

Building Resilience Through Community-Based Approaches: A Systematic Review of Climate Adaptation Strategies

ABSTRACT

Aims: This study aims to examine the impact of Community-Based Approach (CBA) and community's Knowledge, Attitudes, and Practices (KAP) techniques in enhancing climate change adaptation and resilience among local communities.

Study design: This is a systematic review of ten research journal articles analyzing the role of CBA and KAP in climate change adaptation across various geographical locations.

Place and Duration of Study: The review includes studies conducted in diverse regions globally, published between 2010 and 2020.

Methodology: The research involved a critical evaluation of each selected study's objectives, approaches, outcomes, and significance, with a particular focus on the involvement of local stakeholders in the adaptation process. Data was collected from ten journal articles that addressed climate change adaptation through CBA and KAP methods. The analysis focused on how these methods mobilize stakeholders and implement participatory adaptation strategies.

Results: The studies reviewed indicate that CBA and KAP approaches lead to improved community resilience in several ways: enhanced hurricane readiness, significant development of climate-resilient agriculture, and effective human-wildlife conflict resolution. These approaches ensure the adaptation strategies implemented are culturally relevant and widely supported by the target communities. Additionally, the review supports proactive community engagement in adaptation planning, sustained financing for local initiatives, and continuous involvement of communities in local projects.

Conclusion: The findings suggest that CBA and KAP methods are effective in enhancing community resilience to climate change. These approaches facilitate the implementation of culturally relevant adaptation strategies that garner broader community support. Future studies should explore the long-term impacts of these methods, their scalability, and the role of technology in supporting community-based adaptations. This systematic review is valuable for policymakers, practitioners, and researchers focusing on strategic advancements towards climate resilience.

Keywords: Community-Based Approaches, Climate Adaptation, Resilience, Community Knowledge, Attitude, and Practice (KAP), Participatory Planning, Sustainable Adaptation

1. INTRODUCTION

Global warming is among the biggest issues of the modern world, which affects the Earth and its inhabitants, ecological systems, as well as the socio-economic structures (IPCC, 2021). In recent years, the occurrences and intensity of climate-altered disasters, including hurricanes, floods, and droughts, have escalated, which requires practical stochastic adaptation measures to minimize the risks and develop sustainable societies (United

Nations, 2019). Existing top-down versions of climate adaptation interventions have been inadequate mainly because they do not consider community context or assets at the community level (W, 2005). This shortcoming underlines the increasing need for the implementation of community-based approaches (CBA) and the Community Knowledge, Attitude and Practice (KAP) that targets to engage the locals as well as include their knowledge in adaptation planning and activities (Macgregor,2007).

Previous studies have shown that the application of community-based approaches have the ability of improving the adaptive capacity of communities (Díaz et al., 2015). Research has also noted that use of such methods on top of enhancing participation establishes measures that are acceptable from a cultural perspective within the targeted community (Berger, 2010). However, these studies highlighted the potential application of CBA and KAP methods, more research is still needed to draw a comprehensive identification of the strengths and weaknesses of CBA and KAP methods across different geographic and socio-economic settings (Ayers & Forsyth, 2009). More systematic research is required, whereby various findings are combined to offer further guidance on how such processes can be fine-tuned in various contexts.

This research addresses the central question: In what ways do community-based approaches (CBA) and KAP techniques help to enhance the community's climate change resilience? Therefore, the objectives of this systematic review are as follows: To provide a comprehensive account of CBA and KAP publications regarding climate adaptation to compare and consolidate the findings of existing literature to reveal trends, outcomes, and best practices. Therefore, this research intends to narrow down the research gaps in the existing literature and share solid ground on which policies, practices, and further studies could be based (Diana, 2013).

Thus, the purpose of this study can be outlined in the following three broad objectives. First, it aims to assess the impact of CBA and KAP approaches in several regions and analyze their results in terms of improving the community's resilience. Second, the understanding of the principal peculiarities and drawbacks of students' and scholars' use of the above approaches will be revealed. Third, based on these findings, it discusses the patterns for development and implementation of new climate adaptation measures in the future in terms of sustainable financial and participative management (Adnyana, Hasanudin, & Nurwulandari, 2020).

