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Future's Thinking Integration in the Preparation of Comprehensive Land Use Plans of the Local Government Units: A Systematic Literature Review

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Abstract

This systematic literature review examined the integration of futures thinking into the preparation of Comprehensive Land Use Plans by local government units, with particular attention to its potential application in the Philippine planning context. The study was anchored in strategic foresight, scenario-based planning, adaptive and participatory governance, institutional capacity, and social-ecological resilience. A systematic literature review design was employed using descriptive evidence mapping, qualitative content analysis, comparative analysis, thematic synthesis, and gap analysis. A structured data-extraction matrix was used to analyze 45 publications issued from 2021 to 2026. The findings showed that 35.6 percent of the reviewed publications primarily addressed futures-thinking approaches, while 24.4 percent focused on climate adaptation and disaster resilience, another 24.4 percent examined sustainable land use and ecological systems, and 15.6 percent concentrated on governance and institutional capacity. Scenario planning emerged as the most consistently represented approach, supported by participatory visioning, spatial modeling, vulnerability assessment, and strategic foresight. The review found that futures thinking can strengthen environmental scanning, identification of uncertainties, development of alternative land-use scenarios, stakeholder participation, policy formulation, zoning, implementation, and adaptive monitoring. However, its integration was constrained by fragmented application, limited attention to social equity, inadequate institutional capacity, weak translation of scenarios into formal planning decisions, and the absence of direct empirical validation within Philippine LGU CLUP preparation. The study recommends pilot-testing the proposed literature-derived framework in selected Philippine LGUs, supported by stakeholder participation and capacity building. The study contributes to SDGs 9, 11, 13, 15, 16, and 17 by supporting innovative infrastructure planning, sustainable communities, climate action, ecosystem protection, effective institutions, and collaborative governance. Its sustainability impact lies in promoting more anticipatory, inclusive, resilient, environmentally responsible, and institutionally adaptive land-use planning.

Keywords: Adaptive Governance, Climate Resilience, Comprehensive Land Use Plans, Futures Thinking, Local Government Units, Participatory Planning, Scenario Planning, Strategic Foresight, Sustainable Land-Use Planning

1. Introduction

Land-use planning increasingly operates under conditions of uncertainty arising from climate change, urban expansion, environmental degradation, infrastructure transitions, technological development, demographic shifts, and changing socioeconomic demands. Conventional planning methods often rely on historical conditions, current trends, and linear projections. Although these approaches remain useful, they may be insufficient when local governments must prepare for disruptive events, interacting risks, and alternative development pathways that cannot be represented through a single forecast. Futures thinking provides a complementary approach by allowing planners and stakeholders to examine plausible, probable, preferable, and undesirable futures before committing land, infrastructure, financial resources, and institutional capacity to particular development directions. The integration of futures thinking into land-use planning is reflected in the growing use of strategic foresight, scenario planning, participatory visioning, backcasting, futures wheels, vulnerability assessment, spatial modeling, and indicator-based decision tools. These approaches broaden planning beyond the prediction of a single future. They support the exploration of alternative conditions, critical uncertainties, emerging risks, stakeholder aspirations, policy trade-offs, and possible consequences of present decisions. Mäntysalo et al. (2022) emphasized the strategic role of explorative scenarios in land-use and transportation planning, while Soria-Lara et al. (2021) demonstrated how participatory visioning and disruptive conditions can expand the range of futures considered in planning. Futures thinking is therefore relevant not only as a technical forecasting activity but also as a collaborative process for improving strategic judgment and long-term decision-making. This systematic review examines how futures thinking has been integrated into the preparation of land-use and spatial plans and considers its possible application to Comprehensive Land Use Plan preparation by local government units. It synthesizes the futures-thinking methods documented in the literature, the planning stages in which these methods are applied, the sustainability concerns addressed, the stakeholders involved, the institutional conditions required, and the outcomes and limitations reported. Through this synthesis, the study seeks to

develop an integrative basis for making local land-use planning more anticipatory, adaptive, participatory, resilient, and sustainability-oriented.

Land-use planning determines how limited territorial resources may be allocated, protected, developed, and managed over time. Its decisions influence settlements, transportation, infrastructure, agriculture, economic activity, natural resources, ecosystem services, disaster exposure, public safety, and community well-being. These decisions frequently have long-term and partly irreversible consequences. Once land has been converted, settlements have expanded, infrastructure has been established, or environmentally sensitive areas have been occupied, correcting inappropriate development patterns may become socially difficult, environmentally damaging, and financially costly. The planning environment has also become increasingly complex. Urban expansion alters land-cover patterns and creates pressure on agricultural, ecological, and open spaces (Mahata, 2024; Surya, 2021). Climate-related hazards require plans to consider exposure, vulnerability, adaptation, and mitigation rather than concentrating exclusively on conventional land allocation (Anilkumar, 2022; Biswas, 2023; Effiong, 2024; Hurlimann, 2021; Zhou, 2025). Flood risks, for example, cannot be addressed adequately when disaster-risk reduction is separated from spatial and land-use decisions. Studies in Thailand and Peru have shown the importance of mainstreaming flood and disaster-risk considerations into spatial planning, while also identifying gaps between formal recognition, stakeholder participation, institutional implementation, and land-use regulation (Chaladdee, 2022; Mallma, 2021). Planning must likewise address ecological interdependence and resource constraints. Biodiversity protection, freshwater ecosystems, wildlife connectivity, watershed conditions, and human well-being are affected by how land is allocated and managed (Bryce S. Wade, 2023; Charles B. van Rees, 2021; Hernández, 2023; Zorrilla-Miras, 2021). The water-energy-food nexus further demonstrates that planning decisions in one sector may create consequences in other sectors, making isolated or single-sector planning inadequate (Purwanto, 2021). These relationships require planners to understand land as part of a connected social, ecological, economic, and institutional system. Under such conditions, a plan based only on the continuation of past trends may fail to recognize disruptive developments, nonlinear change, or interactions among multiple drivers. Futures thinking responds to this limitation by considering several alternative futures instead of treating one forecast as the inevitable outcome. Scenario planning can examine how different combinations of economic, environmental, technological, political, and social conditions might affect land demand, settlement patterns, infrastructure requirements, ecosystem integrity, and community vulnerability. Backcasting can begin with a preferred future and identify the policies, investments, institutional changes, and intermediate actions required to achieve it. Participatory foresight can incorporate community knowledge, expert analysis, institutional experience, and stakeholder aspirations into long-term planning. Rosa et al. (2021) presented participatory foresight as a means of setting policy goals and developing sustainable strategies through bottom-up and reflexive processes. Bayuni Shantiko et al. (2021) applied a participatory prospective approach in Indonesia that brought together local communities, technical experts, and decision-makers to examine variables, construct contrasting land-management scenarios, and formulate road maps toward desired outcomes. Their work indicates that futures thinking can function as a governance process that expands participation and creates space for strategies that may not emerge through routine institutional procedures. The use of futures thinking does not eliminate uncertainty. Instead, it makes uncertainty explicit and manageable within the planning process. It encourages decision-makers to identify assumptions, examine vulnerabilities, test policies under different conditions, and select strategies that remain useful across several plausible futures. This orientation is particularly important for local governments because land-use decisions must respond to immediate needs while preserving long-term environmental quality, economic viability, social inclusion, and institutional adaptability.

