

Article

Identifying the Impact Factors on the Land Market in Nepal from Land Use Regulation

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Abstract: Measuring the impact of land use regulation on the land market involves identifying and classifying relevant impact factors related to the land market. The objective of this study was to identify land market impact factors in the context of the introduction of land use regulation in Nepal. Through a combination of desktop review and the incorporation of stakeholder perspectives, the paper presents a new approach for determining land market impact factors due to land use regulation where both generic and country issues are considered. A desktop review was carried out to identify a preliminary set of impact factors, which were reclassified through intuitive analysis based on the degree of thematic closeness. Perspective-based impact factors were identified through the qualitative analysis of primary data collected through semi-structured interviews with the Nepalese land market stakeholders. These independently derived impact factors were compared with the desktop literature review impact factors, resulting in 14 land market impact factors across four dimensions, including transaction cost, valuation, mortgage availability, taxation, and compensation across the economic dimension; lot size, subdivision restrictions, and coordination across the institutional dimension; awareness, expectation, and proximity across the social dimension; and risk reduction, quality of residential land, and suitability of zoning classification across the environmental dimension. There was significant overlap and commonality across factors identified from both the literature review and semi-structured interviews. The land market impact factors determined in this study may be adapted and generalized across other countries and could be utilized to better understand the impacts of land policy decisions on urban planning and development. Further research is recommended on the process to operationalize the use of these factors to quantify the impact of land use regulation on different land markets.

Keywords: desktop review; land planning; stakeholder interviews; qualitative data analysis; cluster analysis; urban development



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1. Introduction

The efficient management of land use and well-functioning land markets form the cornerstone of sustainable development. Achieving the sustainable use of land resources entails evaluating economic, social, environmental, and institutional factors. Consequently, assessing the effects of land use regulations on the land market from various perspectives can aid decision-making and promote sustainable land management approaches [1–3]. The measurement of the impact of land use regulation on the land market is a complex process and requires a thorough examination of associated impact factors across a variety of dimensions [4]. This paper offers a comprehensive exploration of the relationship between land use and land markets, drawing from various literature sources and local stakeholders' insights in Nepal. Through the combination of the desktop review and the incorporation of stakeholder perspectives, this study provides a new approach for determining land market impact factors which are both generic but also specific to the country being studied.

A land market is a complex system of processes where several actors, such as landowners and buyers, financial institutions, land developers and their professional organizations, and land administration authorities, interact at different levels to achieve a market outcome [5]. A large body of literature [5–11] has addressed the multifaceted nature of land market dynamics and the diverse impacts of land policy interventions across different countries. Countries that have regulated land use have experienced the impact of this regulation across multiple dimensions of their land markets. Examples from India [12], the UK [13,14], Brazil [15], and Japan [16] demonstrate the wide-ranging effects of land use regulations, particularly on transaction costs, housing affordability, land supply, and property values. In Nepal, the restriction of the fragmentation of agricultural land through enforced agricultural classification nationwide [17] had significant impact on landowners and stakeholders across the country, leading to widespread dissatisfaction and even litigation against the government's policy [18,19].

However, the adverse effects of uncontrolled land use and development have necessitated governments to implement measures to regulate land use and land planning in many countries. Government intervention in the land market often involves the introduction of land use regulations aimed at mitigating negative outcomes such as environmental degradation, food insecurity, and poorly planned development [8]. However, any interventions can change the behaviour of the land market and lead to outcomes that affect many stakeholders. It is, therefore, important to minimize the unforeseen impacts of well-intentioned land use regulations and policies on the land market [20]. Measuring the impact of land use regulation on the land market helps identify areas within the land market that need to be prioritized.

Although the literature on land use policy interventions provides a broad understanding of the influence on the land market, the impact of these interventions will vary across different jurisdictions. Therefore, it is important to recognize that the findings from such studies may not directly extrapolate to land markets in different jurisdictions as each land market is unique in characteristics and is a function of institutional, socio-cultural, and legal settings [21]. A land market is dynamic, relative, and contextual; consequently, the impact outcome varies across jurisdictions and cannot be generalized [5]. A land market outcome can be positive for a particular group of stakeholders but can be negative for others. This implies that multiple perspectives are required to holistically measure the impact of land use regulation on the land market. There have been limited studies that have investigated land use regulation and its impact across multiple dimensions of the land market [6,22]. This study aims to explore and understand the land market impact factors in the context of the recent introduction of land use regulation in Nepal.

Most research on the impact of land use regulation has focused on property values and rights, which affect the economic and institutional dimensions of the land market [5,9,16,23–25]. However, it is crucial to recognize that participants are an integral component of the land market but have often been overlooked in previous studies. The introduction of land use regulations requires a holistic evaluation across multiple dimensions (including the social and environmental dimensions) and multiple stakeholders to effectively understand the complexities of the land market. This study aims to bridge these gaps by identifying a set of relevant land market impact factors through a comprehensive literature review and the inclusion of the perspectives of land market stakeholders across multiple dimensions of the land market. The following three research questions will be utilised to guide this study: What common land market impact factors resulting from land use regulation can be identified from the literature? How can the perspectives of stakeholders impacted by land use regulation in a local land market be assessed? Can the literature identified impact factors and stakeholder perspectives on land market impacts be integrated to better understand the influence of land use regulation in Nepal?

This paper firstly presents the land use–land market situation in Nepal in Section 2, including the concept of the land use–land market relationship. Section 3 discusses the research methods adopted to identify land market impact factors through a desktop litera-

ture review and subsequent stakeholder interviews. Section 4 describes the comparative analysis of both the desktop review and interviews to arrive at a set of refined impact factors. The results are then discussed, and final conclusions are drawn.