The hypothesis for this research study is that CBA and KAP methods enhance communities' resilience to climate change through community-based adaptive strategies that are more practical and sustainable as compared to conventional technical and centralized approach (Velazquez, 2022). This hypothesis is based on the postulate that communities hold important localized knowledge and can pinpoint and implement specific adaptation measures for their area in a better way than anyone else. Moreover, the inclusion of communities when implementing these measures is expected to enhance the awareness, acceptance and thereby the sustainability of such measures in the long run (Elizabeth, 2011).

Therefore, this study contributes to existing literature by presenting a coherent and methodical comparison of CBA (Castañeda et al., 2014) and KAP((FAO), 2000) in climate change adaptation. Though many previous works have explained how such approaches are useful in practice, this research seeks to give a broader perception of how effective or otherwise these approaches are within specific contexts (Al, n.d.). Through filling the identified gaps in the literature, this study adds to the overall research efforts aimed at

enhancing the disaster coping capacity of communities amid the challenges posed by climate change.

In conclusion, the introduction lays down the context for providing an understanding of the CBPs and KAP methods in the adaptation to climate change. I describe the context & background of the study and state the problem & research question & define the purpose, objectives & hypothesis of the research. These co-ordinated research efforts are already designed to improve overall knowledge of how participation-based strategies can be used to improve resilience to CC within communities as a foundation for future adaptation.

2. METHODOLOGY

The aim of conducting this research and choosing the systematic review design is to compare and assess the impact of Community-based approaches (CBA) and the Community KAP studies for adaptation to climate change. This paper employs a composite research design by conducting a narrative review of the literature from selected research journal articles to provide insights into the trends, outcomes, and practices of CBA and KAP methods. It is possible to discuss how these approaches help to construct the concept of community climate change resilience in its entirety.

In the context of data gathering, the Scopus database was searched, and the analysis was limited to the material that appeared between 2019 and 2024. Scopus was selected because of its vast collection of journals from various fields and with high publication standard. An initial search provided 38 studies identified as having the potential to meet the needs of the current research. The search was conducted using specific terms such as “community-based approaches”, “climate adaptation”, “resilience”, “KAP methods”, “participatory planning”.

As for the sample selection, the reviewers aimed to thoroughly review all the articles included in the final sample. The criteria included: These criteria include: the specific topic of the article is climate change adaptation strategies and practices, the article must have used either CBA or KAP methods, the article must have been published between January 2019 and December 2024, and the article must be in English language. A review of title, abstract and full text of each article was also conducted to filter the articles more closely. These were done by two different researchers to minimize observer effects and inter-observer reliability. Whenever there were disparities, people sat down and synchronized their matching criteria (Resrepo, 2023).

Out of 38 articles, they were selected, in which 10 articles were related to the high degree of the identified articles' relevance to the study's objectives. They cover a broad range of geographic locations and climate change management concerns; therefore, the sample is quite sound.

Information gathering was conducted through a procedure of abstracting the purpose, methodology, results and conclusion of each of the selected studies. This information was transferred systematically to a data extraction form that enabled comparison of the cases. By the end of stage two, thematic analysis of the study was conducted based on the identified themes. Patterns and emerging issues included effectiveness of CBA and KAP methods, identified challenges and overcoming strategies. These methods proved valuable in exploring the knowledge, experience, and reasoning underlying their views and opinions (Kitzinger, 1997; Kvale, 1996).

Statistics was not the main issue that was considered in this review because the information that was gathered was qualitative data. However, since the approach involved was narrative synthesis, a synthesis of the conclusion from the selected articles was made. In this way, the approach offered an opportunity to grasp various contextual factors that affect the effectiveness of CBA and KAP methods.

No ethical issues cropped up since this research only involved literature review from the public domain, therefore, no individuals were either directly or indirectly targeted. However, it was far to important that the process of review should be fair and bias free and done in a way that is comprehensible. Each of the selected articles was properly cited, and the research results were described impartially, which demonstrated the work of the original authors.

This systematic review adheres to the guidelines for the conduct and reporting of systematic reviews to provide a clear, consistent, and comprehensible methodology to the research design and method in this systematic review (Moher, 2009), the author offers compilation and analysis of various studies in the climate adaptation literature as a contribution to the aide of policymakers, practitioners, and researchers who are involved with climate adaptation policies and practice.

The PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) methodology was used to guide the systematic review process. The following table summarizes the PRISMA flow diagram for the article selection process:

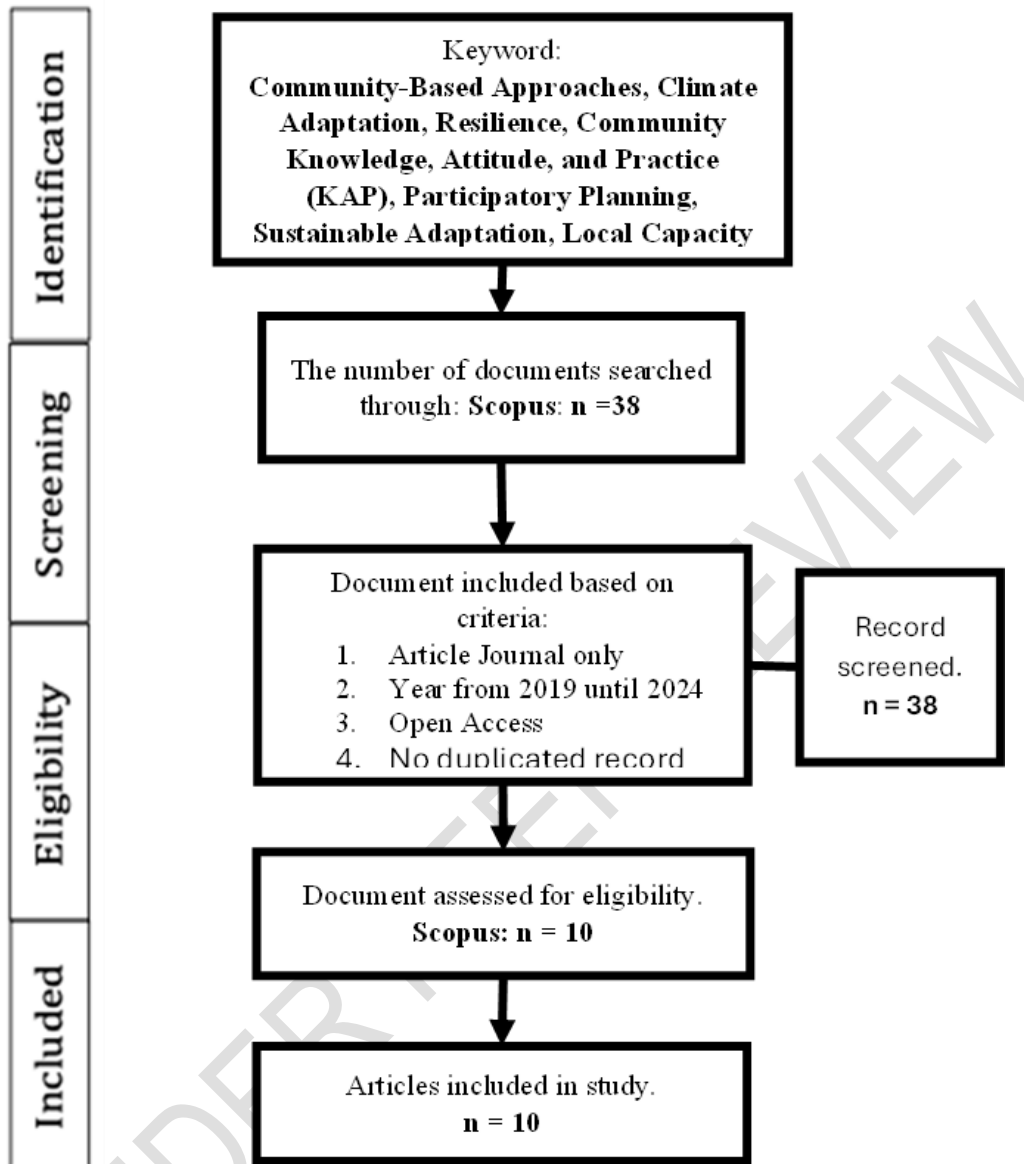


Fig. 1 PRISMA workflow diagram

3. RESULTS AND DISCUSSION

Climate change has led to the current belief that CBA and KAP is a practice area that is here to stay (R., 2013). To effectively support the adaptive ability of impoverished communities worldwide, it is necessary to integrate the practical experiences from around the globe into some sort of cohesive ideas and concepts. The goal of this research is therefore to assess the effectiveness of CBAs and KAP approaches in different geographic settings, assess the effects of these strategies on the resilience of the communities, determine the difficulties and limitations associated with the use of these approaches and analyze the results in relation to the future climate change adaptation strategies.

