

East African Journal of Environment and Natural Resources

eajenr.eanso.org

Volume 5, Issue 2, 2022

Print ISSN: 2707-4234 | Online ISSN: 2707-4242

Title DOI: <https://doi.org/10.37284/2707-4242>

EANSO

EAST AFRICAN
NATURE &
SCIENCE
ORGANIZATION

Original Article

A Review of the Quality of Environmental and Social Impact Statements: The Case of Geothermal Energy Projects in Kenya

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Article DOI: <https://doi.org/10.37284/eajenr.5.2.1027>

Date Published: ABSTRACT

27 December 2022

Keywords:

Environmental and Social Impacts Statements, Quality Review, Geothermal Energy, Lee and Colley Review Package, Kenya.

Evaluation of the quality of Environmental and Social Impact Statements (ESISs) for proposed development action is vital in ascertaining their fitness in informing critical decisions on a proposed development action. In this paper, we present findings of an evaluation of the quality of fifteen (15) ESISs for the geothermal energy resource projects in Kenya in the period 1994-2019. The review which was based on the Lee and Colley Review Package (LCRP), involved a systematic evaluation of how well a number of assessment tasks were performed in four (4) review areas, 13 categories and 40 subcategories. Starting from the lowest level and moving systematically up the hierarchy, the review involved evaluating how well a number of assessment tasks were performed. The quality of each review subcategory within a particular category was assessed. The subcategory assessment results and the relevant impression gained from the ESIS were then used to assess the review category. The result of the assessment of the review category was used to assess each review area of the ESIS. The overall quality of the ESIS was derived from the outcome of the assessment of each of the review areas by considering the main strengths and weaknesses. Results showed seven percent (7%) of the ESISs were of excellent quality, 20% were good, 53% were acceptable, and 13% were of poor quality. Six percent (6%) were of excellent quality in three (3) review areas of identification & evaluation of key impacts, presentation of impact statement and description of the development and baseline conditions. Eighty percent (80%) were of good quality in the review area of the description of the development and baseline conditions, while 60% were of good quality in the review area of the presentation of the impact statement. Six per cent (6%) were of very poor quality

in the review area of the environmental and social management plan and follow-up. Inadequacies and gaps identified in subcategories that constitute consultation and public participation, impact identification and analysis of alternatives, and environmental and social management plans can be addressed by target training of Impact Assessment Practitioners (IAPs) and strengthening of legislation on public participation. This will contribute to improving the quality of future ESISs while supporting better-informed environmental and social decisions regarding proposed development actions.

APA CITATION

Omenge, P. M., Obwoyere, G. O., Eshiamwata, G. W., & Makindi, S. M. (2022). A Review of the Quality of Environmental and Social Impact Statements: The Case of Geothermal Energy Projects in Kenya. *East African Journal of Environment and Natural Resources*, 5(2), 144-163. <https://doi.org/10.37284/eajenr.5.2.1027>.

CHICAGO CITATION

Omenge, Philip M., Gilbert O. Obwoyere, George W. Eshiamwata and Stanley M. Makindi. 2022. "A Review of the Quality of Environmental and Social Impact Statements: The Case of Geothermal Energy Projects in Kenya". *East African Journal of Environment and Natural Resources* 5 (2), 144-163. <https://doi.org/10.37284/eajenr.5.2.1027>.

HARVARD CITATION

Omenge, P. M., Obwoyere, G. O., Eshiamwata, G. W., & Makindi, S. M. (2022) "A Review of the Quality of Environmental and Social Impact Statements: The Case of Geothermal Energy Projects in Kenya", *East African Journal of Environment and Natural Resources*, 5 (2), pp. 144-163. doi: 10.37284/eajenr.5.2.1027.

IEEE CITATION

P. M. Omenge, G. O. Obwoyere, G. W. Eshiamwata & S. M. Makindi. "A Review of the Quality of Environmental and Social Impact Statements: The Case of Geothermal Energy Projects in Kenya", *EAJENR*, vol. 5, no. 2, pp. 144-163, Dec. 2022.

MLA CITATION

Omenge, Philip M., Gilbert O. Obwoyere, George W. Eshiamwata & Stanley M. Makindi. "A Review of the Quality of Environmental and Social Impact Statements: The Case of Geothermal Energy Projects in Kenya". *East African Journal of Environment and Natural Resources*, Vol. 5, no. 2, Dec 2022, pp. 144-163, doi:10.37284/eajenr.5.2.1027.

INTRODUCTION

About five decades have elapsed since the emergency, gradual rollout, and progressive global adoption of Environmental Impact Assessment (EIA) systems now in all countries and jurisdictions (Yang, 2019). Gradual integration and strengthening of social assessment in EIA procedures have resulted in the emergency of Environmental and Social Impact Assessment (ESIA) (Cloquell-Ballester et al., 2006; Corsi et al., 2015; Dendena & Corsi, 2015; Momtaz & Kabir, 2013; Ortiz et al., 2018). ESIA is increasingly being accepted as a useful tool for identifying and evaluating the effects of a wide range of activities (Ortiz et al., 2018). ESIA therefore is a vital tool that provides for the integration and evaluation of environmental and social concerns of the proposed

development (Dendena & Corsi 2015; Muse 2016). Environmental and Social Impact Assessment effectiveness depends on how well its microsystems work (Byambaa & Vries, 2019). ESIA microsystem covers specific process elements whose applications individually and collectively contribute to the system's effectiveness (Glucker et al., 2013). The ESIA process should provide for screening, scoping, stakeholder and public participation, examination of alternatives, impact prediction, identification and mitigation, preparation of an environmental and social management plan, decision making and follow-up (Slootweg et al., 2001; Glasson et al., 2012).

The outcome of an ESIA process for a proposed development action is documented in an Environmental and Social Impact Assessment

Statement (ESIS) (Omeng, 2022). The quality of ESIS is critical as the ESIS informs decision-making (Choji et al., 2022). Whereas ESIA practice is acknowledged globally, poor quality ESISs continue to be reported in developing countries (Ahmad & Wood, 2002; Saif et al., 2015; Choji et al., 2022). Among the documented common contributors to poor quality of impact statements include weak impact identification, poor impact analysis, poor synthesis of mitigation measures, organisational resources constraints, lack of experience and relevant information on international best practices (Omeng et al., 2019; Bishong & Mvile, 2022; Omeng et al., 2022; Choji et al., 2022). Other contributing factors include inadequate baseline data, lack of experienced ESIA practitioners (Kamijo & Huang, 2016), inadequate time to carry out ESIA (Chanthy & Grünbühel, 2015), limited published research on ESIA (Kamijo & Huang, 2016) and lack of independence of ESIA practitioners from project developers (Kamijo & Huang, 2016).

The quality of ESISs depicts how well each ESIA process step (Omeng et al., 2020) is conducted and documented (Choji et al., 2022). Effective enforcement of mitigation measures by regulatory authorities to achieve maximum compliance by project proponents is partly dependent on the quality of ESISs of projects being implemented (Caro & Toro, 2016). A review of the quality of ESISs encompasses the assessment of processes, methods, and documents (Lawrence, 1997). Quality aspects such as procedures, institutional arrangements, methods, and outcomes are critically analysed during the quality review of impact statements (Tang et al., 2009). Whereas it is observed that the overall quality of ESISs improves over time (Jalava et al., 2010), it is in mature Impact Assessment (IA) systems that impact assessments make a difference in development (Jay et al., 2007). Impact Assessment practice can be strengthened partly by implementing recommendations informed

by gaps and weaknesses identified from the review and critical analysis of ESISs (Choji et al., 2022).