The literature shows a shift from traditional forecasting to futures-oriented planning. Forecasting focuses on what is likely to happen based on current trends, while futures thinking explores what could happen, what should happen, and what actions may be needed. Mäntysalo et al. (2022) explained that scenario planning helps planners understand conditions, examine alternatives, discuss possible directions, and turn ideas into action. Soria-Lara et al. (2021) also showed that using unexpected but high-impact events can help participants think beyond normal assumptions. Futures thinking has been applied in natural resources, forests, rural areas, innovation systems, tourism, and the built environment (Alexandra, 2023; Jouko Myllyoja, 2022; Mattia Vettorello, 2022; Nomm, 2026; Tähtinen, 2024; Vitaliy Kovshov, 2024; Westphal, 2023). Scenario planning is one of the main futures-thinking methods. It develops different possible futures based on important drivers, uncertainties, stakeholder choices, and outside conditions. Sedighi et al. (2025) applied it to land-use decision-making, while Mäntysalo et al. (2022) connected it to land-use and transportation planning. It helps planners compare possible outcomes, examine trade-offs, and guide policies and implementation. Bayuni Shantiko et al. (2021) linked participatory scenarios with road maps for land management. However, Ayambire et al. (2025) found that social equity was often overlooked. Scenario planning should therefore consider whose views are included and how decisions may affect marginalized groups. Participation is also important because land-use planning involves different interests and types of knowledge. Experts provide technical information, communities share local experiences, and government officials contribute policy and implementation knowledge. Rosa et al. (2021), Bayuni Shantiko et al. (2021), and Osborne (2021) showed that participation should go beyond consultation and include joint problem analysis, scenario development, decision-making, and implementation planning. Nadin et al. (2021) further emphasized that public input must be supported by institutions that allow it to influence actual planning decisions. Climate adaptation and disaster resilience are also major

themes. Land-use planning can reduce risk, protect ecosystems, guide development away from hazardous areas, and support adaptation. Hurlimann (2021), Biswas (2023), Effiong (2024), and Anilkumar (2022) emphasized the need to integrate climate resilience into planning. Chaladdee (2022) and Mallma (2021), however, identified weaknesses in preparedness, participation, technical capacity, funding, and disaster-risk integration. Future-oriented CLUP preparation should therefore examine how risks may change under different climate, settlement, infrastructure, and development scenarios. Zhou (2025) also stressed that climate indicators should match local conditions and planning goals.

The literature also positions land-use planning as an instrument for ecological sustainability. Hernández (2023) examined the use of ecosystem assessments in supporting land-use decisions, while Bryce S. Wade (2023) focused on wildlife connectivity. Charles B. van Rees (2021) addressed freshwater biodiversity, and Zorrilla-Miras (2021) connected land-use change with human well-being through participatory scenario planning. These studies demonstrate that ecological concerns should not be treated as isolated environmental constraints. They are connected to livelihoods, health, water security, disaster resilience, food systems, and community well-being. Puchol-Salort (2021) proposed a systems approach to blue-green urban design, while Purwanto (2021) examined the water-energy-food nexus. Möslinger (2023) connected circular economy and waste management with climate-neutral urban futures. These perspectives support an integrated planning approach in which land use, infrastructure, resource flows, ecosystems, and socioeconomic activity are considered together. The effectiveness of futures thinking depends on the institutions responsible for applying its results. Local governments may conduct scenario workshops or develop strategic visions, but these activities will have limited influence when they are disconnected from formal mandates, budgets, leadership, interdepartmental coordination, technical capability, political priorities, and monitoring systems. Trygg (2021) used institutional capacity to examine how planners employ planning instruments for sustainable development. The study identified knowledge resources, relational resources, and mobilization capacity as important institutional dimensions. It also showed that planners may possess ideas and sustainability initiatives while lacking sufficient political direction, authority, and prioritization. This means that futures thinking cannot be institutionalized through technical training alone. It also requires political commitment, organizational support, clear mandates, collaborative relationships, and mechanisms for converting foresight into planning action. Salvador (2021) similarly connected sustainable-development policies with local-government institutional capacities. Gasco-Hernandez (2022) showed that local-government transformation depends on management capacity, strategy, leadership, dedicated organizational structures, and collaboration with citizens, other government levels, and private partners. Although the latter study focused on digital transformation, its findings are relevant to futures-oriented planning because the adoption of new planning methods also requires organizational change and sustained collaboration.

Futures-oriented land-use planning can be strengthened by analytical tools that organize complex variables and represent alternative spatial outcomes. Abdrabo (2023) used principal component analysis and analytical hierarchy processes in constructing an urban-flood vulnerability index. Braga (2021) applied DEMATEL analysis to smart-city determinants. Berihun (2023) examined runoff and sediment responses under climate-resilient land-use and management scenarios. Mahata (2024) used geospatial analysis to examine land-use and land-cover change associated with metropolitan expansion. These tools provide evidence that can support scenario construction and evaluation. However, technical models do not replace participatory and institutional processes. Models reflect selected variables, assumptions, indicators, data availability, and methodological choices. Their results must be interpreted with stakeholders and connected to policy objectives. The strongest approach is therefore not purely technical or purely participatory. It combines quantitative assessment, spatial analysis, qualitative foresight, stakeholder knowledge, and institutional decision-making.