2. Literature Review

Recent land classification in Nepal dates back to the land reform program of 1963, which established the land registration system using cadastral surveying and the management of land records at district land revenue and survey offices [26]. Under the Land Survey and Measurement Act [27], land was classified into four classes based on agricultural productivity: Abal (highly productive land), Doyam (land of medium-level productivity), Sim (low-level productive land), and Chahar (unproductive land) [26,28]. However, this legislation did not address land suitability for non-agricultural purposes such as residential, commercial, and industrial use. The introduction of the National Land Use Policy in 2012 and its amendment in 2015 aimed to address concerns regarding food security and environmental degradation [29–31]. This policy was followed by the implementation of restrictions on the subdivision of agricultural land in 2017 [17] and the enactment of the Land Use Act 2019 and Land Use Regulations 2022 [32,33], further reinforcing land use regulation in Nepal.

The limited agriculture-based land classification in Nepal failed to address critical issues such as land fragmentation and haphazard land development driven by rapid population growth and internal migration from rural to urban areas [34,35]. This led to concerns about the loss of agricultural land, food security, congested urban settlements, lack of open space, and environmental degradation [29,36]. In response, the Nepalese government introduced the National Land Use Policy in 2012 [25] to control haphazard land use development. However, after the 2015 earthquake in Nepal, the focus shifted to resettlement programs, prompting the replacement of the policy with a revised Land Use Policy in 2015 [30]. This updated policy expanded land classification to 11 zones, mandated hazard area delineation, and specified land use implementation strategies. Political priorities delayed the enactment of land use controls [37] and resulted in the exacerbating of agricultural land fragmentation [34]. In response, a ministerial decree was issued in 2017 [17] to enforce the restriction of the subdivision of agricultural land nationwide, leading to dissatisfaction among real estate agents and private land developers. However, the High Court upheld the government's decision [19] and directed the continuation of restrictions until the enactment of a land use act. Subsequently, the Land Use Act 2019 was enacted, mandating that local governments designate land classifications prior to land transactions [32]. The implementation of land use regulation has been closely monitored by key stakeholders in the land market, as well as academics and researchers [18,31,34,38,39].

In India, land acquisition for urban expansion has diverse impacts across multiple dimensions, and therefore has been a topic of significant focus concerning sustainable development [40]. For instance, the initiation of an urban expansion program resulted in the conversion of over 1.5 million hectares of land which could have produced 1 million tons of grain into Special Economic Zones (SEZs). The land use change displaced at least 1.4 million households and caused loss of livelihood to approximately 8.2 million agricultural workers [41]. This displacement led to various adverse outcomes, including landlessness, unemployment, homelessness, marginalization, increased illness rates, food insecurity, loss of access to common property, and social disconnection [41]. Additionally, new towns are being developed near major cities like Mumbai, Kolkata, and Delhi, often entailing the conversion of agricultural land into urban areas to address issues of overcrowding and congestion. Landowners predominantly engaged in farming and fishing often struggle to resist land conversion due to their limited bargaining power. Consequently, this process frequently triggers land acquisition and the displacement of original inhabitants, leading to legal disputes and social unrest [42].

Bhutan has also recently embarked on the implementation of its National Land Use Zoning (NLUZ) strategy to optimise its limited land resources, increase the sustainable

use of land, prioritize food security, and enhance opportunities for socio-economic development [43]. Like other countries, Bhutan has challenges, including across-agency coordination, disparate land use data sets, limited information sharing and the management of multiple stakeholders [44,45]. The National Land Commission Secretariat of Bhutan is working closely with stakeholders to coordinate nationwide land use zoning and prepare land zoning maps [46,47].

Land Use–Land Market Relationship in Nepal

A land market involves a multifaceted network of interactions involving various participants such as landowners, buyers, financial institutions, land developers, professional organizations, and land administration authorities, all working together across different levels to establish market dynamics [5]. The land market in Nepal aligns with Dale and Baldwin's [48] three-pillar model, which encompasses land registry services, financial services, land valuation services, and the involvement of key stakeholders as fundamental elements which shape the market. In Nepal, land transaction processes involve various stakeholders who engage through the district land revenue and survey offices dispersed throughout the nation. With over 25 million land parcels documented in these offices [49], they serve as pivotal hubs for coordinating land valuation activities mandated by the Land Revenue Act [50]. These offices also provide land records to their customers such as landowners, notaries, financial institutions, land developers, and real estate offices. Nepal has over 11,000 branches of banks and financial institutions [51], providing credit services to the landowners where land properties serve as collateral [52,53]. The collaborative ecosystem, comprising various organizations, institutions, and customers, facilitates the transfer of land rights throughout the transactional process [26,28]. The legal framework underpinning the Nepalese land market primarily comprises the Land Revenue Act [52], the Land Act [54], and the Land Survey and Measurement Act [27]. Nevertheless, the introduction of the Land Use Act 2019 [32] and Land Use Regulations 2022 [33] alongside the enforcement of land use policies has begun to influence various dimensions of the land market.

The economic dimension of the land market impact can be represented through economic models that assess land value by considering various factors, including legal and political, economic, environmental, social, urban, public interest, and demographic considerations [55]. Economic factors such as commodity value, quantity, or price are influenced by buyer and seller behaviour [56] and are influencers of the land market [7,9,57–65]. Land use planning has, at times, led to delays in land development, resulting in shortages of land and space for residential and commercial purposes, impacting not only the housing market but also the broader economy [14,22]. Economic factors influencing the land market due to the introduction of zoning or related restrictions include transaction costs [21], the balance of demand and supply of land [6], taxation based on permitted use [66], availability of mortgage financing [8,21], compensation mechanisms [21,67], and, notably, land speculation [68,69].