Statement of the Problem

The product of an ESIA process for every proposed development project is an ESIS. This document is one among the many official documents that are useful in informing an environmental decision for a proposed project. An informed decision on a proposed project is one that ensures environmental and social considerations are adequately considered and factored in during licencing. An ESIS that is useful in informing decisions should be comprehensive, balanced and of good quality. Informed decisions made out of a good quality ESIS eliminate potential conflicts that could otherwise delay the execution of a project. All geothermal energy resource development projects in Kenya are by law, subject to the ESIA process prior to implementation. As Kenya remains focused on her trajectory of developing the country's geothermal energy resources potential, it is important that an evaluation of the quality of ESIS for geothermal energy projects be carried out from time to time not only to document gains made but most important to aid in identifying gaps and areas of weaknesses for timely action to avoid potential setbacks.

METHODOLOGY

Study Area

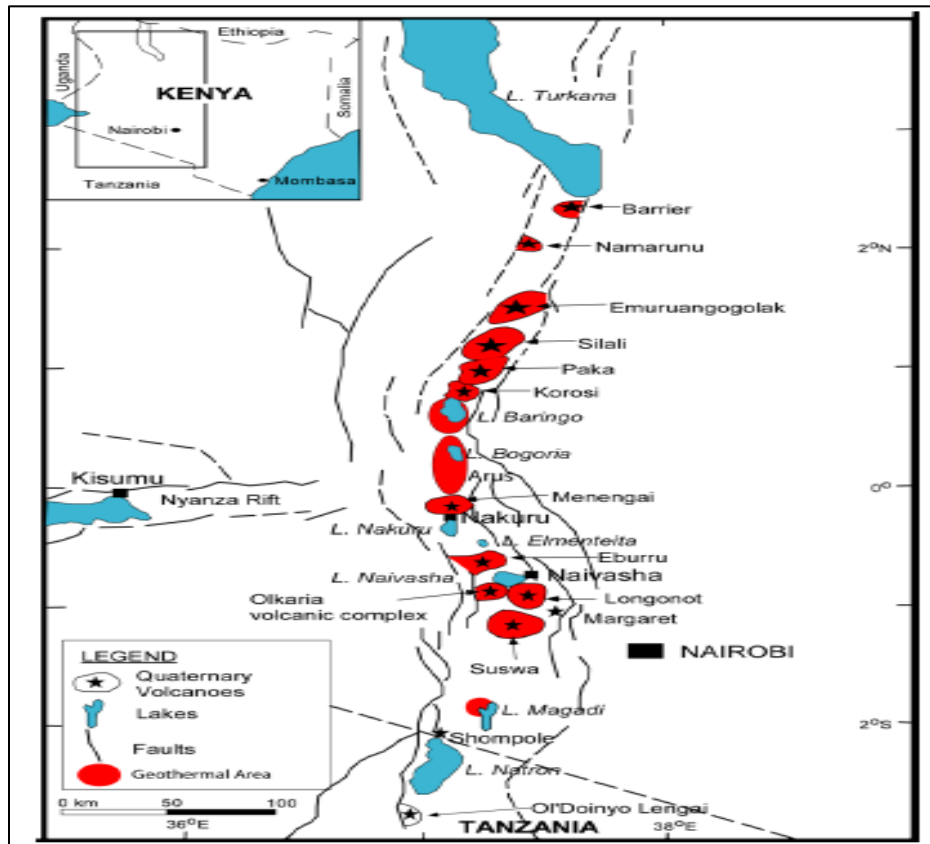
This study involved an evaluation of the quality of Environmental and Social Impact Statements (ESISs) for the geothermal energy sub-sector in Kenya. ESISs reviewed were those of geothermal energy projects located at the Great Rift Valley in Kenya at Olkaria, Menengai, Silali and Suswa. Kenya's geothermal resources are hosted within volcanic centres, which are located along the axis of the Kenyan Rift Valley (Mangi, 2017). The geothermal resources are thus located in the Rift Valley region (Mangi, 2018) which is environmentally and culturally sensitive (Marriita, 2002). The Olkaria volcanic complex is the main

geothermal area in Kenya (Omenda et al., 2020), it lies on the axis of the rift but with a bias towards the Mau escarpment (Mangi, 2016). Olkaria geothermal field is located approximately 120 km west of Nairobi, in Naivasha Sub-County, Nakuru County (Koissaba, 2017). Part of the concession area lies within Hell’s Gate National Park (HGNP) (Barasa, 2016).

The Olkaria geothermal fields are located within and adjacent to natural and manmade sensitive ecosystems such as; HGNP, Lake Naivasha, flourishing large-scale flower farms (Barasa, 2016; Marriita, 2002), Akiira geothermal field, which is

surrounded by the Suswa and Longonot volcanoes located approximately 10 km south of the Olkaria IV, and Domes geothermal field (Mangi, 2017). Menengai geothermal field, which is a quaternary caldera volcano within the axis of the central segment of the rift (Mangi, 2016), is located near Nakuru town, about 160 km from Nairobi (Omenda et al., 2020). Menengai’s west geothermal field falls on the western side of the Menengai caldera floor. It extends around Boita, Menengai Station, Ngata Farm and Kabarak Estate (Muse, 2016). The location of geothermal projects whose ESIS were evaluated is shown in *Figure 1*.

Figure 1: Geothermal energy resources locations in Kenya



(Source: Omenda & Mangi, 2016)

Study Design and Sampling Procedure

A descriptive research design was adopted whereby characteristics of the study phenomenon were

described with the narration of facts (Kothari, 2004). This research design used descriptive statements to seek answers to the research questions

(Kumar, 2011). The data collection method used was an examination of ESIS for geothermal energy projects carried out in the period 1994-2019 and their content analysed.

Data Collection Procedure

Instruments used to collect and record relevant data were tally sheets and collation templates. Tally sheets were used to record the review findings of each ESIS reviewed in terms of reviewed subcategory, category, and area. A collation template was used to collate data from the tally sheets. Fifteen (15) ESISs for geothermal energy projects were reviewed based on the Lee and Colley Review Package (LCRP) as per Lee et al. (1999). The review covered 40 subcategories, 13 categories, four (4) areas and overall report quality. The 40 subcategories were collapsed into four clusters, namely project description and baseline information, impact identification and analysis of alternatives, consultation and public participation (CPP) and Environmental and Social Management Plan (ESMP) and communication of findings. The study preferred LCRP because it was based on international best practices besides its wide use as a quality review tool for ESIA reports (Anifowose et

al., 2016; Aung et al., 2018; Gwimbi & Nhamo, 2016; Kabir & Momtaz, 2014; Kamijo & Huang 2016; Mounir 2015).

