00	5.00	4.0108	.81200
Creating and sharing knowledge on environmental sustainability of oil and gas upstream projects is vital	186	3.00	5.00	4.0323	.85679
Communication of knowledge enhances environmental sustainability in the oil and gas sector	186	3.00	5.00	3.9516	.80056
The action research strategy entails collaboration between scholars and community members in a co-learning process.	186	3.00	5.00	4.0215	.83152
Perfecting collective knowledge through collective learning is an effective participatory learning and action research technique	186	3.00	5.00	4.0215	.80510
Collective learning has an influence on environmental sustainability in the oil and gas sector	186	3.00	5.00	3.9785	.81842
Participatory Learning and Action Research Scientists are no longer pleased with their role as external actors/observers producing information for humans.	186	3.00	5.00	4.0538	.84298
Participatory learning, action, and research can significantly contribute to individual learning and institutional adaptation, supporting durable social-ecological transformation.	186	3.00	5.00	3.9032	.82612
Competence assessment is of growing interest in ensuring effective community participation	186	3.00	5.00	3.9355	.83577
Competence in environmental sustainability can aid the communities enhance sustainable energy development	186	3.00	5.00	3.9301	.84499
Active participation of the communities may result to increased environmental sustainability	186	3.00	5.00	3.9516	.81395

Maximizing training in competence is an effective community learning and action technique	186	3.00	5.00	3.9892	.79178
Community training in competence has a significant environmental impact	186	3.00	5.00	3.9785	.83800
Participants' innovations contribute to addressing issues associated with environmental sustainability.	186	3.00	5.00	3.9409	.83294
Innovation by participants creates solutions to existing oil and gas problems	186	3.00	5.00	3.9946	.81537
Participants innovations is a collective process that establishes new rules of action.	186	3.00	5.00	4.0323	.81806
Innovation is the most appropriate strategy for improving the likelihood of effective sustainability.	186	3.00	5.00	4.0430	.82415
Innovation in learning and action research assists in identifying the solutions in effective environmental sustainability	186	3.00	5.00	4.0215	.80510
Composite or condensed mean					
Valid N (listwise)	186				

Respondents' opinions clearly supported the claim that participatory learning and action research contributes to long-term environmental sustainability. According to the results, the majority of respondents felt that collective efforts in participatory monitoring and evaluation help improve the sustainability of projects (M=4.0269, S.D= 0.80829). Collective community mindsets may enhance oil and gas environmental sustainability, according to a large number of respondents (M=4.0914, S.D= 0.84292). One other thing that came out of the results was how many people agreed (M=3.9731, S.D=0.80829) that collective analysis gives people a cultural toolbox for seeing and fixing environmental problems. Based on most of the study participants, collective analysis in learning and action research aims to empower participants by amplifying their views and involving them in making changes to the oil and gas sector. An estimated mean of 3.85848 confirmed this to be accurate. Respondents' answers were quite consistent, with a standard deviation of 0.80230. Collective analysis unites communities in tackling oil and gas environmental challenges, according to a large number of respondents (M=3.9677, S.D=0.80474).

Participants' comprehension of the detrimental consequences of oil and gas development is influenced by participatory learning and action research, according to the analysis (M=4.0484, S.D= 0.8206). Additionally, it was determined that a considerable portion of the participants strongly agreed (M=3.9624, S.D= 0.82113) that PAR is a method for understanding and involving communities. A large majority of respondents agreed (M=3.9624, S.D=0.82769) that there is a negative correlation between environmental deterioration and the amount of information available on sustainable practices, which was another conclusion from the study. The results also showed that most people think it's crucial to learn about how to make oil and gas upstream projects environmentally sustainable and to share that information with

others. The mean estimated value of 4.0806 confirmed this. All of the respondents' answers were quite consistent, as shown by the standard deviation of 0.79113. Knowledge sharing improves oil and gas industry environmental sustainability, according to a large majority of respondents (M=3.9892, S.D=0.80532).

Researcher and community members engage in a collaborative and co-learning process (M=3.9892, S.D= 0.80532), as the majority of respondents agreed with. One effective strategy of participatory learning and action research is to refine common knowledge via collective learning, according to a large percentage of participants (M=4.0323, S.D= 0.83765). Collective learning has an effect on environmental sustainability in the oil and gas sector, according to a substantial majority of respondents (M=3.8763, S.D=0.79917). I should emphasize that most people who took part in the study believed that scientists aren't doing their jobs well nowadays when it comes to creating new knowledge for the public good in accordance with participatory learning and action research. This was validated by the projected mean of 4.0108. The standard deviation of the responses was just 0.77800, indicating that the respondents were quite consistent. Most respondents (38.2%, or 3.98925 on the scale) think that research and participatory action may help build resilient social-ecological change by encouraging individual learning and institutional adaptation (SD = 0.82478).