The social dimension of land policy decisions relates to how well land policies align with public expectations. Introducing a new land administration or management system, as argued by Tuladhar and van der Molen [70], can lead to service delivery delays until participants become familiar with the system. Dowall [6] suggested that land use regulation can cause procedural delays and bureaucratic hurdles, while Mayer and Somerville [71] highlighted delays in development processes due to land use regulations. Refs. [17,72] Nepal's land use policy does not accommodate mixed land-use zones, contrary to common urban land-use planning [73], thereby limiting flexibility in planning and community needs. Schirmer [74] identified issues related to land availability, employment, and identity as part of the socio-economic impacts of land use change. In Nepal, the designation of a land use class on land already purchased for a different purpose has raised concerns regarding economic loss and fairness of the process [19]. Loxton et al. [75] argued that individual

social impacts resulting from policy changes and interventions interact with and aggregate cumulative social impacts.

The environmental dimension of the land market's impact can lead to either positive or negative changes in the land market in relation to the land use changes. For instance, road expansion in Kathmandu has improved traffic flow and increased open spaces, yet it has also contributed to noise and air pollution along major roadways [76]. Residential land development standards necessitate the establishment of open spaces, roads, and utility services before land is brought into the land market. Residential plots with improved quality attract higher demand than unplanned developments [77]. Land use planning, as argued by Burby and Dalton [78], restricts land availability for development by demarcating hazard-prone areas. According to [79,80], the designation of risk areas also causes changes in potential buyers' preferences in the land market, with reduced interest in investing in high-risk zones.

The institutional dimension of the land market encompasses problems stemming from inefficient regulation implementation or additional institutional barriers during land use regulation implementation. New legislation should not introduce further risk to land use or land ownership rights [81]. One of the most contentious issues in the land use–land market relationship is land rights [8]. Inadequate attention to land rights during land use implementation often leads to complaints, legal disputes, and conflicts [17–19,82,83]. Similarly, the implementation of the Guided Land Development Project (GLDP) in Kathmandu failed to pay compensation to the landowners for the land acquired for road expansion, prompting protests and legal action [84,85]. Poor coordination, another institutional factor, leads to the poor sharing of information and experiences, creating gaps which are not addressed by any party [86].

The literature underscores that effective land use management and efficient land markets are foundational prerequisites for achieving sustainable development [1]. However, 'land use' and the 'land market' share a reciprocal relationship, with the former often regulating land use rights while the latter promotes freedom in land use [8,83]. In general, two overarching institutional issues regarding rights are prominent: the right to live in a safe environment without being adversely affected by others' actions and the right to dispose of property at one's discretion [18,87]. The implementation of land use regulations can also impact other aspects, such as changes in actors' behaviour [5] and organizational business processes [48]. Thus, the effects of land use regulation on the land market extend beyond the economic dimension but influence the social, institutional, and environmental dimensions. Research adopting an integrated approach to consider these various dimensions of the land market is lacking.

Assessing the impact of land use regulations on the land market involves comparing the market's condition before and after the implementation of land use regulations. Given that the land market comprises multiple components, there are various aspects to consider, each reflecting the perspectives of different stakeholders as identified in this study. A holistic evaluation cannot rely solely on quantitative methods, and so, to address these complexities, a hybrid approach is needed [88].

The intricate nature of the land market, demonstrated by its diverse impact factors, presents a challenge in applying a single theory for its evaluation. This aligns with the theoretical view discussed by Needham et al. [5] that there cannot be a general theory for a land market. Consequently, a unified theory to comprehensively describe the land market was not considered as appropriate. The three-pillar model of the land market by Dale and Baldwin's [48] supports this approach as it encompasses various components, whether categorized as three pillars or represented by the diverse range of participants involved in transactions and services within the market [21]. Therefore, a holistic assessment requires a pragmatic approach that explores a range of impact factors and perspectives. The research approach adopted in this paper thus explores land market impact factors based on a desktop study in combination with the perspectives of land market stakeholders [89].

3. Materials and Methods

3.1. Description of the Research Approach

The selection of a particular research method depends on the purpose of the research: descriptive, explanatory, or exploratory [88]. This study has followed an exploratory research approach to investigate land market impact factors based on desktop study in combination with semi-structured interviews with land market stakeholders. As suggested by Tashakkori and Teddlie [89], the multi-qualitative data collection technique has been adopted. Various research approaches were evaluated with respect to the impact of land use regulation on the land market. These approaches were reclassified and categorised, including the use of quantitative methods by Lees [9,90] and qualitative approaches adopted by Needham, Segeren, and Buitelaar [5] to identify land market outcomes [91]. A desktop review of literature enables the integration of multiple research outcomes to understand the available evidence at a meta level and helps identify the areas requiring further research. It also enables the development of theoretical frameworks and conceptual models [92] to advance progress in this field. In this study, a two-step approach was used to determine the associated impact factors for the Nepalese land market. Firstly, a desktop study was performed to identify the preliminary set of the land market impact factors. Then, a semi-structured interview with stakeholders was utilized to refine the preliminary land market impact factors in the context of the Nepalese land market. The research approach is summarized in Figure 1.