The LCRP criterion consisted of multiple criteria hierarchically structured in review areas, categories, and subcategories (Lee et al., 1999). The lowest level was subcategories, second in the hierarchy from the bottom review categories, followed by review areas and overall report grade at the top of the hierarchy. Starting from the lowest level and moving systematically up the hierarchy, the review involved evaluating how well a number of assessment tasks were performed. The quality of each review subcategory within a particular category was assessed. The subcategory assessment results and the relevant impression gained from the ESIS was then used to assess the review category. The result of the assessment of the review category was used to assess each review area of the ESIS. The overall quality of the ESIS was derived from the outcome of the assessment of each of the review areas by considering the main strengths and weaknesses. Based on the quality of information presented in each of the four areas, assessment grades were assigned to each ESIS as defined in *Table 1*.

Table 1: Quality review assessment grades

Grade	Definition	Explanation
A	Excellent	Relevant tasks well performed; no important tasks left incomplete
B	Good	Generally satisfactory and complete, with only minor omissions and inadequacies
C	Acceptable	Considered just satisfactory despite omissions and or inadequacies
D	Poor	Parts attempted but as a whole considered just unsatisfactory because of omissions and inadequacies
E	Very poor	Not satisfactory, significant omissions and inadequacies
F	Unsatisfactory	Very unsatisfactory, important tasks poorly done or not attempted

Source Lee et al., 1999

Data Collection Instruments

Data collection instruments used were collation sheets and tally sheets. Collations sheets were used to record review findings, while tally sheets were

used to tally data from the collation sheets of each ESIS reviewed.

Data Analysis

Data collected was analysed with the help of Microsoft Excel using descriptive statistics. Pie charts were derived to show the contribution of each quality review assessment grade obtained to the overall assessment grade for all the ESIS reviewed. Clustered columns were derived from comparing the contribution of each review area to the overall assessment grade of the review areas. Stacked column charts were derived by comparing the contributions of each ESIS to subcategory and category assessment grades.

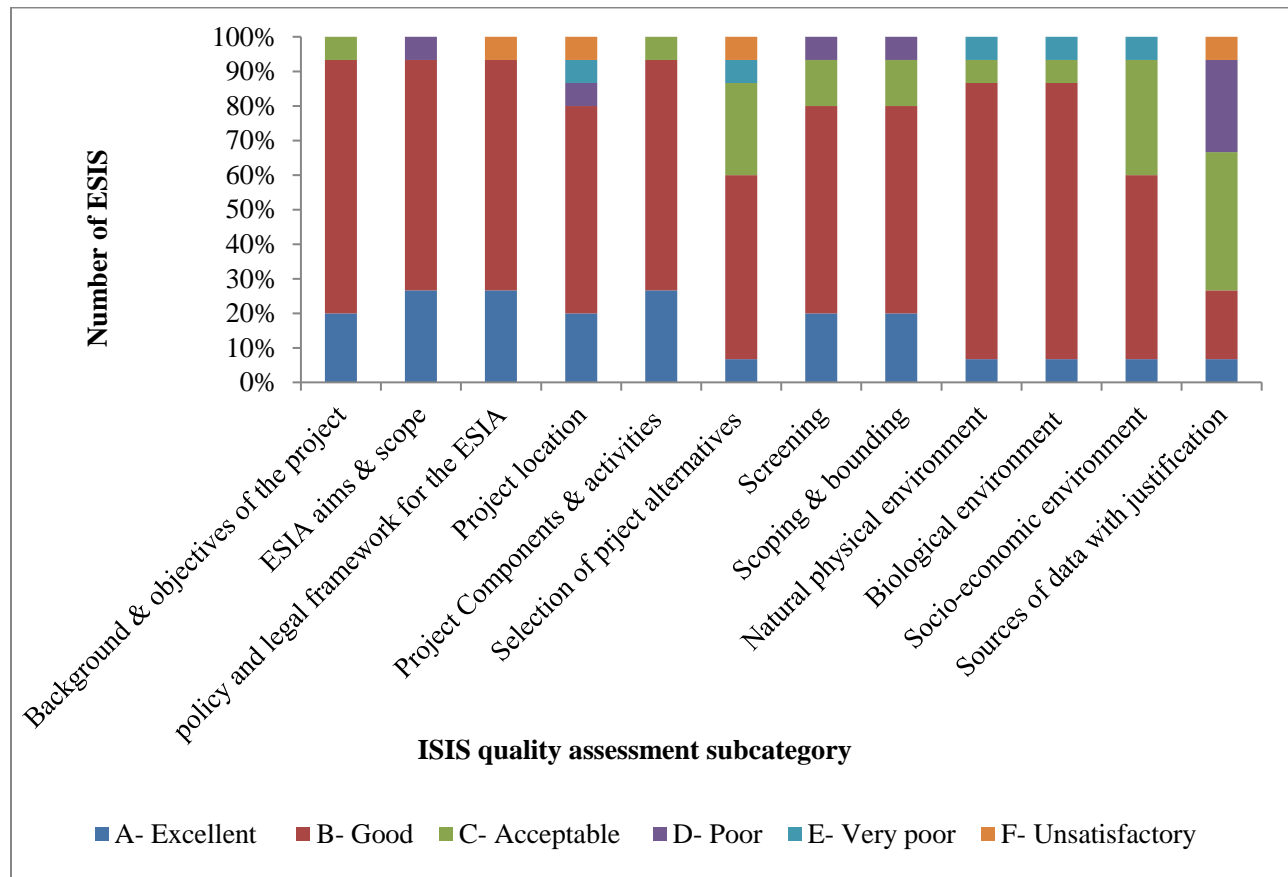
RESULTS

Subcategory Quality Review

Sub-Categories Falling Under Project Description and Baseline Information

The quality of 1-4 ESISs (6-26%) was excellent. That of 3-11 (20-73%) ESISs in all the said subcategories were good, while the quality of 1-6 ESISs (6-40%) in ten of the thirteen subcategories was acceptable. The quality of one ESIS (6%) was poor in four of the thirteen subcategories, very poor in six of the subcategories and unsatisfactory in four of the subcategories. Four of the fifteen ESISs (26%) were of poor quality in the subcategory source of data with justification. *Figure 2* compares the quality of the ESISs in thirteen subcategories falling under project description and baseline information.

Figure 2: Comparison of subcategories of project description and baseline information