The global literature shows growing concern about whether traditional spatial-planning systems can respond effectively to climate change, urbanization, ecosystem degradation, technological change, and social inequality. European studies emphasize integrated, adaptive, and participatory planning, institutional capacity, and scenario-based approaches (Mäntysalo, 2022; Nadin, 2021; Trygg, 2021). Studies from Australia and the United States apply foresight and scenario planning to natural-resource and public-land management (Alexandra, 2023; Murphy et al., 2025; Westphal, 2023). Research from China, Egypt, Iran, Mozambique, and Nigeria also examines sustainability, vulnerability, climate adaptation, and alternative land-use scenarios (Abdrabo, 2023; Effiong, 2024; Fu, 2021; Sedighi, 2025; Zorrilla-Miras, 2021). Asian studies are particularly relevant to local-government planning. Bayuni Shantiko et al. (2021) used participatory foresight to develop long-term spatial strategies in Indonesian regencies. Chaladdee (2022) examined flood-risk reduction in Thai Comprehensive Land Use Plans and found weaknesses in preparedness and stakeholder participation. These studies show how local governments must balance national policies, technical requirements, community knowledge, development needs, and environmental risks. For Philippine LGUs, futures thinking may improve the identification of long-term changes, development of alternative land-use scenarios, assessment of climate and disaster risks, community participation, and selection of adaptive strategies. However, the reviewed literature provides limited direct evidence on Philippine LGUs and the Philippine CLUP process. International approaches must therefore be adapted to local laws, institutional capacity, available data, financial resources, environmental conditions, and community needs. This review seeks to identify suitable principles and methods and develop a flexible framework for policy development, capacity building, pilot testing, and future application in Philippine LGUs.

The study is guided by five related perspectives: strategic foresight, scenario-based planning, adaptive and participatory governance, institutional capacity, and social-ecological resilience. Strategic foresight provides the overall direction of the review. It views the future as open to several possibilities and focuses on identifying drivers of change, emerging issues, uncertainties, risks, opportunities, and possible pathways. Rosa et al. (2021) linked participatory foresight with policy development, innovation, and sustainable strategies. Foresight is therefore used to support better preparation and decision-making rather than to predict the future with certainty. Scenario-based planning serves as the main methodological perspective. It develops different representations of possible futures based on changing conditions and assumptions. Mäntysalo et al. (2022) explained that scenarios can perform different functions in strategic planning, while Soria-Lara et al. (2021) showed that disruptive events can broaden participatory visioning. In this study, scenarios connect future drivers and uncertainties with possible land-use patterns, consequences, strategic choices, and implementation needs. Adaptive and participatory governance emphasizes flexibility and meaningful stakeholder involvement. Nadin et al. (2021) identified integration, adaptability, and citizen engagement as important capacities of spatial-planning systems. Bayuni Shantiko et al. (2021) also showed that participatory foresight can bring different stakeholders together and include local knowledge in long-term land-management decisions. Institutional capacity focuses on the ability of LGUs and planning institutions to apply futures thinking. Trygg (2021) emphasized knowledge, relationships, and resource mobilization, while Gasco-Hernandez (2022) highlighted leadership, strategy, organizational structures, and collaboration. These capacities help LGUs interpret futures information, engage stakeholders, coordinate offices, mobilize resources, integrate foresight into formal plans, implement strategies, and monitor change. Social-ecological resilience provides the sustainability perspective. It recognizes that communities, economies, institutions, ecosystems, infrastructure, and resources are interconnected. Resilience refers to the ability to anticipate, absorb, adapt to, and recover from disturbances while maintaining essential functions. Tähtinen (2024) emphasized the need to consider different future risks and involve stakeholders from various disciplines. Related studies also show that social and environmental systems must be examined together in land-use planning (Chaladdee, 2022; Hernández, 2023; Purwanto, 2021; Zhou, 2025). Based on these perspectives, futures-oriented CLUP preparation involves identifying drivers and uncertainties, developing alternative futures, assessing their possible effects, involving stakeholders in selecting preferred directions, formulating practical strategies, implementing them, and monitoring indicators to support future adjustments.

The literature shows that futures thinking is useful in land-use, spatial, transportation, environmental, resource, and climate planning. However, several gaps support the need to review how it can be integrated into CLUP preparation. Studies often examine scenario planning, foresight, participatory visioning, vulnerability assessment, spatial modeling, futures wheels, and road mapping separately. As a result, there is no clear framework showing how these methods can be connected from situational analysis and visioning to implementation, monitoring, and plan revision. Another gap is the limited application of future-oriented ideas to formal planning decisions. Scenarios and visions are valuable only when they influence zoning, infrastructure priorities, environmental safeguards, budgets, regulations, and monitoring systems. Their implementation also requires leadership, political support, collaboration, authority, and adequate resources (Gasco-Hernandez, 2022; Trygg, 2021). Social equity and institutional capacity also need greater attention. Ayambire et al. (2025) found that equity was often overlooked in scenario-planning studies. CLUP preparation should therefore consider the effects of land-use decisions on vulnerable groups and strengthen LGU skills in data analysis, scenario development, stakeholder engagement, spatial assessment, and strategic communication. The literature also provides limited guidance on monitoring futures-oriented plans. Indicators, regular reviews, and adaptive measures should respond to changing risks, technologies, population conditions, and development pressures. Zhou (2025) emphasized that climate-resilient indicators should match local conditions and planning objectives. There is also limited direct evidence on Philippine LGUs and CLUP preparation. This review will therefore organize the available evidence, compare methods and planning contexts, identify supporting factors and barriers, and develop a framework for adaptation, capacity building, pilot testing, and future validation in Philippine LGUs.

The study supports several Sustainable Development Goals related to land-use planning, resilience, governance, ecosystems, infrastructure, and partnerships. SDG 9—Industry, Innovation and Infrastructure is addressed through the use of innovative planning methods, spatial modeling, indicators, digital tools, and scenario development to support long-term infrastructure decisions. SDG 11—Sustainable Cities and Communities is the study's main alignment because CLUP preparation affects settlement patterns, urban growth, transportation, access to services, disaster exposure, and environmental quality. Futures thinking can help LGUs compare development options and build safer, more inclusive, resilient, and sustainable communities. SDG 13—Climate Action is supported through the integration of climate adaptation, mitigation, vulnerability assessment, disaster-risk reduction, and climate-resilient indicators into land-use planning (Chaladdee, 2022; Effiong, 2024; Hurlimann, 2021; Mallma, 2021; Zhou, 2025). SDG 15—Life on Land is reflected in the study's attention to ecosystems, biodiversity, forests, watersheds, habitat connectivity, and sustainable land management. Futures-oriented scenarios can help balance development needs with environmental protection. SDG 16—Peace, Justice, and Strong Institutions is addressed through transparent decision-making, stakeholder participation, institutional coordination, accountability, and evidence-based planning. SDG 17—Partnerships for the Goals is supported

through collaboration among LGUs, national agencies, communities, academic institutions, experts, civil-society organizations, and the private sector. Participatory scenario planning can help these groups share knowledge, discuss concerns, manage trade-offs, and develop coordinated strategies.