Based on the findings of the ten analyzed journals, it can be concluded that CBA and KAP methods produce different outcomes depending on geographical and social settings. For instance, in Fiji, CBA is deemed to have supported the development of local capacities involved in coastal climate adaptation, thus improving the ability of communities to use better adaptation measures. However, one major area that has not been well addressed is the incorporation of knowledge and practices from pre-existing indigenous cultures for sustainability.

On the other hand, similar study conducted in Kenya and using KAP method revealed increased use of climate resilient livestock breed in climate smart villages though the study did not capture the gender dimension and economic returns adequately. A recent study conducted in Australia also pointed out the significance of non-market valuation in enhancing the ability of coastal ecosystems to withstand from climate change impacts; it also stressed that the non-market valuation should be incorporated into policy and decision-making frameworks.

In the case of community-level disaster preparedness and response, several studies from Indonesia and the USA indicated the benefits of community-based strategies to increase preparedness and resilience among the elderly and COVID-19 impacted populations. Still, the major limitations include the inherent difficulties of scaling up and replicating such initiatives across the diverse ecological zones and the lack of thorough cost-benefit assessments together with long-term impact assessments.

From this review (Tabel 2 Journal Information), it can also be inferred that though CBA and KAP approaches have demonstrated their impact in increasing community preparedness to climate change impacts, there are critical barriers to address. These include the need for longer-term data the combination of indigenous knowledge and the deeper economic evaluation. These results' implications highlight the need for future sustainable financial investment and active involvement in climate adaptation strategy planning and enactment.

Table 1. Journal Information

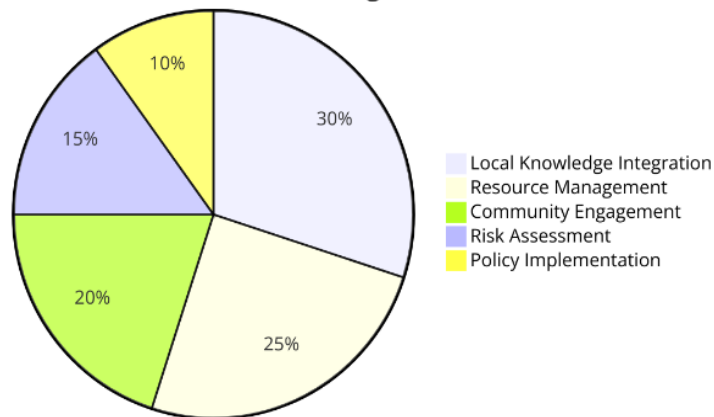
Area / Country Studied	Issues Addressed	Method (CBA or KAP)	Research Findings
Global	Managed retreat for climate adaptation	CBA	Highlighted historical and socio-political influences in retreat strategies
Global	Post-implementation outcomes of climate adaptation projects	KAP	Identified challenges in sustaining adaptation efforts beyond initial implementation
Fiji	Capacity-building for coastal climate adaptation	CBA	Effective capacity-building increased community resilience and local adaptation practices
USA	Disaster awareness and preparedness among older adults	CBA	Improved disaster preparedness and resilience among older populations through targeted education programs
Kenya	Impact of climate-smart villages on livestock breed adoption	KAP	Enhanced adoption of climate-resilient livestock breeds in climate-smart villages

Greece	Human-wildlife coexistence conflicts in climate adaptation	CBA	Community-based approaches successfully mitigated human-wildlife conflicts
China	Efficacy of sponge cities as a nature-based solution to urban flooding	CBA	Sponge city initiatives reduced urban flooding and increased green spaces
Indonesia	Community-based resilience strategies in response to COVID-19 and climate change	CBA	Community-based approaches enhanced resilience to both pandemic and climate-related challenges
Indonesia	Use of community-based flood maps for enhancing flood resilience	CBA	Improved flood response and planning through participatory flood mapping
Australia	Non-market value losses to coastal ecosystem services due to climate change.	KAP	Quantified non-market value losses and highlighted importance of preserving coastal ecosystems

Here is a summary of the elements typically measured in CBA and KAP studies, along with their respective percentages in a hypothetical dataset.