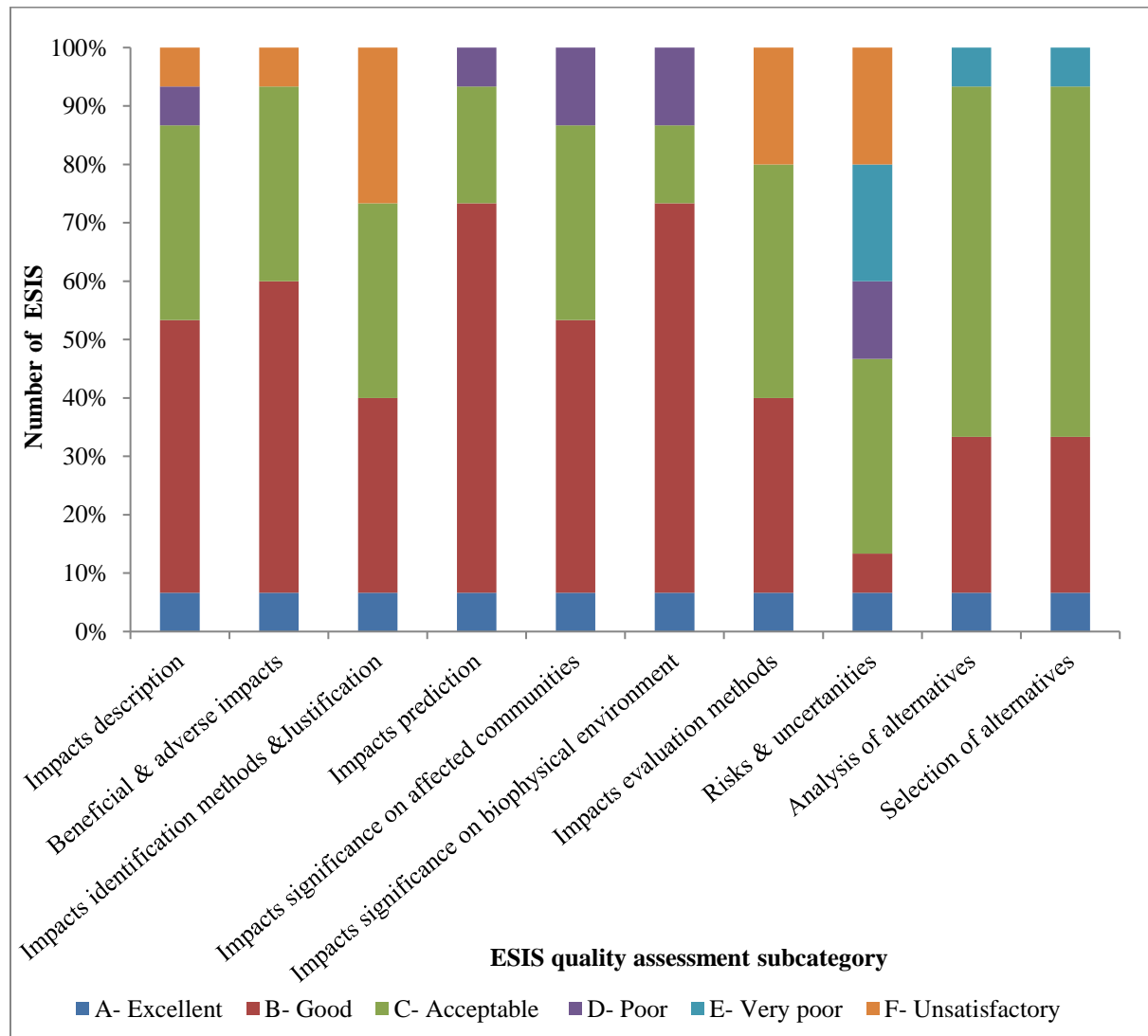


Sub-Categories Falling Under Impact Identification and Analysis of Alternatives

Under the subcategories of impact identification and analysis of alternatives, the quality of one report (6%) was excellent, 2-9 reports (13-60%) acceptable, 1-2 reports (6-13%) poor, 1-3 reports (6-20%) very poor and 1-4 reports (6-26%) unsatisfactory. Three subcategories namely impact

identification methods and justification impact evaluation methods, and risks and uncertainties had the highest percentage of reports (20-26%) whose quality was unsatisfactory. *Figure 3* compares the quality of ESIS for geothermal energy projects in the ten subcategories falling under impact identification and analysis of alternatives.

Figure 3: Comparison of subcategories of impact identification and analysis of alternatives



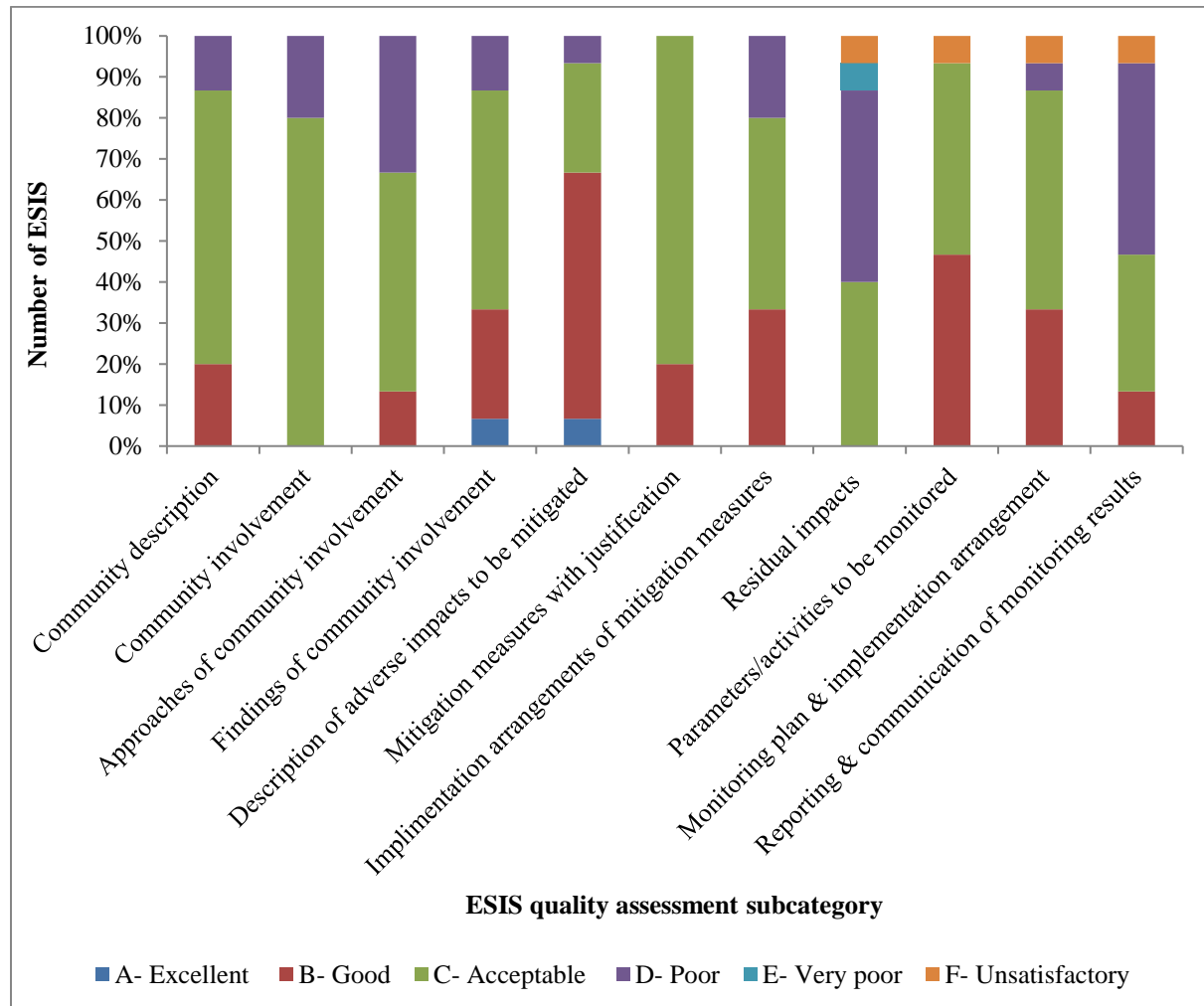
Subcategories Falling Under CPP and ESMP

The quality of one report (6%) was excellent in two of the eleven subcategories. That of 2-9 (13-60%)

was good in nine subcategories, while that of 4-12 (33-80%) was acceptable in eleven subcategories, 2-7 (13-46%) poor in nine subcategories, and, 1

(6%) very poor in one subcategory, and unsatisfactory in three subcategories (Figure 4).