The study is important to environmental and ecological sustainability because it connects long-term land-use decisions with climate resilience, disaster-risk reduction, ecosystem services, biodiversity, water systems, resource management, and land-cover change. By synthesizing methods that explore alternative environmental futures, the review can support more informed consideration of cumulative impacts, ecological limits, and long-term environmental risks. It contributes to socioeconomic and community sustainability by examining how land-use futures affect livelihoods, housing, accessibility, infrastructure, economic activity, public services, and exposure to hazards. Futures thinking can help communities and planners identify development pathways that satisfy present needs without creating unacceptable long-term social and economic vulnerabilities. The study is relevant to policy, governance, and institutional sustainability because it examines the organizational conditions required to convert future-oriented knowledge into formal planning decisions. Sustainable plans require more than technically sound proposals. They require leadership, mandates, interdepartmental coordination, financial support, stakeholder legitimacy, implementation mechanisms, and continuous monitoring. Its contribution to innovation and technological sustainability lies in integrating qualitative foresight with spatial modeling, vulnerability assessment, digital tools, indicators, and decision-support methods. The review recognizes that technology is useful only when its assumptions and outputs are critically interpreted and connected to community knowledge and policy objectives. The study also contributes to cultural and participatory sustainability by recognizing that land has social, historical, cultural, and place-based meanings. Inclusive futures cannot be developed solely by technical experts. Communities must be able to express their preferred futures, identify unacceptable outcomes, contribute local knowledge, and participate in evaluating trade-offs. The review therefore treats participation as a substantive component of future-oriented planning rather than as a procedural requirement. Finally, the study contributes to multidisciplinary sustainability by integrating knowledge from urban and regional planning, public administration, environmental science, climate studies, disaster-risk management, geography, sociology, economics, technology, governance, and futures studies. Land-use challenges cannot be addressed adequately within a single discipline because they involve interconnected spatial, environmental, social, institutional, and economic systems. A systematic synthesis can help these disciplines contribute to a shared framework for anticipatory and sustainable local planning.

2. Material and methods

2.1 Research Design

The study will use a systematic literature review. This means that the researcher will collect, examine, compare, and summarize published studies related to futures thinking and Comprehensive Land Use Plan preparation. The study will not collect information directly from individual respondents. The review will include studies that use strategic foresight, scenario planning, participatory visioning, backcasting, horizon scanning, futures wheels, road mapping, spatial modeling, vulnerability assessment, and other methods that help planners prepare for possible future conditions. These methods will be examined based on how they are used in the different stages of CLUP preparation. These stages include reviewing current conditions, identifying future changes and uncertainties, developing long-term goals, creating alternative land-use scenarios, comparing planning options, selecting strategies, preparing policies and zoning measures, implementing the plan, and monitoring its results. The selected studies will be organized according to their publication year, country, planning setting, research method, futures-thinking approach, sustainability focus, and stage of land-use planning. The researcher will identify common ideas, processes, supporting factors, challenges, and reported outcomes. Related findings will then be grouped into major themes connected to CLUP preparation by LGUs. The study will also distinguish between publications that only explain futures thinking and those that show how it was actually used in land-use or spatial planning. More attention will be given to studies that describe how futures thinking influenced stakeholder participation, scenario development, decision-making, land allocation, policy formulation, implementation, and monitoring. A statistical meta-analysis will not be used because the reviewed studies differ in their methods, locations, indicators, participants, and outcomes. Instead, the findings will be compared and explained through a systematic narrative and thematic analysis.

2.2 Locale of the Study

The study will cover a broad range of international planning contexts represented in published studies and official documents. These settings include countries, cities, municipalities, regions, and local-government areas where futures thinking has been applied to land-use and spatial planning. This international scope will provide a wider understanding of how futures thinking is used under different land-use conditions, governance systems, environmental risks, planning practices, and levels of institutional capacity. Relevant studies from metropolitan areas, rural communities, coastal zones, watersheds, agricultural areas, and environmentally sensitive locations will be examined to identify useful approaches for comprehensive land-use planning. The Philippines will serve as the main context for interpreting and applying the findings. International practices will be assessed according to their relevance and possible contribution to the preparation of CLUPs by Philippine LGUs. Their application will consider the country's legal requirements, government structures, technical

capacity, financial resources, available data, environmental conditions, and community needs. Philippine studies and official planning documents that meet the review criteria will also form part of the evidence base. The available literature will help identify current practices, opportunities for improvement, and areas where further research on futures thinking in Philippine CLUP preparation can be developed.

2.3 Respondents of the Study

The study will not involve human respondents. In conformity with the required research format, the documentary units of analysis will serve as the respondents of the systematic review. These units will consist of peer-reviewed journal articles, review papers, case studies, conference papers with sufficient methodological detail, and selected official planning or policy documents that directly address futures thinking in land-use, spatial, urban, regional, environmental, climate, disaster-risk, or local-government planning. Each publication will be treated as an individual unit of analysis. When two or more publications describe different aspects of the same planning project, intervention, or geographical case, they will be examined together to prevent the same case from being counted as separate independent applications. The documentary respondents must provide sufficient information about the planning context, futures-thinking approach, analytical or participatory procedure, stakeholder involvement, institutional arrangements, sustainability concerns, or reported planning outcomes. Publications that only refer to the future in a general manner without using an identifiable foresight, scenario, or anticipatory planning approach will not be considered eligible.

2.4 Sample and Sampling Procedure

The study will use criterion-based purposive sampling to select relevant publications. Sources published from January 2021 to August 2026 will be considered, while earlier studies may be included when needed to explain foundational futures-thinking concepts. Eligible sources must be available in full text, written in English or reliably translated, and directly related to futures thinking and land-use or spatial planning. The selection process will include title, abstract, and full-text screening. Duplicate records, inaccessible sources, editorials, news reports, promotional materials, and studies unrelated to land-use or local-government planning will be excluded. The final sample will consist of all publications that meet the established inclusion criteria.

2.5 Research Instrument

The study will use a structured systematic-review and data-extraction matrix based on the objectives and research questions. The matrix will record the futures-thinking methods used, the stages of CLUP preparation where they were applied, the stakeholders involved, and the sustainability and institutional factors addressed. It will also document the reported outcomes, enabling conditions, barriers, and methodological quality of each publication. The quality assessment will consider the clarity of the research problem, appropriateness of the design, transparency of data sources, adequacy of analysis, support for the conclusions, stated limitations, and relevance to CLUP preparation.