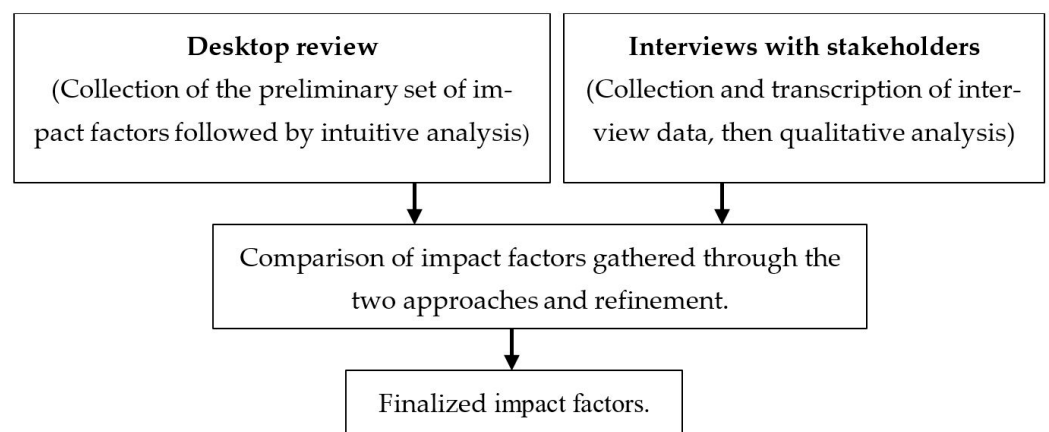


Figure 1. Research approach.

3.2. Desktop Review

The desktop review was selected for the identification of land market impact factors associated with land markets for two reasons. Firstly, it provided a comprehensive breadth of knowledge of possible land market impact factors across multiple jurisdictions. Secondly, it was a low-cost approach in identifying the land market impact factors at the preliminary phase of the research [91].

The desktop literature review was not limited to academic journals and included conference proceedings, international guidelines, professional reports, government policy documents, working papers, and discussion papers, with the expectation of any relevant studies on the impact factors of land use on the land market or its components. Platforms such as Web of Science and library databases identified a limited number of peer-reviewed articles. In comparison, Google Scholar provided links to a diverse and larger set of publications, including published articles, preprints, theses, books, and court opinions. An internet search using the Google search engine with keyword searches in single and combined forms such as ‘land market’, ‘land market impact assessment’, ‘impact of land zoning on land market’, and ‘land use on land market’ was used to identify relevant articles. The output of the searches was reviewed, which led to the elimination of many of the articles and provided a list of preliminary selected articles. This was followed by a review

of the articles' key words, abstract, summary, introduction, and conclusion, from which was filtered a list of selected articles for in-depth study. Table 1 shows the search statistics of the articles collected for the preliminary study.

Table 1. Selection of articles for identification of land market impact factors.

SN	Articles	Initially Collected	Dropped	Selected Articles for in-Depth Study
1	Journal based	70	46	24
2	Conference proceedings/conference paper	27	21	6
3	Report and guidelines from government authorities and global financial and welfare organizations	17	12	5
4	Books/book section	8	5	3
5	Others (magazine articles, guidelines, thesis, unpublished articles)	17	12	5
	Total	139	96	43

The preliminary study helped to select articles for an in-depth study of their content to identify land market impact factors. Based on the degree of similarity of the impact factors and their re-interpretation, they were re-classified and categorized into social, economic, institutional, and environmental dimensions. The application of the desktop review provided a list of the preliminary impact factors. The final refinement was undertaken during an interview with stakeholders.

3.3. Interview Data Collection in Nepal

The Kathmandu Valley in Nepal was chosen as the study area for this research due to its significance as a representative case regarding recent land use regulation. It encompasses the districts of Kathmandu, Bhaktapur, and Lalitpur (Figure 2), along with 19 local authorities—two metropolitan cities and 17 municipalities. The valley presents a diverse environment from high density built-up areas to sprawling peri-urban settlements. With a population of approximately three million as of 2021, the Kathmandu Valley ranks as the most densely populated region in Nepal [93]. The land administration infrastructure in the study area included nine land revenue and cadastral survey offices that facilitate land transactions for approximately 1.5 million registered landowners [94]. Additionally, the Kathmandu Valley holds considerable economic importance within Nepal, hosting 23% of the nation's financial institutions [95] and contributing significantly to the country's economic activities, accounting for roughly one-third of its total output [96]. Furthermore, key governmental bodies, ministries, departments, land professional organizations, and private land development agencies are concentrated within this study area. Due to the recent implementation of subdivision restrictions and lot size control, the Kathmandu Valley presents an ideal study area for investigating land use restrictions, particularly in a context where there is expected to be a high demand for residential land. Therefore, the Kathmandu Valley was selected as a representative sample for assessing the impact of land use regulation on Nepal's urban land market.

For the second stage of this study, semi-structured interviews with various land market stakeholders were undertaken to better understand and position the land market impact factors in the Nepalese context. Before commencing fieldwork, the authors obtained ethical clearance through the University of Southern Queensland to ensure that the research adhered to appropriate ethical guidelines. The semi-structured interviews were guided by the findings from the desktop review and the preliminary impact factors. However, these interviews also provided stakeholders with the opportunity to offer further insights into their experiences regarding the impact of land use regulation in Nepal.

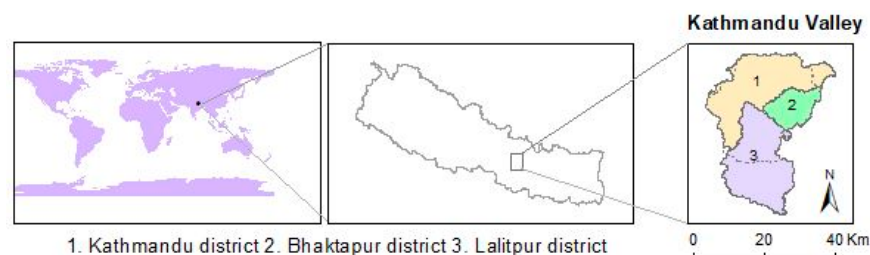


Figure 2. Study area.