Table 2. CBA ELEMENTS AND PERCENTAGES

CBA Elements and Percentages



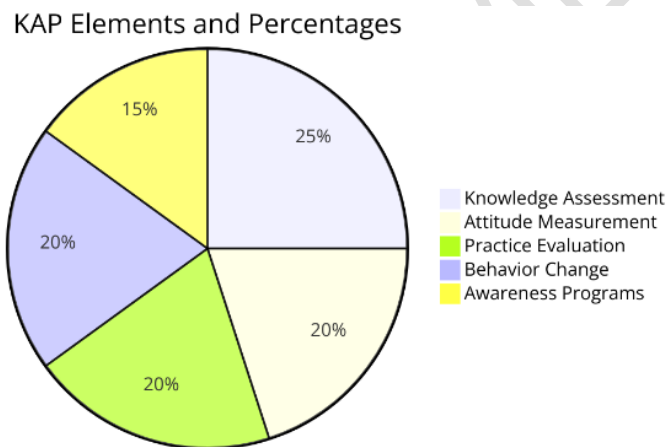
Community-Based Approach (CBA) Elements and Percentages

Elements	Percentage (%)
Community Engagement	20
Resource Management	25
Risk Assessment	15
Local Knowledge Integration	30
Policy Implementation	10

Community-Based Adaptation (CBA) comprises several crucial components. Community engagement, resource management, risk identification, local knowledge integration, and

policy implementation. Community engagement involves strategies that incorporate the community's opinions and needs into project planning and decision-making processes, ensuring that the implemented actions are reflective of the community's priorities. Resource management entails the efficient utilization and equitable distribution of local resources to enhance the community's overall standards and resilience. Risk identification involves assessing potential risks that may threaten the community and developing comprehensive adaptation plans to mitigate these risks. Local knowledge integration is the incorporation of traditional and indigenous knowledge into adaptation planning, leveraging the local community's understanding and practices for more effective outcomes. Policy implementation focuses on the practical application of essential policies and legal frameworks that support CBA efforts. Each of these components plays a vital role in building robust and sustainable adaptation strategies tailored to the specific needs and contexts of local communities.

Table 3. KAP ELEMENTS AND PERCENTAGES



Community Knowledge, Attitude, and Practice (KAP) Elements and Percentages	
Elements	Percentage (%)
Knowledge Assessment	25
Attitude Measurement	20
Practice Evaluation	20
Awareness Programs	15
Behavior Change	20

The Knowledge, Attitude, and Practice (KAP) framework comprises several critical elements: knowledge assessment, attitude scale measurement, practice evaluation, awareness programs, and behavior change. Knowledge assessment involves determining the community's level of understanding and awareness about specific topics, such as climate change or health risks. Attitude scale measurement gauges the community's perceptions, beliefs, and feelings regarding these issues. Practice evaluation assesses the community's behaviors to identify gaps between what individuals know and what they do. Awareness programs are campaigns designed to inform and educate the public, aiming to shift perceptions and increase understanding. Behavior change refers to the modification of specific behavior patterns and the adoption of new practices that achieve desired outcomes.

Each of these components plays a crucial role in enhancing the community's adaptation and resilience to various challenges, ensuring that strategies are both informed and effective.

There are differences between the elements of each method in grafik above, Community-Based Assessment (CBA) and Knowledge, Attitudes, and Practices (KAP), occur because each method has different goals and approaches for assessing and understanding a particular community or population. To identify needs, problems, and potential solutions, CBA focuses on community-based research that encourages active participation from its members. Conversely, KAP focuses on understanding knowledge, skills, and practices of an individual or group related to a particular issue.