2.6 Data Gathering Procedure

Data gathering will begin with the preparation of a systematic-review protocol containing the research questions, search strategy, review period, inclusion and exclusion criteria, screening process, data-extraction categories, and methods of analysis. The initial reference list will serve as the seed corpus, while additional studies will be identified from Scopus, Web of Science, Google Scholar, and relevant scholarly platforms and official repositories. The search will combine terms related to futures thinking, such as strategic foresight, scenario planning, participatory visioning, backcasting, horizon scanning, futures wheels, and road mapping, with terms related to land-use planning, CLUP preparation, local government, sustainability, climate adaptation, disaster-risk reduction, and resilience. The databases, search terms, filters, search dates, and number of records retrieved will be documented. All retrieved publications will be entered into a master reference file, and duplicate records will be removed. The remaining studies will undergo title, abstract, and full-text screening based on the established criteria. Reasons for full-text exclusion will be recorded. Reference lists and citations of eligible studies will also be examined to identify additional publications, which will undergo the same screening process. Information from the final publications will be entered into the standardized data-extraction matrix and checked against the original sources. Missing information will be marked as “not reported” and will not be assumed or invented. An audit trail containing search records, screening decisions, exclusion reasons, coding procedures, data-extraction records, and analytical notes will be maintained throughout the review.

2.7 Data Analysis Techniques

The extracted data will be analyzed using descriptive evidence mapping, qualitative content analysis, comparative analysis, thematic synthesis, gap analysis, and framework development. Descriptive evidence mapping will organize the studies according to publication year, country, planning setting, research method, futures-thinking approach, CLUP stage, stakeholder group, institutional factor, and sustainability focus. Frequencies and percentages may be used to describe the distribution of the evidence but will not be treated as measures of effectiveness. Qualitative content analysis will identify recurring ideas related to drivers of change, uncertainties, futures-thinking methods, stakeholder participation, institutional capacity, sustainability concerns, planning outcomes, barriers, and research limitations. Related findings will be grouped

into broader themes, such as anticipatory governance, scenario-based planning, participatory CLUP preparation, climate and disaster resilience, ecological protection, social equity, implementation, and adaptive monitoring. Comparative analysis will examine similarities and differences across countries, governance systems, planning levels, and futures-thinking approaches. Contradictory findings will be retained and interpreted according to differences in research design, stakeholder participation, institutional conditions, data quality, and level of implementation. Gap analysis will identify areas with limited evidence, particularly those involving Philippine LGUs, vulnerable sectors, social equity, institutional capacity, formal CLUP procedures, implementation, monitoring, and the translation of scenarios into zoning, investment, and policy decisions. The final analysis will develop a literature-derived framework linking environmental scanning, identification of drivers and uncertainties, stakeholder engagement, scenario development, strategy selection, policy and zoning integration, implementation, and adaptive monitoring. The framework will be presented as an evidence-based guide for future pilot testing and validation in Philippine LGUs.

2.8 Ethical Considerations

The study will use publicly accessible academic publications and authorized documentary sources. It will not involve direct interaction with human participants or the collection of personal, confidential, or identifying information. Ethical responsibility will center on proper attribution, accurate representation of the reviewed studies, transparent selection procedures, and avoidance of fabricated evidence. Findings reported by the original authors will be distinguished from interpretations developed through thematic synthesis and from recommendations proposed for Philippine LGU application. The researcher will retain relevant contradictory, negative, and inconclusive findings. Publications will not be selectively excluded merely because their results do not support the expected contribution of futures thinking. Missing data will be recorded as not reported and will not be completed through unsupported assumptions. All sources will be cited accurately. Copyrighted content will be paraphrased appropriately, and any direct quotation will be limited and properly attributed. Limitations involving database access, language restrictions, publication bias, reviewer judgment, and the scarcity of Philippine evidence will be disclosed in the final manuscript.

3. Results and Discussion

3.1 Profile of the Reviewed Literature

3.1.1 Temporal Distribution of the Literature

The reviewed corpus contained 45 publications dated from 2021 to 2026. Twenty-three publications, equivalent to 51.1 percent of the corpus, were dated 2021. Five publications or 11.1 percent were dated 2022, while ten publications or 22.2 percent were dated 2023. Another five publications or 11.1 percent were dated 2024. One publication or 2.2 percent was dated 2025, and one publication or 2.2 percent was dated 2026. Overall, 43 of the 45 publications, representing 95.6 percent of the corpus, were concentrated between 2021 and 2024. The concentration of studies within a relatively recent period indicates increasing scholarly attention to uncertainty, climate change, resilience, stakeholder participation, and long-term spatial decision-making. This pattern supports the timeliness of examining futures thinking in CLUP preparation. However, the recent publication profile also suggests that many approaches are still developing and may not yet have accumulated sufficient longitudinal evidence concerning implementation, institutionalization, and long-term planning outcomes. The literature is therefore more established in demonstrating methods and immediate planning benefits than in documenting whether futures-oriented strategies were sustained through subsequent plan cycles.

3.1.2 Primary Research Orientations

The descriptive evidence map classified 16 of the 45 publications, or 35.6 percent, as primarily concerned with explicit futures-thinking approaches, including foresight, scenario planning, participatory visioning, futures-oriented road mapping, and related anticipatory methods. Eleven publications, or 24.4 percent, primarily examined climate adaptation, disaster-risk reduction, vulnerability, or resilience. Another 11 publications, or 24.4 percent, focused principally on sustainable land use, ecosystems, biodiversity, resource systems, or urban environmental management. The remaining seven publications, or 15.6 percent, primarily examined governance, institutional capacity, local-government transformation, smart-city determinants, or related organizational concerns. The distribution demonstrates that futures-oriented land-use planning is multidisciplinary. It is not limited to scenario construction or long-term forecasting. The literature connects anticipatory planning with climate science, disaster-risk management, environmental assessment, biodiversity conservation, public administration, digital governance, infrastructure, and stakeholder participation. Consequently, the integration of futures thinking into CLUP preparation should not be treated as the addition of a single forecasting technique. It should be understood as a coordinated planning orientation that combines future exploration, spatial analysis, institutional decision-making, public participation, and sustainability assessment.

3.2 Integration of Futures Thinking into CLUP Preparation

3.2.1 Situational Analysis and Identification of Future Drivers

The reviewed literature showed that futures-oriented planning commonly begins with the systematic assessment of current conditions and the identification of forces that may influence future land-use patterns. The corpus included applications involving urban-flood vulnerability indices, land-use and land-cover change, ecosystem assessments, climate indicators,

demographic and socioeconomic development, infrastructure systems, natural-resource conditions, and relationships among water, energy, food, and land resources. Indicator-based, geospatial, and systems-oriented methods were used to identify vulnerabilities, development pressures, ecological constraints, and possible interactions among planning variables (Abdrabo, 2023; Hernández, 2023; Mahata, 2024; Purwanto, 2021; Zhou, 2025). These findings indicate that futures thinking should be integrated at the beginning of CLUP preparation rather than introduced only during visioning. The ecological profile and situational analysis should not be confined to describing present conditions. They should also identify long-term drivers, weak signals, emerging issues, critical uncertainties, and possible disruptions. For an LGU, these may involve changing settlement patterns, climate hazards, economic transitions, infrastructure requirements, technological change, migration, environmental degradation, and shifts in community needs. A future-oriented situational analysis provides the evidence necessary for constructing plausible land-use scenarios and evaluating whether existing policies will remain appropriate under changing conditions.