The data collection phase was undertaken from June to August 2018 and included detailed fieldwork across the study area. The stakeholders included individuals, groups, and organizations involved in land market activities and processes [21]. The study identified potential interview respondents by employing a purposive sampling method [97]. This approach involved initially identifying relevant organizations, reaching out to their executives, identifying suitable participants within them, and subsequently recruiting them into the data collection process. Three main groups were identified: private and professional, institutional, and financial. Participants were selected based on their roles and positions within their respective groups. Minimum criteria were set for each group to ensure the inclusion of knowledgeable and relevant individuals. A total of 60 interview participants were selected through purposive sampling, with 20 participants per group. This sampling method ensured representation across the different stakeholder groups. An interview guide consisting of a list of topics covered in the interview was distributed to each participant along with the schedule for the interview. Semi-structured interviews were conducted that focused on identifying key land market impact factors and perspectives on the impact of land use regulation across economic, social, environmental, and institutional dimensions.

The interviews investigated stakeholders' perspectives on how land use regulation in Nepal had influenced various aspects of the land market, including economic, social, environmental, and institutional dimensions. A total of 14 questions were asked about identify factors and issues affecting the land market due to these regulations. The interviewer began by asking stakeholders about the impacts they had observed, followed by questions about specific areas such as taxation changes, land transaction costs, mortgage availability, and compensation. The social aspects related to land use regulation, including whether the regulations met social expectations and the impact of resettlement programs, were explored next. The environmental impacts were then investigated followed by the institutional arrangements and their effects on the land market. Finally, participants were asked to summarize their overall views on the impact of land use regulation on the land market. Each interview took approximately half an hour. Data was digitally recorded, transcribed, and coded.

3.4. Data Analysis

In the desktop review, the 43 selected papers underwent a thorough examination to identify key terms associated with factors influencing the land market. A total of 109 land market terms were identified, reclassified to reduce duplication, and then ranked in the frequency of their occurrence to highlight the most important terms. These identified key terms were aligned with one of the four dimensions—economic, institutional, social, and environmental—as discussed above in Section Land Use–Land Market Relationship in Nepal. Within each dimension, the initially allocated key terms were further scrutinized for similarities, redundancies, and relevance. Terms sharing similar meanings were grouped together, while ambiguous or overly general terms were excluded. Subsequently, a final set of literature-based impact factors was established for each dimension.

The qualitative data collected through the semi-structured interviews were analysed to identify the perspective-based land market impact factors. Qualitative data analysis forms a systematic analytical protocol that typically involves three sequential activities: data reduction, data display, and conclusion-drawing and verification [98,99]. The 60

recorded interviews were first transcribed into text format and saved as individual files, then reviewed and checked for any transcription errors. Data codes were defined based on their thematic alignment to an identified dimension—economic, social, environmental or institutional—as indicated by the literature reviewed in Section 2 and the preliminarily identified literature-based impact factors. These codes consisted of single words or combinations of words that indicated the changes that occurred in the Nepalese land market as perceived by the participants. Data analysis using the codes was then undertaken in the Qualitative Data Analysis (QDA) Miner v6 software. This software aided in identifying recurring words and phrases linked to the codes and performed link analysis on the coded data to visualize its clusters. A total of 3187 identified occurrences across 112 clusters were determined by QDA Miner.

The clusters of computer-grouped codes within each dimension were examined to ensure that they were relevant to their respective dimensions. Codes with similar themes were grouped together and represented with corresponding colours for visualization purposes. A frequency analysis was conducted to determine the prevalence of each code, and the size of each node within a cluster reflected the frequency of coded responses. Recurring codes and their clusters were analysed further to uncover the underlying impact issues. This qualitative data analysis involved three stages: coding, identifying impact issues, and defining representative themes associated with each cluster. Finally, the results were compared with findings from a desktop review to offer a comprehensive understanding of the impact of land use regulation on the land market.

4. Results

4.1. Identification of Land Market Impact Factors through Desktop Review

The desktop review provided an initial set of land market impact factors/indicators. Although a limited number of studies were identified as relating directly to the measurement of the impact of land use regulation on the land market, many of the variables used in those studies were commonly used in other studies on land use and the land market. Table 2 shows the list of pre-identified impact factors and indicators selected through the desktop review.

Table 2. Key terms related to the land market impact factors highlighted through the desktop review.

Authors	Impact Factors/Indicators
Reps and Smith [100]	Subdivision control, supply
Ohls, Weibserg and White [65]	Price, value
Courant [57]	Land price
Shultz and Groy [101]	Subdivision control, supply
Dowall [6]	Supply, price, affordability, sub-division standard, consideration of future requirements (adequacy or suitability of zoning), procedural delays
Burby and Dalton [78]	Hazard, risk, land availability
Dale and McLaughlin [102]	Laws and institutions, financial instruments and services, land recording and valuation agencies, land rights and records, participants
Dale and Baldwin [48]	Credit accessibility, demand, supply, cultural acceptance, transparency, social, environmental and economic sustainability, value for money, tax, transaction cost, openness, accessibility, incentives, clarity, compensation
Mayer and Somerville [71]	Delay, red tape, transaction cost
Bertaud and Malpezzi [103]	Demand, supply, imposition of higher taxation on consumer
Tuladhar and van der Molen [70]	Transaction cost, coordination, customer satisfaction
Deiningner [68]	Credit accessibility, transparency, productivity, desirability, subsidies, transaction cost

Table 2. Cont.