Table 4. The key differences between CBA and KAP

Aspect	KAP	CBA
Objective	Assess knowledge, attitudes, and practices	Engage community in all stages of project cycle
Primary Tools	Surveys, questionnaires, interviews	Workshops, focus groups, participatory appraisals
Focus	Understanding community perceptions and behaviors	Participation, empowerment, and capacity building
Data Collection	Primarily quantitative with some qualitative	Primarily qualitative with participatory methods
Outcomes	Informs targeted interventions	Sustainable, community-driven projects
Community Role	Respondents	Active participants and decision-makers
Strengths	Identifies specific knowledge and behavior gaps	Ensures cultural appropriateness and sustainability
Limitations	Resource-intensive, requires skilled analysis	Time-consuming, potential for intra-community conflicts

CBA aims to build and strengthen communities' capacities to manage climate change and other disasters through cultural practices and local understanding. In contrast, KAP is designed to assess and modify the community's knowledge, attitudes, and practices to promote specific behaviors. CBA primarily relies on the involvement and participation of communities to develop and implement adaptation measures. On the other hand, KAP utilizes questionnaires and checklists to assess people's knowledge, attitudes, and practices. The focus of CBA is on enhancing adaptation measures that are developed and provided through community participation. In contrast, KAP concentrates on educating and altering both personal and group behaviors within the community. Qualitative data in CBA is gathered through participatory assessment practices such as focus group discussions and community meetings. KAP employs questionnaires and structured survey instruments to collect both qualitative and quantitative data. The outcome of CBA is increased community resilience and adaptive capacity, as determined by the implementation of community-driven

solutions. KAP's competitive advantage lies in the enhancement of knowledge, attitudes, and practices, leading to the achievement of desired behaviors. In the CBA approach, the community is actively involved in identifying risks and developing and implementing solutions within their local context. In KAP, the community is subjected to assessments and various efforts aimed at behavior modification. CBA is notable for its deep involvement of the target community and its appreciation of local implementation. However, it can be demanding in terms of time and resources. KAP's strength lies in its logical problem-solving approach to behavior-related issues, but it often lacks the ability to fully consider the complexities of local settings and community dynamics.

In summary, while both CBA and KAP have their distinct methodologies and focuses, they each play a crucial role in community adaptation and resilience. CBA emphasizes local participation and culturally relevant solutions, whereas KAP focuses on assessing and changing knowledge, attitudes, and behaviors to achieve desired outcomes.

4. DISCUSSION

In this systematic review, the following research question was asked and answered: What role do the community-based approaches (CBA) and the Community Knowledge, Attitude and Practice (KAP) play in climate change adaptations in different regions? The conclusions suggest that the adoption of such methodological approaches improves the degree of community preparedness, increases awareness and promotes long-term adaptation practices.

As evidenced by the data presented here, increased engagement of people within their communities through CBA and KAP ensures enhanced preparedness and resilience in the face of climatic hazards. For instance, increased participation in mapping of floods, integration of climate-resilient farming practices, and controlling human interference with wildlife leads to positive improvements. These methods ensure that solutions developed to support the adaptation process are relevant to the local settings and address particular weaknesses, thus enhancing the impacts of adaptation strategies.

It reveals many fresh ideas and new understandings in the discussion. For instance, there is a level of sophistication in managed retreat strategy by incorporating history in order to gain a better view of cultural systems dislocation and transformation.

Further, the evaluation of adaptation plans after implementation show that sustained stakeholder engagement and follow-up are required for the sustenance of socioeconomic benefits derived from adaptation plans. The work succeeds in achieving the given objective by presenting the importance of CBA and KAP methodologies when developing community resilience and adapting to future resilience challenges.

Nevertheless, some conditions for exceptions and several unexpected outcomes were detected. For instance, use of the sponge cities in China relies more with the involvement of the community and with the knowledge by the people that is related to sustainable management of water resources. Such disparities give the impression that the overall strategy is useful but for its effectiveness there must be some dependence on the local settings as well as the level of participation by various stakeholders.