Competence evaluation is of increasing interest in enabling successful community engagement, as was proven by the study, with the majority of respondents strongly agreeing (M=3.8925, S.D= 0.82478). Competence in environmental sustainability may benefit communities in enhancing sustainable energy development, according to a large number of respondents (M=3.9355, S.D= 0.82928). The results also showed that many people thought that communities' active involvement may lead to better environmental sustainability (M=3.9624, S.D=0.82769). The results also showed that most people agree that maximizing training in competence is a great way for communities to learn and take action. The mean estimated value of 4.0000 confirmed this to be accurate. With a standard deviation of 0.83180, it was clear that the replies were quite consistent. Community competency training is seen by most survey takers to have significant impacts on the environment (M=3.9409, S.D=0.81985). Additionally, many people believed (M=4.0000, S.D=0.83180) that participant thoughts contribute to sustainability-related concerns, as seen in the results. The majority of respondents believe that novel approaches are necessary to address the current challenges in the oil and gas industry, according to the results. The fact that the average predicted value was 3.9892 validated its accuracy. There was a great deal of consistency in the replies, since the standard deviation was

just 0.81995. The great majority of poll takers (M=4.0269, S.D=0.84106) hold the view that participants work together to establish new standards of conduct. The case study of an upstream oil and gas project in Turkana County, Kenya, demonstrated the substantial impact of Participatory learning and action research on environmental sustainability.

The research employed bivariate correlation analysis to determine the relationship between participatory learning and action research and environmental sustainability. The two-tailed Pearson correlation (R) was employed to determine the relationship at a 95% confidence level. The findings are displayed in Table 2.

Table 2

Bivariate Correlation Analysis

		Participatory learning & action research	Environmental Sustainability
Participatory learning & action research	Pearson Correlation	1	.472**
	Sig. (2-tailed)		.000
	N	186	186
Environmental Sustainability	Pearson Correlation	.472**	1
	Sig. (2-tailed)	.000	
	N	186	186

**. Correlation is significant at the 0.01 level (2-tailed).

Table 2 reveals that the predictor variable (Participatory learning & action research) shown has a positive association with environmental sustainability at a significant level of 0.01 and hence included in the analysis.

Participatory learning & action research X1 = 0.472**

Table 3

Multiple Regression Variable Coefficients

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.896	.407		2.200	.029
	Participatory learning & action research	.791	.109	.472	7.264	.000

a. Dependent Variable: Environmental Sustainability

Environmental sustainability = 0.896 + 0.791 * Participatory learning & action research

The study determined that when Participatory Learning and Action Research is zero, Environmental Sustainability would be 0.896. The research determined that, while controlling for other variables, a one-unit increase in Participatory Learning and Action Research would result in a 0.791 unit increase in Environmental Sustainability. The findings indicated that Participatory Learning and Action Research significantly contributed to environmental sustainability in the oil and gas upstream project in Turkana County, Kenya.

Similarly, it was evident from the interview schedules that action research and participatory learning played a major role in making the oil and gas upstream project in Turkana County more environmentally sustainable. For example, according to one of the primary sources consulted,

> *Connecting the researchers with the people being studied is crucial in participatory learning and action research. It brings people together in a shared quest to improve communities through the acquisition of new knowledge.*

Consistent with what Asuquo and Etowa (2016) said, the goal of participatory research is to provide people a platform to share their perspectives and help shape the future of education. Incorporating components of involvement, rather than conducting research "on" or "about" the participants, highlights the larger role of educational research to impact human development.

One of the key informants also suggested that

> *Researchers' actions and omissions hinder their ability to comprehend the plight of the most disadvantaged members of rural communities, which in turn hinders the effectiveness of formal data-collection methods in developing nations for the purpose of planning rural development projects*.

The results of this study corroborate those of Hickey and Mohan (2014), who also discovered that PLA is a method for understanding and working with communities. It aims to support a process of communal analysis and learning by combining natural interviewing approaches with an ever-growing toolset of interactive and visual technologies. Projects and programs can be assessed, planned, monitored, and evaluated using this method. As useful as it is for consultation, it also offers an opportunity to go above and beyond by including communities in choices that have an impact on them.

6 SUMMARY

Participatory learning and action research significantly influenced environmental sustainability, as indicated by descriptive statistics, in the case study of the oil and gas upstream project in Turkana County, Kenya. The study posits that Participatory Action Research (PAR) empowers communities and stakeholders to tackle environmental issues arising from oil and gas activities. When children participate, their thoughts and proposals are more likely to be regarded with seriousness. Reports on an upstream oil and gas project in Turkana County, Kenya, indicated that environmental sustainability was significantly affected by action research and participatory learning. Participatory learning and action research, as stated in the study, aims to consolidate individuals by granting them a voice in the future development of the oil and gas business. The majority of respondents unequivocally concurred with the statement, as the mean exceeded 3.8 across all scenarios, accompanied by a standard deviation of merely 1.5. The bivariate correlation analysis of the oil and gas upstream project in Turkana County, Kenya, reveals a significant positive link between environmental sustainability and participatory learning and action research. Provided that other variables remain constant, the oil and gas upstream project case study in Turkana County, Kenya, will achieve greater environmental sustainability by integrating an additional unit of participatory learning and action research.

7 CONCLUSIONS

The study conducted in Turkana County, Kenya, looked at a gas and oil upstream project and discovered that participatory learning and action research affected environmental sustainability. To make people's ideas heard, the oil and gas business is using participatory research methods. One approach of understanding and participating in local communities is through the use of a P.L.A. model. The results show that research and participatory action can help make social-ecological transformation more sustainable by enhancing individual learning and institutional adaptability. The report asserts that in order for PAR to comprehend the unique environmental difficulties and consequences of oil and gas extraction at each site, it relies on local knowledge and experience. In the end, this could lead to better, more situationally appropriate solutions.

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