Figure 4: Comparison of subcategories of CPP and ESMP

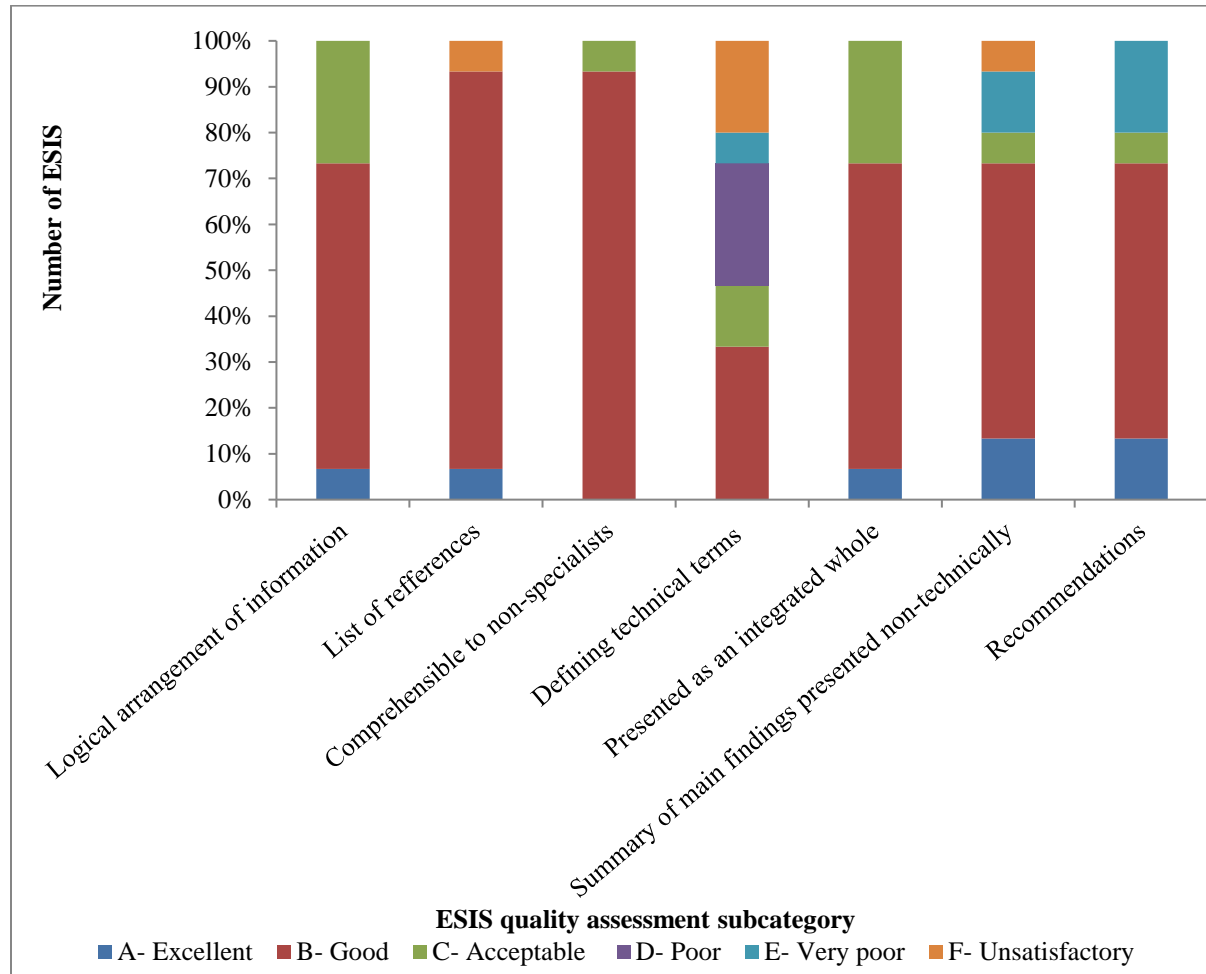


Sub-Categories Falling Under Communication of Findings

The quality of 2-3 (6-13%) of the ESIS was excellent in five of the seven subcategories, 5-14

(33-93%) good in seven subcategories and 1-4 (6-26%) acceptable in six subcategories. Of 4 (26%) were poor in one subcategory, 1-3 (6-20%) very poor and unsatisfied in three subcategories (Figure 5).

Figure 5: Comparisons of subcategories of communication of findings of ESIA

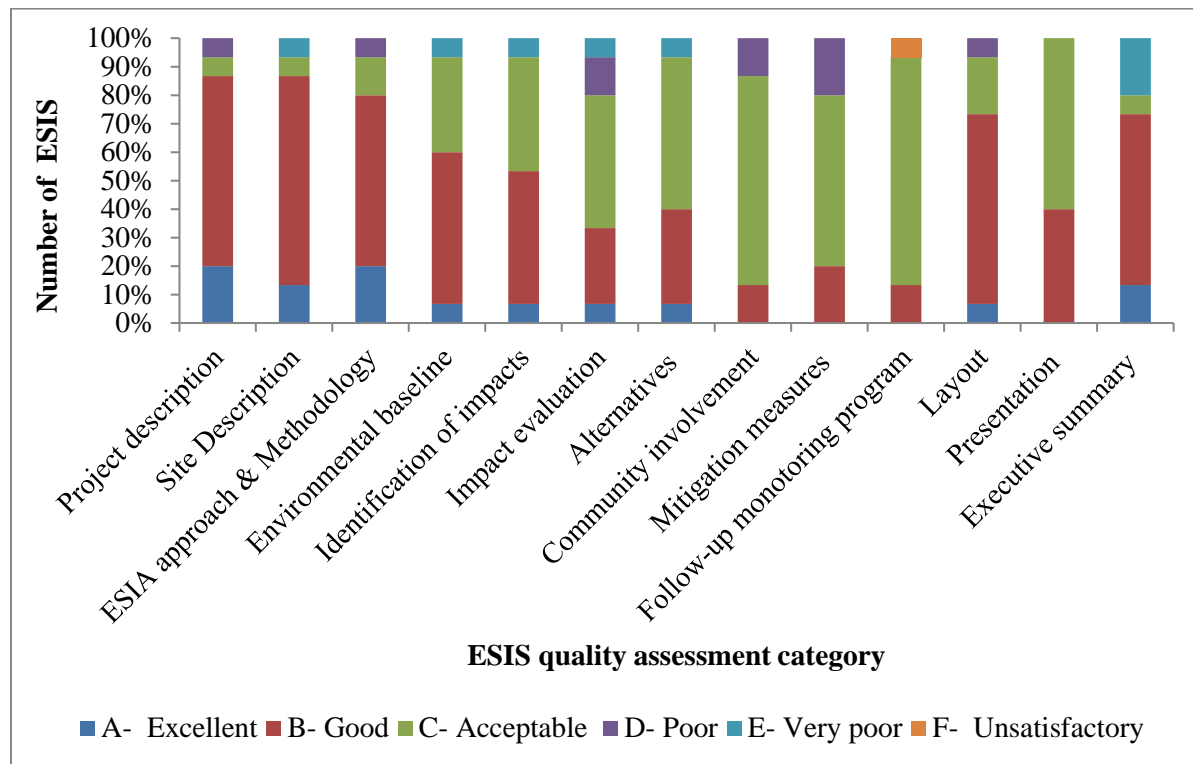


Category Quality Review

The quality of 1-3 (6-20%) of the ESIS reviewed was excellent in nine (9) of the assessment categories and poor and very poor in six (6) of the assessment categories. The quality of only one (1) ESIA report (6%) was unsatisfactory (very unsatisfactory, important tasks poorly done or not