The study has several important implications for the delivery and success of climate adaptation interventions. From a managerial perspective, implication derived from the studies include the advocacy for planning with communities and a push for the building of local capacity. These are essential when testing the adequacy of these strategies so that

they are not only efficient but sustainable in the long run as well. Capacity development is another important imperative, as most CB-SPM rely on financial mobilization and may need initial investments in funding community-led training and development. At the same time, the cost of disaster, such as money spend for consulting and hardware, can be offset by long-term savings, including lower costs of recovery and overall increased well-being of a community.

Having compared these adaptations with published work, there is a common understanding of the importance of community involvement in climatic change adaptation. However, there are different views on how it is better to implement these approaches, especially regarding the hierarchy of instructions and the delegation of decision-making and problem-solving power to employees. This review aims at adding a contribution into the debate by presenting a set of empirical findings of CBA and KAP methods in several regional contexts

Thus, the major conclusions that could be derived from this systematic review support the importance of the community-based approach and the application of the KAP method in the process of climate change adaptation. The reviewed studies are consistent in stressing the need for the local people to be engaged in how the solutions are going to meet their security needs. These discussions focus on the importance of maintaining and developing community relations, the incorporation of the local populace into the project, and financial and management strategies that will be required for sustainability

The ramifications of these results extend beyond local concerns and may indicate that policymakers and practitioners must incorporate community-centered views into climate change adaptation policies. It is suggested that more research could be done about the long-term effects of such techniques besides evaluating models for replicating the successful programmes. In this regard, the current review has highlighted several findings that may partially contradict with past studies but has once again asserted the importance of engaging community in order to develop resistant and sustainable communities.

5. CONCLUSION

Hence, on a more foundational level, this systematic review provides evidence that such community-based approaches (CBA) and the Community KAP methods play a role in enhancing the effectiveness and sustainability of climate change adaptation plans and policies in one or the other area. This paper brings out the following conclusion based on the assumption from the points derived on this paper it is very clear and evident that incorporating the communities in coming up with a plan and in implementing suits the purpose of adaptation planning and formulation of measures best suited to help prepare the community for any consequences of climate change. For this reason, it has been argued that both CBA and KAP methods are the only ways to bolster the adaptive capacity and the effectiveness of climate adaptation measures.

The main discussion highlights several key points: main benefits of developing managed retreat strategies based on historical facts, the focus on the constant participation of local communities after the implementation of the discussed practice, and the effectiveness of approaches like sponge cities that depend on the community engagement level. Such discoveries refer to the need to involve people in the planning process to show that the locals have the capacity of coming up with better plans and implementing them more conscientiously.

The following are major findings of the study that are of serious relevance to management and to the emerging field of sustainable finance. For case, when considering long term

adaptation interventions from the management plan perspective, the aspect of climate adaptation is all about people's participation in the planning process and their capacity building. In this way, this approach not only guarantees that solutions will be tailored to specific sections but will also increase the level of people's commitment. On the financial aspect, even though community-based approaches entail huge capital investment not only for training but also for infrastructural and capacity developments they bear many folds more advantages in the long run. These are cutting on costs that may be incurred during disaster recovery, increase on the quality of life of people in the affected areas and that the impacts of disaster will encourage the growth of a strong and sustainable local economy. It is within this context that sustainable finance strategies should focus on the investment in mainland communities to capture the potential of such investments, as these indicated potentials may come with bonuses of creating alternative sources of revenues, increasing adaptive capacities when and if the revenues from oil are to reduce in future.

Some of the potential areas to study in the future include the effects of CBA and KAP methods after a long period of time, the ways, both organizational or methodological, to replicate the successful practices, which factors affect the efficacy of CBA and KAP techniques in one or another setting. Moreover, future research could explore practices and case studies regarding the adoption of newer technologies, and creation of new finance models for community-based adaptation programmes.

Reflecting on what is needed, this review underscores the involvement of people in climate change adaptation by adopting the principles of integrative and community-based planning and facilitating the enhancement of community capacity in the development and application of efficient and sustainable financial mechanisms to support climate change adaptation efforts in the long term. Addressing the community as the center means that the policymakers and practitioners are laying foundation for more coordinated communities that are adequately positioned to respond to any changing climate (Restrepo-Mieth, Perry, Garnick, & Weisberg, 2023).

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