Authors	Impact Factors/Indicators
Karki [77]	Quality of residential land, supply, open space
UNECE [104]	Taxation, valuation, informal settlement, tenure security, conflict, satisfaction, information availability, transaction cost, transparency, affordability, environmental sustainability
Potsiou [81]	Availability of land information, access to mortgage and credit, security, content, information quality and availability, tax
Jaeger [4]	Value, compensation
Wallace and Williamson [105]	Mortgage, lease, land information, securities, information management and availability, credit facility, ownership, cognitive capacity, land rights, coordination
Dale, Mahoney and McLaren [21]	Credit accessibility, demand, supply, cultural acceptance, transparency, social, environmental, and economic sustainability, value, transaction cost, openness, accessibility, incentives, clarity, compensation
Ihlanfeldt [7]	Competitiveness, land price, land value, self-interest, lot size, degree of restriction
Wu [58]	Erosion, desertification, land degradation, conflict, affordability, productivity, pollution, fragmentation, incentives
Cheshire and Vermeulen [106]	Price, cost, benefit
Glaeser and Ward [107]	Demand, supply, price
Williamson, Enemark, Wallace and Rajabifard [8]	Mortgage, lease, land information, securities, information management, credit facility, ownership, expectations, land rights, coordination, information availability, taxation, compensation
Needham, Segeren and Buitelaar [5]	Transaction cost, expectations, prevalence laws, hope value
Ciaian, Kancs, Swinnen, Van Herck and Vranken [59]	Land price, value
Monkkonen and Ronconi [60]	Land price
Loxton, Schirmer and Kanowski [75]	Distrust, injustice, stress, dissatisfaction
Woestenburg [63]	Land value
Alexander [61]	Land price
Luca [62]	Land price, transaction volume
El-Barmelgy, Shalaby, Nassar and Ali [55]	Proximity, social acceptance, price, demand, supply, land values, public interest, hazards
Copenheaver, et al. [108]	Land price, value
Mangioni [67]	Compensation
Schirmer [74]	Employment, identity, land availability
Lodin, Sonila and Onsrud [86]	Coordination, local ownership, information technology
Government of Nepal [30]	Value, tax, subsidies, compensation, conflict, coordination, fragmentation, disaster, risk, lot size, subdivision control
Dirgasova, Bandlerova and Lazikova [64]	Land price, lot size
Lees [90]	Housing prices, affordability, supply, demand
Cheshire [14]	Value, housing price, transaction delay
Faust, et al. [109]	Quality plots, open space, relocation of informal settlements, value, price, inadequate planning, affordability, data sharing, compensation, ad hoc planning decisions
Jalali, MacDonald, Fini and Shi [10]	Price, lot size, building density, urban growth boundary
Nakajima and Takano [16]	Price, building heights
Wen, et al. [110]	Price, supply, demand

In the first instance, terms identified in Table 2 as having similar meaning were standardized, rationalized, and reclassified where appropriate. This rationalization resulted in a total of 109 terms that were ranked and grouped into 16 factors. The highest-ranking term was land value (30 occurrences), followed by landowner expectation (11), transaction cost (9), and compensation (8). Finally, the ranked impact factors were allocated to the economic, social, institutional, and environmental dimensions based on their proximity to that dimension. Figure 3 shows both the occurrence of each factor and their categorization into the four dimensions.

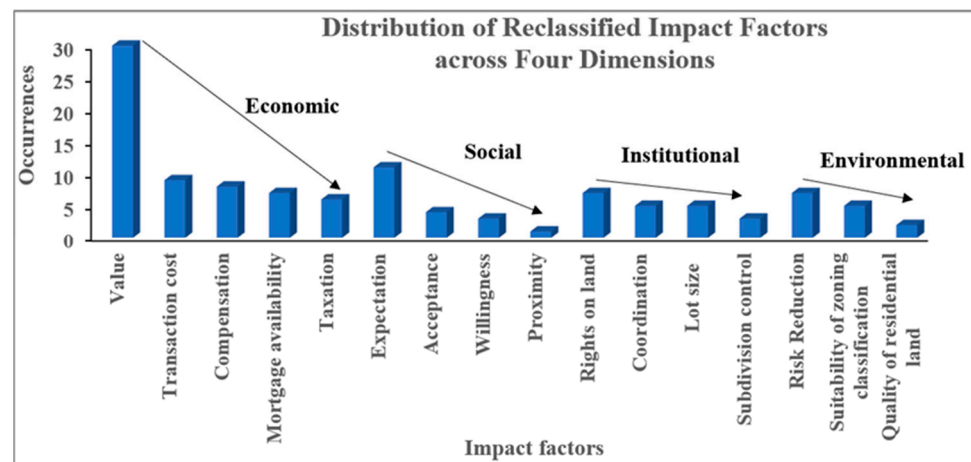


Figure 3. Reclassified impact factors and their occurrence from the desktop review.

Across the economic dimension, redundancies were noted, such as variations like land price, land value, land affordability, or simply land valuation. These terms were consolidated under the impact factor ‘value’ to encompass all aspects related to land price. Similarly, terms like supply and demand were often used generically but most specifically relating to land price, which was influenced by both supply and demand. Therefore, where appropriate, these terms were substituted with ‘value’. Similarly, terms relating to access to mortgage and credit, security/securities, credit facility, credit accessibility, or the presence of financial instruments and services were consolidated under the impact factor ‘mortgage availability’. Terms like ‘incentives’ or ‘subsidies’ were aligned to compensation in the context of this study and were consequently represented by the impact factor ‘compensation’. Finally, two other economic impact factors of ‘taxation’ and ‘transaction cost’, were determined.