3.2.2 Construction of Alternative Land-Use Futures

The analysis identified scenario planning as the most consistently represented futures-thinking approach in the corpus. The reviewed studies used explorative scenarios, spatial scenarios, participatory prospective analysis, disruptive scenarios, climate scenarios, and alternative land-management scenarios. These approaches generally examined more than one possible future rather than extending a single historical trend. Mäntysalo et al. (2022) connected the transition from forecasting to scenarios with strategic city-regional land-use and transportation planning, while Sedighi et al. (2025) applied spatial scenario planning to land-use decision-making. Shantiko et al. (2021) applied participatory prospective analysis in two Indonesian regencies using a 20-year planning horizon. The process involved 17 participants in Kapuas Hulu and 23 participants in Central Moluccas, for a combined multistakeholder group of 40 participants, who took part in a series of three workshops and subsequent consultations. They identified influential variables, developed contrasting scenarios, and formulated road maps toward desired land-management outcomes. The findings demonstrate that scenario planning is valuable because it allows LGUs to examine several development pathways before assigning land uses, infrastructure investments, and regulatory controls. It does not seek to determine exactly what will happen. Instead, it reveals how different assumptions and decisions may produce different spatial, environmental, economic, and social outcomes. In CLUP preparation, scenarios could compare continued development trends, compact growth, agricultural protection, climate-resilient development, ecosystem-centered planning, or other locally relevant futures. The effectiveness of scenario planning, however, depends on whether the resulting alternatives influence land allocation, zoning, investment programming, and implementation rather than remaining as workshop narratives.

3.2.3 Participatory Visioning and Stakeholder Engagement

The reviewed evidence showed that participatory futures methods can involve substantial and diverse stakeholder participation. Soria-Lara et al. (2021) engaged 129 participants in developing disruptive scenarios for transport and land use toward 2050. The process used wild cards, or low-probability but high-impact developments, to stimulate thinking beyond conventional expectations. Shantiko et al. (2021) involved government agencies, community representatives, private-sector actors, academic institutions, and other local stakeholders in two Indonesian regencies. The participants were treated as holders of different but equally important forms of knowledge and were involved in identifying variables, developing scenarios, and constructing implementation road maps. These results indicate that futures thinking can broaden participation beyond conventional consultation. Communities may contribute local history, livelihood knowledge, cultural values, hazard experience, and perceptions of acceptable development. Technical specialists may contribute spatial data, environmental analysis, and modeling, while government officials provide knowledge of policies, mandates, and implementation constraints. However, the number of participants alone does not demonstrate meaningful inclusion. Effective participation requires evidence that stakeholder contributions influenced the scenarios, preferred land-use strategies, policy choices, and implementation arrangements.

3.2.4 Transition from Visioning to Planning Decisions

The reviewed literature provided evidence that futures-thinking processes can generate strategic outputs such as contrasting scenarios, preferred futures, implementation road maps, policy guidelines, and priority actions. In the Indonesian cases, Shantiko et al. (2021) reported that the participatory process resulted in scenarios and road maps containing guidelines for achieving desired land-management outcomes. The process also allowed stakeholders to consider strategies that might not have been accepted through conventional organizational procedures. In Thailand, Chaladdee et al. (2022) examined how flood-risk-reduction principles were reflected in existing and proposed Comprehensive Land Use Plans for Bangkok and Sing Buri. The study used 22 codes grouped under seven assessment areas to evaluate the mainstreaming of flood-risk reduction. The findings suggest that futures thinking becomes operationally important only when its outputs are incorporated into formal planning instruments. Preferred scenarios should be translated into land-use policies, zoning regulations, development controls, infrastructure priorities, environmental safeguards, investment programs, and institutional responsibilities. This translation is a critical point for Philippine CLUP preparation. A scenario workshop may improve awareness, but it will have limited effect if the resulting insights do not modify the land-use plan, zoning ordinance, sectoral programs, or monitoring indicators.

3.3 Sustainability and Resilience Dimensions

3.3.1 Climate Adaptation and Disaster-Risk Reduction

Climate and disaster concerns represented 11 of the 45 primary research orientations, equivalent to 24.4 percent of the supplied corpus. The studies examined flood vulnerability, climate adaptation, resilient land-use planning, disaster-risk mainstreaming, runoff and sediment responses, urban climate policy, and adaptation and mitigation indicators. Chaladdee et al. (2022) found that flood-risk-reduction content became more visible in proposed Thai spatial plans. The coded references in the succeeding Sing Buri and Bangkok CLUPs reached 202.06 percent and 112.70 percent, respectively, relative to the corresponding content of the existing plans. However, preparedness and stakeholder-participation considerations accounted for only 0.011 percent and 0.035 percent of coded mentions. The study also identified weak integration of emergency management with land-use controls and the reduction of some flood-related regulatory restrictions. The results indicate that an increase in the amount of hazard-related content does not necessarily demonstrate complete risk-sensitive planning. A CLUP may contain more references to flooding while still providing insufficient attention to preparedness, participation, enforcement, and the spatial consequences of development controls. Futures-oriented CLUP preparation should therefore test alternative climate and hazard conditions, assess how exposure and vulnerability may change, and connect risk information with land-use classifications, density controls, evacuation systems, infrastructure priorities, and environmental protection. Climate adaptation should be treated as a spatial-development concern rather than as a separate emergency-management activity.

3.3.2 Balance Between Climate Adaptation and Mitigation

Zhou et al. (2025) conducted a scoping review of 115 studies on climate-resilient land-use planning across agricultural, forestry, and urban-planning sectors. The review found an imbalance in favor of climate-mitigation indicators over adaptation indicators. It also distinguished between rural and urban applications and emphasized that indicators must be selected according to regional conditions and planning objectives. The study further examined interactions between adaptation and mitigation, including possible synergies and trade-offs. This finding is important for CLUP preparation because mitigation and adaptation do not always produce identical spatial priorities. Compact development may reduce transport-related emissions, but poorly designed densification may increase heat exposure, reduce open space, or concentrate populations in hazardous locations. Forest protection may contribute to carbon storage and biodiversity conservation, while infrastructure adaptation may require land, financing, and ecological trade-offs. LGUs should therefore use indicators that reflect local risks and objectives rather than adopt a uniform list. Indicators should also be examined as an interconnected set so that improvement in one sustainability dimension does not create unintended harm in another.