attempted) in only one (1) assessment category. The quality of 2-11 (13-73%) of the ESIS reviewed was good in all the assessment categories, while that of 1-11 (6-73%) of the reports reviewed was acceptable in all the assessment categories. *Figure 6* shows a detailed ESIS quality comparison across all 13 assessment categories.

Figure 6: Comparisons of the thirteen categories assessed

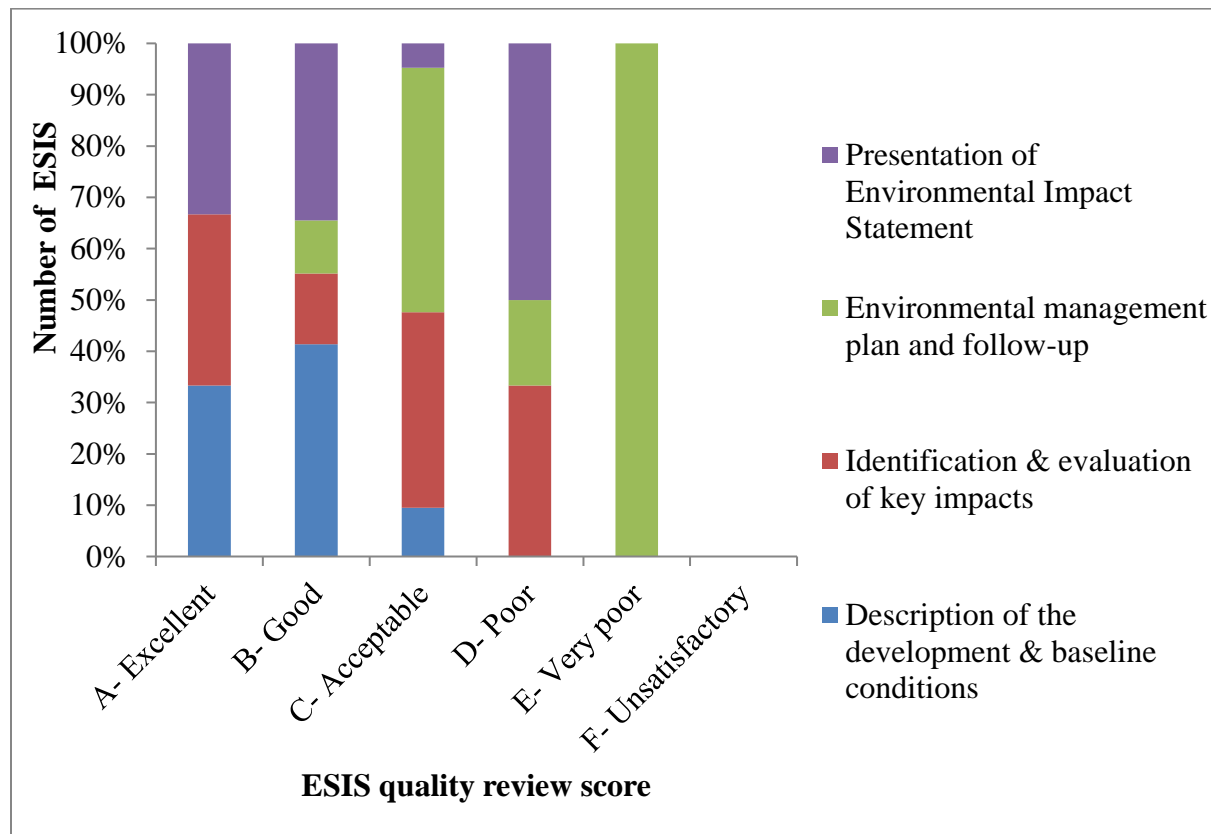


Review Area Quality

Eighty per cent (12) and 66% (10) of the ESIS were of good quality in two (2) review areas of the description of the development and baseline conditions and presentation of the environmental impact statement, respectively. The quality of one (6%) ESIS was excellent in three review areas of

identification and evaluation of key impacts, presentation of environmental impact assessment statement and description of the development and baseline conditions. Likewise, the quality of one (6%) ESIS was very poor in one review area of environmental management plan and follow-up. *Figure 7* is a graphical presentation of the findings of the four review areas.

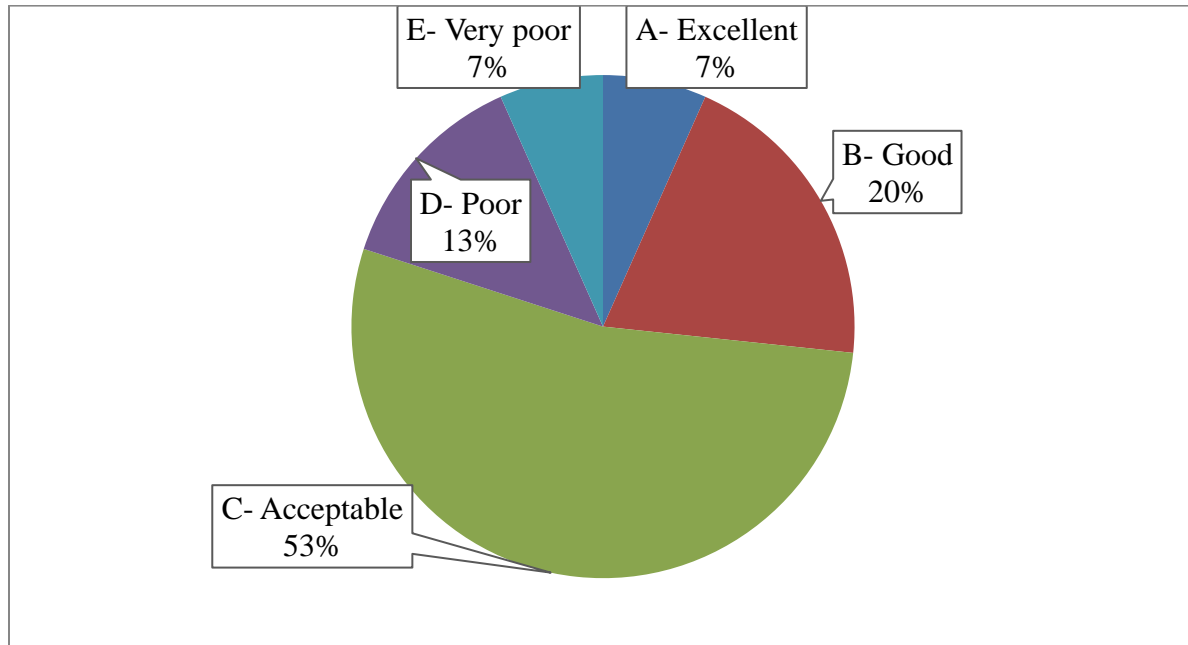
Figure 7: Comparison of quality in the four areas of ESIS



Overall Quality

Overall, a marginal seven percent (7%) of the ESISs reviewed were of excellent quality with relevant tasks well performed, and no important task left incomplete. However, the overall quality of relatively few of ESISs (20%) was good, where the statements were generally satisfactory and complete with only minor omissions and inadequacies. The

overall quality of most of the statements (53%) was acceptable, indicating satisfaction despite omissions and inadequacies. The overall quality of a minimal percentage of the ESISs (13%) were poor meaning that parts of the statements were well attempted but overall, considered unsatisfactory because of omissions and inadequacies. *Figure 8* presents the percentage distribution of the overall quality of the ESISs.