Terms such as transparency, openness, social sustainability, desirability, clarity, expectations, employment, and identity were evident in the social dimension, suggesting that land use regulation may lead to dissatisfaction among market participants by not meeting their expectations. These terms were reclassified as the impact factor ‘expectation’. Likewise, impact factors such as ‘willingness’ was used to represent the terms ‘self-interest, public interest or competitiveness’. Other terms like ‘customer satisfaction’, ‘satisfaction’, ‘distrust’, ‘injustice’, ‘stress’, ‘dissatisfaction’, and ‘social and cultural acceptance’ were linked to stakeholders choosing whether to accept or reject the land use restriction and therefore were reclassified under ‘acceptance’. Likewise, the term ‘proximity’ was recognized. However, the term ‘cognitive capacity’ and some other generic social terms were omitted from consideration as a factor influencing the land market.

In the institutional context, terms such as ‘tenure security’, ‘land accessibility’, ‘ownership rights’, and the presence of legal frameworks pointed towards the significance of ‘rights on land’ as a crucial impact factor. Additionally, factors associated with the execution of land use regulation included ‘subdivision control’, ‘coordination among participants’, and ‘lot size’. The concept of ‘information availability’ or ‘data sharing’ was seen to be contingent on the level of ‘coordination among the land market participants’; thus, it was not treated as a distinct impact factor to avoid redundant contributions in impact outcomes.

The literature identified terms such as ‘inadequate planning’, ‘consideration of future requirement’, ‘suitability of planning’, and ‘ad hoc planning decisions’, which related to environmental outcomes but were too vague in the context of impact factors. These terms were therefore re-classified with a generic factor ‘suitability of zoning classification’. Similarly, terms such as ‘hazard’, ‘risk’, ‘disaster’, ‘desertification’, ‘erosion’, ‘land degradation’, and ‘pollution’ were reclassified as the impact factor ‘risk reduction’. The impact factor ‘quality of residential land’ was determined by consolidating the terms ‘quality plots’ and ‘open space’.

The concepts of environmental sustainability, economic sustainability, and social sustainability were viewed as encompassing broader ideas but were ultimately excluded from categorisation as specific impact factors. Nevertheless, they still signify broader impact areas within their respective dimensions. As shown in Figure 3, the desktop review determined 16 land market impact factors across all dimensions with varying degrees of occurrence, as shown on the vertical axis. Land value, transaction cost, mortgage availability, compensation, and taxation were identified as the land market impact factors across the economic dimension. The factors of rights on land, lot size, coordination, and subdivision controls were identified across the institutional dimension. Within the environmental dimension, the factors of risk reduction, suitability of zoning classification, and the quality of residential land were identified. Finally, the factors of social expectations, proximity, willingness to support land use implementation, and the acceptance of land use planning were found to be impact factors across the social dimension. The impact factors across the economic dimension were rated highest, with around 56% of total occurrences. The impact factors across the environmental dimension were rated lowest, covering approximately 10% of total occurrences. The factors across the institutional and social dimensions had occurrence percentages of 20% and 18%, respectively. When compared individually, the maximum occurrence of the reclassified land market impact factors was associated with the ‘value’ of land, a factor associated with the economic dimension of land market assessment.

4.2. Impact Factors Based on Stakeholder’s Perspective

Primary data collected through the interviews were processed in QDA Miner software for descriptive and link analysis. The analysis of interview data showed interrelated clusters of responses across the economic, social, environmental, and institutional dimensions which, after closer analysis, converge to key themes at a higher level. Each of these broadly identified key themes represented an amalgamation of relevant responses. The cluster of coded responses across the economic dimension as analysed and visualized in QDA minor software is shown in Figure 4. Across the economic dimension, clusters were found to be related to changes in the land price or value, transaction cost, taxation, mortgage availability, and compensation against the loss caused by the implementation of land use regulation. The size of each code is proportional to the volume of responses provided by the respondents (Figure 4).

The analysis of the coded responses in the economic dimensions showed that there were different value-related changes that occurred in the land market such as changes in the price of residential and agricultural land, a decrease in the financial strength of the landowners due to reduction in land price, and price speculation. Most of respondents (81%) indicated there were changes in land prices or land value after the introduction of land use restrictions, particularly due to land reclassification and subdivision control. The supply of residential land decreased due to subdivision control while the demand for residential land increased, causing the price of such land to be higher than before the introduction of land use regulation. Many responses (68%) indicated that prices of residential land had increased, and 23% indicated an increase in price speculation in the Kathmandu Valley due to the reduced supply of land caused by land use restrictions. Around 8% of the respondents indicated a reduction in the price of agricultural land due to restrictions on the subdivision of land.