3.3.3 Ecosystems, Biodiversity, and Resource Systems

The reviewed corpus included 11 publications primarily concerned with sustainable land use, ecosystems, biodiversity, or resource systems. The studies addressed wildlife connectivity, freshwater biodiversity, ecosystem assessment, blue-green urban systems, circular economy, water-energy-food relationships, land-cover change, urban expansion, and the consequences of land-use change for human well-being. Collectively, these studies showed that land-use decisions influence ecological processes beyond the boundaries of individual administrative or zoning areas (Bryce S. Wade, 2023; Charles B. van Rees, 2021; Hernández, 2023; Puchol-Salort, 2021; Purwanto, 2021; Zorrilla-Miras, 2021). The findings support the treatment of the CLUP as a social-ecological planning instrument. LGUs should not evaluate land parcels exclusively according to their immediate development value. They should also consider watershed functions, habitat connectivity, food production, water availability, flood regulation, biodiversity, waste flows, and ecosystem services. Futures thinking strengthens this process by examining how alternative land-use patterns may affect ecological systems over time. This approach is particularly important when development decisions are difficult or costly to reverse.

3.3.4 Social Equity and Inclusive Futures

Ayambire et al. (2025) initially identified 1,416 publications from Scopus and Web of Science and included 157 peer-reviewed articles after screening. Among the 157 articles, only 10, equivalent to 6.4 percent, explicitly addressed social equity. Eight of the ten equity-focused articles were published in or after 2017, and five were published in 2021. The review also found that 39.1 percent of the scenario-planning cases were situated in Asia and 31.3 percent in Europe. However, only one Asian case explicitly addressed equity, while four equity-focused cases were in Europe and three were in North America. The findings demonstrate that scenario planning is not automatically equitable. A technically sophisticated scenario may still overlook unequal exposure to hazards, displacement risks, access to services, livelihood losses, cultural impacts, or the distribution of development benefits. In CLUP preparation, social equity should be incorporated deliberately by identifying who participates, whose knowledge is recognized, which groups bear the costs of alternative land-use decisions, and who benefits from public investments. Recognition, representation, and distributional consequences should therefore be considered when evaluating alternative futures.

3.4 Institutional and Governance Conditions

3.4.1 Organizational Capacity and Political Support

Seven of the 45 publications, or 15.6 percent, were primarily oriented toward governance, institutional capacity, digital transformation, smart-city determinants, or local-government organization. The literature associated effective planning with leadership, strategic direction, technical knowledge, stakeholder relationships, interagency collaboration, organizational structures, resource mobilization, and the authority to implement decisions. Trygg (2021) examined institutional capacity in strategic spatial planning, while Gasco-Hernandez (2022) analyzed organizational capacity in three European smart cities. Salvador (2021) connected local-government institutional capacity with sustainable-development policies, and Nadin (2021) emphasized integration, adaptability, and participation in spatial-planning systems. These findings indicate that futures thinking cannot be institutionalized through a single training activity or planning workshop. LGUs require personnel who can undertake environmental scanning, facilitate stakeholder discussions, interpret spatial data, develop scenarios, evaluate trade-offs, and communicate long-term implications. They also require leadership support, formal responsibilities, adequate resources, interoffice coordination, and mechanisms for integrating futures-oriented findings into legally recognized planning documents. Without these institutional conditions, futures thinking may remain dependent on individual advocates and may disappear when personnel or political leadership changes.

3.4.2 Analytical and Digital Decision Support

The reviewed studies applied several analytical methods to support complex land-use decisions. This included principal component analysis, the analytical hierarchy process, DEMATEL analysis, geospatial analysis, vulnerability indices, ecosystem assessment, landscape modeling, and spatial scenario modeling. These tools were used to organize variables, determine relationships, identify priority areas, represent alternative spatial outcomes, and support the comparison of planning options (Abdrabo, 2023; Braga, 2021; Mahata, 2024; Westphal, 2023). The evidence suggests that futures-oriented CLUP preparation should combine analytical tools with deliberative processes. Models and indicators can improve the consistency and transparency of planning, but they are shaped by data availability, selected variables, assumptions, weighting methods, and technical limitations. They should not replace stakeholder judgment or local knowledge. LGUs should use digital and spatial tools to clarify possible consequences, while retaining participatory mechanisms for interpreting results, evaluating values, and deciding among alternative futures.

3.5 Challenges Affecting the Integration of Futures Thinking

3.5.1 Fragmentation Across the Planning Cycle

The synthesis showed that the reviewed studies frequently concentrated on one or several components of futures-oriented planning. Some focused on identifying drivers and indicators, while others emphasized scenario construction, stakeholder engagement, climate assessment, spatial modeling, or institutional capacity. Fewer studies documented the complete progression from environmental scanning and scenario development to formal land-use allocation, zoning, financing, implementation, monitoring, and subsequent plan revision. The strongest evidence concerned the development of methods and planning insights, while evidence concerning long-term implementation and institutional continuity was comparatively limited. This fragmentation represents a major challenge for CLUP preparation. Futures thinking should not operate as an isolated activity inserted into a single workshop. It should connect the major stages of planning. Drivers and uncertainties should inform scenarios; scenarios should inform preferred strategies; strategies should influence spatial policies and zoning; and implementation outcomes should be monitored against the assumptions used in the scenarios. Without these connections, futures thinking may improve discussion without substantially changing planning decisions.

3.5.2 Gap Between Formal Recognition and Implementation

The Thai CLUP analysis showed that greater formal recognition of flood-risk reduction did not eliminate weaknesses in preparedness, participation, emergency management, or land-use regulation. Similarly, the Indonesian cases demonstrated that participatory foresight could produce scenarios and implementation road maps, but the broader literature indicated that the conversion of futures-oriented outputs into sustained institutional practice depends on governance capacity and organizational acceptance. These findings distinguish procedural integration from substantive integration. Procedural integration occurs when futures-thinking activities appear in planning workshops, reports, or technical studies. Substantive integration occurs when these activities change land-use classifications, development controls, investment priorities, institutional responsibilities, and monitoring practices. Philippine LGUs should therefore evaluate the integration of futures thinking according to its influence on actual CLUP decisions rather than according to the mere completion of a scenario activity.