Figure 8: Overall quality of ESIS reviewed

DISCUSSION

Review Category and Subcategory Quality

Discourse in most literature on the quality of ESISs is limited to overall performance and review areas (Peterson, 2010; Chanthy & Grünbühel, 2015; Mounir, 2015; Kamijo & Huang, 2016; Aung et al., 2018; Choji et al., 2022). This study however, went a step further to analysis and discussed review results and performance at category and subcategory levels. Comparatively, the categories of description of the project, study site and methodologies, layout presentation and executive summary were of better quality than those of identification and impact evaluation, community involvement and impact mitigation. Worst performing subcategories were residual impacts prediction (D+E+F= 60%), reporting and communication of monitoring results (D+E+F=53%), evaluation of risk and uncertainties (D+E+F=53%), approaches of community involvement (D+E+F=33%), and impacts identification methods and justification (D+E+F=26%).

Quality of Review Areas

There were variations in the quality of the ESIS in each of the four areas reviewed. Overall, area one (1) had the best quality followed by area four (4). The lowest quality was recorded in Review Area 3, followed by Review Area 2. The findings are in line with those of Choji et al. (2022), who in the evaluation of the quality of impact statement reports in the mobile telecommunication infrastructure sector, found that the quality of the impact statement was generally satisfactory in only two Review Areas specifically project description and communication of results (Choji et al., 2022, p. 1). These findings also mirrored those of Sandham et al. (2020) who evaluated a sample of 24 ESISs of projects in South African National Parks and documented the best quality in Review Area 4, Review Area 1, and Review Area 3, respectively. The findings also concurred with those of Mounir (2015, p. 92), who also concluded that area 1 and area 4 are better performed than area 2 and area 3. These findings are also similar to those of Kamijo and Huang (2016, p. 146), who conclude that area 1-description of the project and environment, is

better performed compared to area 2- identification and evaluation of key impacts and area 4- communication of results/ presentation of Environmental Impact Statement (EIS). The findings, however, slightly differed from those of Chanthy and Grünbühel (2015, p. 227), who concluded that the ESIA reports were inadequate with omissions noted in the executive summaries (area 4) and economic assessment chapters (area 2).

ESISs Overall Quality

ESIAs were conducted and ESISs prepared for proposed development actions in the geothermal energy sub-sector in Kenya prior to mandatory legal requirements were put in place in the country. The quality of ESISs prepared for proposed development projects in this sub-sector has evolved over time (Barasa, 2015). Considering the overall quality of the sample of 15 ESIS reviewed, a significant majority (80%) were of acceptable quality (A-C) this being excellent, good, and acceptable distributed as follows; 7%, 20% and 53%, respectively. This is a high score in overall quality compared to previous studies elsewhere, such as Choji et al. (2022), Aung et al. (2018), Kamijo and Huang (2016), Chanthy and Grünbühel (2015), Mounir (2015). The results concurrence with that of Sandham et al. (2020) but differ from that of Malepe et al. (2022). Choji et al. (2022, p. 10) reviewed a sample of 80 EISs for the mobile telecommunication infrastructure sector in Nigeria, and the overall quality of 73% of the EISs was grossly unsatisfactory. Aung et al. (2018, p. 6) reviewed a sample of 10 Chinese EISs produced in the natural resources sector between 2010 and 2017, 33% of the EISs sampled were of satisfactory quality, 40% were unsatisfactory and 27% were borderline.

Chanthy and Grünbühel (2015, p. 227) reviewed a sample of 39 ESIS for development projects in Cambodia prepared in the period 2007-2011; 69% of the statements' overall quality was satisfactory, Mounir (2015, p. 92) reviewed a sample of 15 ESIS

in the water, and industry sectors in Niger Republic, 60% of the overall quality was satisfactory (A-C) while that of 40% was unsatisfactory (D & E). Kamijo and Huang (2016, p. 146) reviewed a sample of 120 JICA EIARs prepared in the period 2001- 2012; the overall quality of 35% of the statements was satisfactory (A-C), the most common grade was D, followed by C & then B. Peterson (2010, p. 175) reviewed a sample of 50 ESIS in Estonia prepared in the period 2001–2005; the overall quality of the sample ESISs was satisfactory, 68% of the sample ESISs were graded positively (A+B+C), and 32% negatively (D+E). Sandham et al. (2020, p. 4) reviewed a sample of 24 ESISs for South African National Parks; 92% of the statements were graded as satisfactory (A-C), while 8% of the statements were graded as just unsatisfactory (D). Malepe et al. (2022, p. 384) reviewed ESISs for tourism developments in Kruger to Canyons Biosphere Reserves; overall, the quality of all the ESISs was satisfactory.

Inadequacies and Identified Gaps

Significant gaps were identified in subcategories that constitute consultation and public participation, impact identification and analysis of alternatives and environmental and social management plan. The finding corresponds with that of Peterson (2010, p. 175), who identified most gaps in three categories of the impact assessment statements notably: project description, mitigation measures and consideration of alternatives. There were gaps in the description of potentially affected communities, approaches to community involvement, and details of involvement. Information on residual or unmitigated impacts was scanty and, in some cases, lacked completely. In scenarios where residue impacts were identified, justification for why they should not be mitigated is lacking. Whereas methods used to identify impacts were stated, their justification was lacking. The description of impacts was adequately done except for the lack of information on interactions between

identified impacts as well as the snowball effect of one impact leading to another impact.

Inadequacies in impact description were also noted in the lack of definitions for qualitative descriptions used such as significant, insignificant, and minimum. Whereas impact significance on affected communities was assessed, there was no clear distinction between the significance and magnitude. Description of the significance of residual impacts remaining after implementation of proposed mitigation measures lacking. There was a clear lack of justification for standards, assumptions and values systems used to assess impact significance. Alternatives considerations were well attempted, but there were gaps in the discussions around environmental and social advantages and disadvantages of the alternative and justification of the preferred alternative. In as much as proposed mitigation measures were well documented, conversely, gaps as to what extent the mitigation measures were to be effective when implemented were evident. Whereas a monitoring plan was outlined, there were gaps in the determination of the effectiveness of the monitoring in relation to projected impacts. Conspicuously missing in most of the ESISs was a communication plan on the disclosure of the progress of implementation of the monitoring plan and the monitoring results. These findings concur with those of Malepe et al. (2022), who indicated that there were inadequacies in the ESISs reviewed in certain review areas, such as public participation, mitigation measures, monitoring and non-technical summaries respectively.