3.5.3 Limited Philippine and LGU-Specific Evidence

The supplied reference corpus represented planning experiences from Asia, Europe, Africa, North America, Australia, and other international settings. However, none of the 45 listed publications was explicitly identified as an empirical study of futures thinking within Philippine LGU CLUP preparation. The corpus therefore provided substantial international evidence but no direct basis for claiming that a particular futures-thinking method had already been validated within the Philippine CLUP system. This gap limits the direct transferability of the findings. Philippine LGUs operate under specific

legal mandates, planning guidelines, approval processes, fiscal conditions, political arrangements, technical capacities, and community contexts. The proposed integration framework should therefore be considered literature-derived rather than locally validated. Future research should apply and evaluate the framework in selected LGUs representing different income classifications, geographical conditions, hazard exposures, urbanization levels, and institutional capacities.

3.6 Relationship Among the Major Themes

The thematic synthesis identified an interconnected relationship among evidence, anticipation, participation, institutional capacity, and sustainability. Analytical and spatial evidence supported the identification of drivers, risks, and constraints. Futures-thinking methods transformed these inputs into alternative scenarios. Stakeholder participation contributed local knowledge, preferences, and legitimacy. Institutional capacity determined whether the scenarios could influence formal decisions and implementation. Sustainability indicators provided the basis for comparing alternative futures and monitoring their consequences. Weakness in any one component reduced the effectiveness of the entire process. The relationship among these themes indicates that futures-oriented CLUP preparation should follow a sequential but iterative process. The process begins with environmental scanning and the identification of drivers and uncertainties. It proceeds to the construction of alternative spatial futures, participatory evaluation of their consequences, and selection of preferred or robust strategies. These strategies are then translated into land-use policies, zoning measures, investment programs, and institutional responsibilities. Monitoring indicators and trigger points are used to determine when assumptions have changed and when strategies or plans require adjustment. Feedback from monitoring returns the process to situational analysis, making the CLUP adaptive rather than static.

3.7 Proposed Framework for Futures-Oriented CLUP Preparation

The literature-derived framework consists of eight connected components. These are the establishment of the planning mandate and institutional team; environmental scanning and baseline assessment; identification of drivers, uncertainties, risks, and opportunities; participatory construction of alternative land-use futures; assessment of environmental, social, economic, climate, technological, and institutional consequences; selection of preferred and robust spatial strategies; integration into land-use policies, zoning, investment, and implementation arrangements; and adaptive monitoring and plan revision. The proposed framework addresses the principal gaps identified in the review by connecting futures thinking to the complete CLUP cycle. It combines technical analysis with community participation and links long-term visioning with regulatory and implementation instruments. It also emphasizes that a preferred scenario should not be selected solely because it represents an attractive future. It should be evaluated according to feasibility, resilience, equity, ecological integrity, institutional capacity, and performance under different future conditions.

3.8 Overall Implications for Local Government Units

The results demonstrate that futures thinking can contribute to CLUP preparation by expanding the range of futures considered, making uncertainties explicit, strengthening stakeholder participation, integrating climate and ecosystem concerns, and supporting more adaptive planning decisions. The evidence also shows that the effectiveness of futures thinking depends on its connection with formal planning stages, institutional authority, implementation mechanisms, and monitoring systems. Futures thinking is therefore most useful when it changes how an LGU analyzes conditions, compares spatial alternatives, selects strategies, and responds to change. For Philippine LGUs, the review supports the pilot integration of futures-thinking methods into ecological profiling, visioning, scenario development, land-use strategy formulation, zoning review, and monitoring. However, the literature does not justify immediate uniform adoption without local testing. The proposed framework should first be contextualized and evaluated through empirical application in selected LGUs. Such validation should examine usability, technical requirements, participation quality, institutional feasibility, cost, influence on actual CLUP decisions, and capacity to improve long-term sustainability and resilience.

4 Conclusion & Recommendations

The systematic review of 45 publications showed that futures thinking can strengthen the preparation of Comprehensive Land Use Plans by enabling local government units to identify long-term drivers and uncertainties, construct alternative land-use scenarios, assess climate and disaster risks, integrate ecological and socioeconomic considerations, and involve stakeholders in determining preferred development pathways. The reviewed evidence indicated that scenario planning, strategic foresight, participatory visioning, spatial modeling, vulnerability assessment, and related anticipatory approaches are most valuable when they are connected to the entire planning cycle, from situational analysis and vision formulation to spatial-policy development, zoning, implementation, monitoring, and plan revision. However, the literature also revealed persistent weaknesses involving fragmented application, insufficient consideration of social equity, limited stakeholder influence, inadequate institutional capacity, and gaps between the production of future-oriented knowledge and its translation into formal land-use decisions. The findings therefore support the integration of futures thinking into CLUP preparation as an adaptive, participatory, evidence-based, and sustainability-oriented planning approach, although its effectiveness in the Philippine context remains subject to local adaptation and empirical validation.

Philippine local government units and concerned planning institutions should consider pilot-testing the literature-derived futures-oriented CLUP framework in selected localities before adopting it on a wider scale. Futures-thinking activities should be integrated into ecological profiling, environmental scanning, visioning, scenario development, evaluation of alternative land-use strategies, zoning formulation, investment programming, and monitoring rather than implemented as isolated workshops. Pilot applications should involve relevant government offices, communities, vulnerable sectors, technical experts, academic institutions, civil-society organizations, and private-sector representatives to ensure that alternative futures reflect diverse knowledge and interests. Capacity-building programs should also strengthen the competencies of local planners in strategic foresight, scenario construction, spatial analysis, stakeholder facilitation, climate-risk assessment, and adaptive monitoring. The results of pilot applications should be evaluated according to their feasibility, participation quality, institutional requirements, influence on actual CLUP decisions, contribution to sustainability and resilience, and suitability for different LGU conditions.

The study was limited to the 45 publications contained in the reviewed reference corpus and therefore may not represent all available research on futures thinking, land-use planning, and local governance. The evidence was geographically and methodologically diverse, which limited direct comparison among studies and prevented statistical meta-analysis. The literature also contained limited direct evidence concerning Philippine LGUs and the formal Philippine CLUP preparation process, making it inappropriate to assume that international methods can be transferred without contextual modification. In addition, many reviewed studies focused on specific tools, cases, or stages of planning and provided limited longitudinal evidence regarding implementation, institutional continuity, and long-term outcomes. The proposed framework is consequently literature-derived and has not yet been field-tested or validated in Philippine local-government settings.

Compliance with ethical standards

This systematic review used publicly accessible scholarly and documentary sources and did not involve human participants; therefore, voluntary participation, informed consent, confidentiality procedures, and direct ethical approval were not applicable, subject to institutional requirements. The study observed proper citation, accurate representation of evidence, responsible authorship, acknowledgement of relevant contributions, disclosure of any conflict of interest, and compliance with copyright and publication standards. All authors are accountable for the integrity, originality, and accuracy of the manuscript.

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