Relative Importance of Review Areas and Subcategories

The quality of ESIS is a major dimension of an effective ESIA system (Kamijo & Huang 2016, p. 143). An ESIS for a proposed development action is vital in guiding decision-makers to arrive at an informed decision. Whereas the overall quality of the ESIS is important, the significance of each

review area and subcategory is not the same when informing decisions on a proposed development action (Omenga et al., 2022; Veronez & Montaña, 2018). A decision based on ESIS can have a significant implication for a people's way of life, the existence of communities, and social, built, and natural environment systems beyond the catchment of a proposed development. This is tenable when findings in the ESIS and its review are the main determinant of a decision on a proposed development action (Omenga et al., 2022).

In light of the importance of ESIS in decision-making, the ESIA process should be based on impact assessment methodologies with thorough structures and implementation to ensure accurate assessment results (Caro & Toro 2016). Areas 2 & 3 of an ESIS are considered more important than areas 1 & 4 (Veronez & Montaña 2018, p. 4) as impact prediction and evaluation are at the heart of impact. These two areas (2 & 3) are more complex as they not only incorporate the study of the environment but also impact prediction based on scientific data combined with the expertise and experience of the consulting team preparing the ESIS (Glasson et al., 2012). Identification of probable impacts worthy of study should be aided by the scoping process (Ortolano & Shepherd, 1995, p. 7), manuals, computer programs (Fedra et al., 1991) and professional judgement based on the experience of the Practitioner. Impact prediction should be based on reliable, robust predictive models (Glasson et al., 1999; Steinemann, 2001), checklists and matrices (Muse, 2016, p. 3). Matrices such as Leopold Matrix (LM) and Lohani and Thanh impact evaluation and analysis methods combined with baseline data and professional judgement can be vital in predicting cumulative impacts for proposed development actions (Muse, 2016).

Evaluation of the predicted impacts perhaps is the most difficult aspect of impact assessment (Ortolano & Shepherd, 1995, p. 8) as it is a complex and subjective process. In some instances,

algorithms which combine predictions and the subjective values of affected parties have been used (Ortolano & Shepherd, 1995, p. 8). Therefore, the ESIS should not only state the methods used for impact identification but also the justification of its use. The use of appropriate methodologies will ensure a comprehensive evaluation of the significance of impacts on the affected community and biophysical environment. Determination and analysis of alternatives are important if the ESIA process has to remain a relevant creative problem-solving process (Kamijo & Huang, 2016). A Project Alternative (project option) is another combination of the project's costs, schedules, resources, and risks that allow for achieving the same results as compared to the project baseline. It is one or more ways to produce the project and address its needs while using the same resource base yet operating in a new way and facing new working conditions.

Discussion of alternatives is the heart of the environmental impact statement (Kamijo & Huang, 2016, p. 150). A thorough consideration of alternatives thus is supposed to begin early in the project planning phase before decisions on the scale, type of development and project location are decided (Glasson et al., 2012). The involvement of the community is an important step in the ESIA process (Machaka, 2020, p. 2). It is part of the compulsory stakeholder and public participation process (Ortolano & Shepherd, 1995, p. 19). The participation of the community in the ESIA process is very rigorous as it is to be sustained throughout and in all stages of the process, including the decision-making stage (Omeng'et al., 2019, p. 137). This is because public participation during the scoping ensures the inclusion of potential impacts that are of greater concern to all stakeholders (Mora-Barrantes et al., 2018, p. 434). It adds value to developments and minimises potential delays brought about by misunderstandings and opposition from communities and civil society groups (Barasa, 2015). Well-planned and executed comprehensive and transparent public participation during the

ESIA process is vital in contributing to a more comprehensive and balanced ESIS for an informed decision (Omeng'et al., 2019). The higher the number of public involvements during the ESIA process, the better the quality of ESIS (Peterson, 2010).

Weighty stakeholder issues and concerns, including potential conflicts from a proposed development action, are identifiable during the public participation process (Omeng'et al., 2020). In scenarios where community involvement was costly in terms of financial, time and human resources, their inputs during public participation substantially contributed to a better ESIS and better-informed decision for proposed development action. Environmental and Social Management Plan (ESMP) is a vital component of an ESIS. The ESMP outlines scientifically underpinned, logically reasoned, and stakeholder-supported measures to mitigate identified potential negative impacts of proposed development action. It also includes a monitoring schedule complete with measurable indicators (Chanthy & Grünbühel 2015, p. 230), responsible persons, timeframe, and resources for its implementation (Gupta et al., 2005). Additionally, it outlines a communication plan that indicates how the progress of its implementation will be disclosed. The ESMP is thus complex as it draws expertise from various disciplines to ensure accuracy and completeness.

CONCLUSION AND RECOMMENDATIONS

Conclusion

The study analysed the quality of a sample of 15 ESISs compiled from the ESIA process for geothermal energy sub-sector projects in Kenya using LCRP. It established the overall quality of ESIS to be satisfactory, with minor omissions and inadequacies. We therefore conclude that the impressive overall quality of the ESIS can possibly be attributed to two factors notably; (i) the period the geothermal energy sub-sector has been

subjecting proposed projects to the ESIA process relative to when impact assessment requirement was legislated in the country, and (ii) mainstreaming of World Bank (WB) Safeguards, Environment and Social Policies Environmental Assessment (EA) policy, Operational Directive (OD) 4.00 in the sub-sectors ESIA process. The sub-sector has a history of over 26 years of impact assessment for its projects, as the Environmental Management and Coordination Act (EMCA) 1999 was enacted in Kenya in 1999. However, actual assessments began in the year 2003, when the Environmental Impact Assessment and Audit Regulations were gazetted. This translates to about a 9-year period of head-start for the sub-sector. ESIA process for the sub-sector has thus evolved over time which has contributed to the improvement of the overall quality of ESISs prepared.

Geothermal energy development is capital intensive, and most of the projects are thus funded by WB and other multilateral funding agencies. We thus conclude that by implementing WB environmental assessment procedures, the sub-sector has significantly benefitted from the Bank's elaborate environmental assessment procedures including a thorough review process that has over time, yielded high-quality ESISs. Whereas the overall ESIS quality was generally good, omissions and inadequacies were noted in subcategories considered more important and weightier in informing environmental and social decisions. Additional measures are thus needed to address the omissions and inadequacies while ensuring that the gains made in well-performing, less important subcategories are not compromised.

Recommendations

In order to bridge identified gaps and inadequacies in the ESISs, targeted training of ESIA practitioners is to be carried out continuously. The Environment Institute of Kenya in collaboration with the National Environment Management Authority (NEMA), should design a professional development guide to

address the training needs of the practitioners. The training should focus on public participation, impact identification, analysis of alternatives, and environmental and social management plan. Further, to strengthen public participation, stand-alone regulations on public participation during ESIA, which are anchored in international best practices, should be legislated.

ACKNOWLEDGEMENT

The authors thank NEMA and the Ministry of Energy and Petroleum in Kenya for facilitating access to ESISs for geothermal energy projects in the country.

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