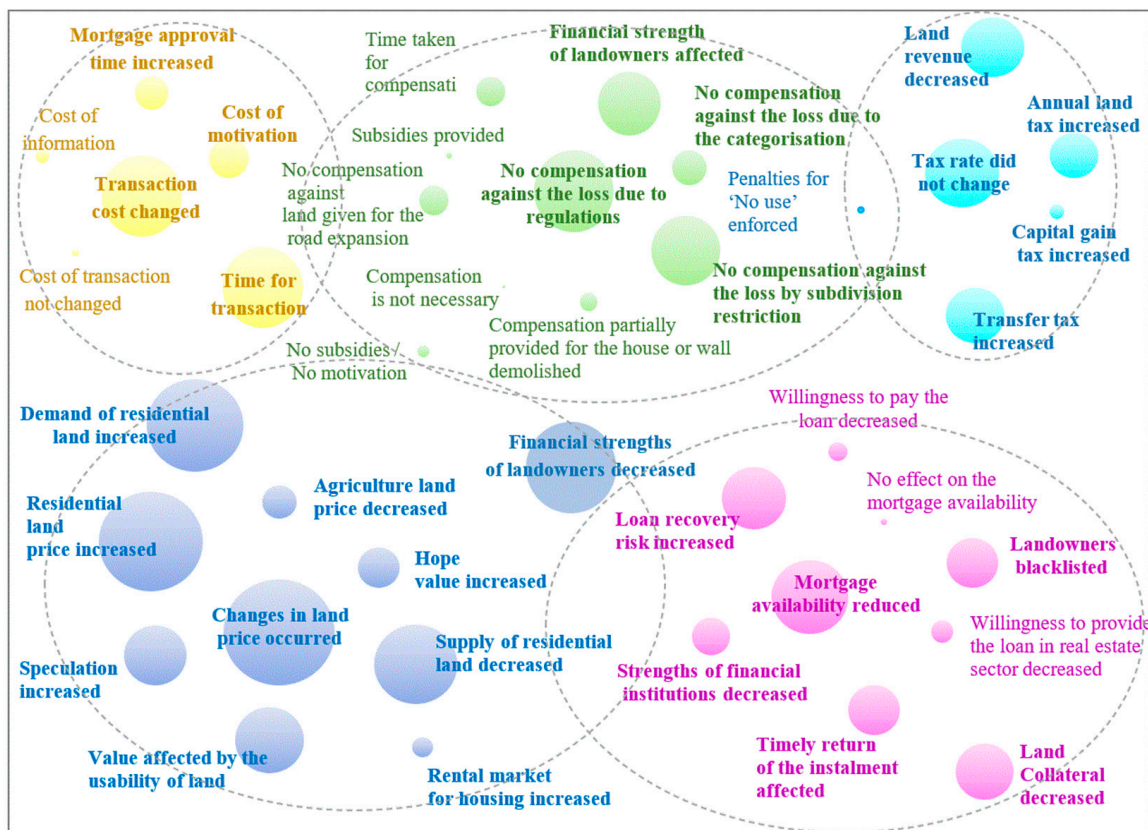


Figure 4. Clusters of responses across the economic dimension.

Nine different coded responses were relevant to mortgage availability, with 38% of respondents indicating that there was reduction in mortgage availability. The key themes indicate there were no changes in the land property tax due to land use regulation, but transfer tax, annual land tax, and capital gains tax increased due to changes in land value. As shown in Figure 4, there were six coded responses relevant to the transaction cost theme, and ten different coded responses relevant to the compensation area. The land market experienced an increase in transaction costs due to the increase in transaction time as well as various other costs involved in land transactions. The interviewees indicated that compensation paid to the affected landowners over the loss caused by the implementation of the land use regulation was inadequate.

The analysis across the social dimensions (Figure 5) shows that the highest responses indicate confusion over a lack of awareness of the new subdivision restrictions. Among the eight different coded responses, many of the responses pointed to the lack of awareness of land use regulation causing conflicts between the stakeholders and social dissatisfaction. Similarly, respondents noted that the procedure for approval to subdivide land was not only lengthy, expensive, and time-consuming but was also legally complicated. As a result, the social expectations of stakeholders were not met after the implementation of land use regulation. The third key theme identified in the social dimension was proximity issues relating to the resettlement program in flood and earthquake prone areas. As the land allocated for resettlement areas was relatively far away, landowners were reluctant to move.

Three clusters of recurring responses were identified across the environmental dimension related to risk reduction, quality of residential land in planned areas, and haphazard or unplanned land use, with the size of the circle being proportional to the number of responses (Figure 6).

Across the institutional dimension, respondents raised concerns about the property rights associated with the land (Figure 7) due to subdivision restrictions, lot size control, and the absence of coordination mechanisms.

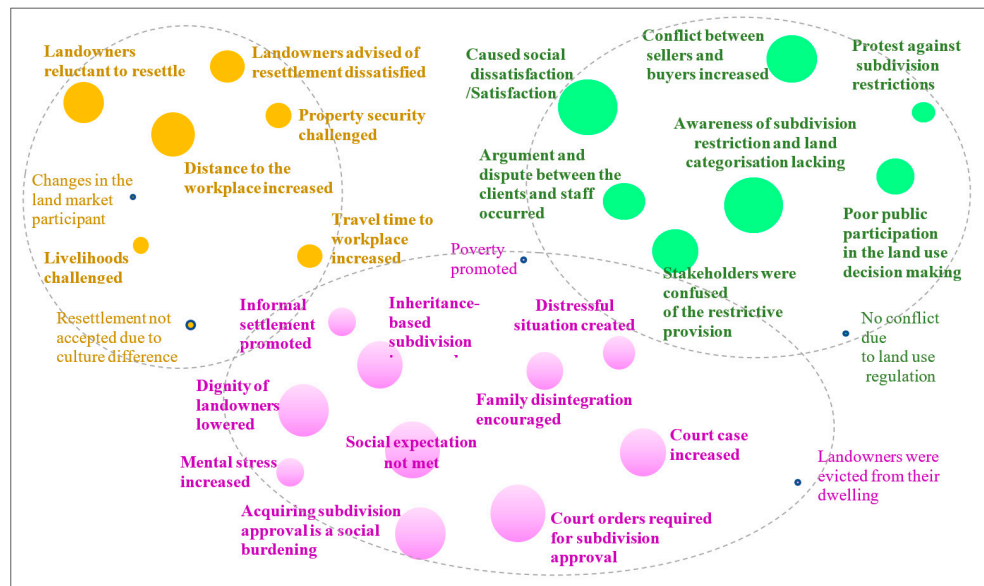


Figure 5. Clusters of responses across the social dimension.

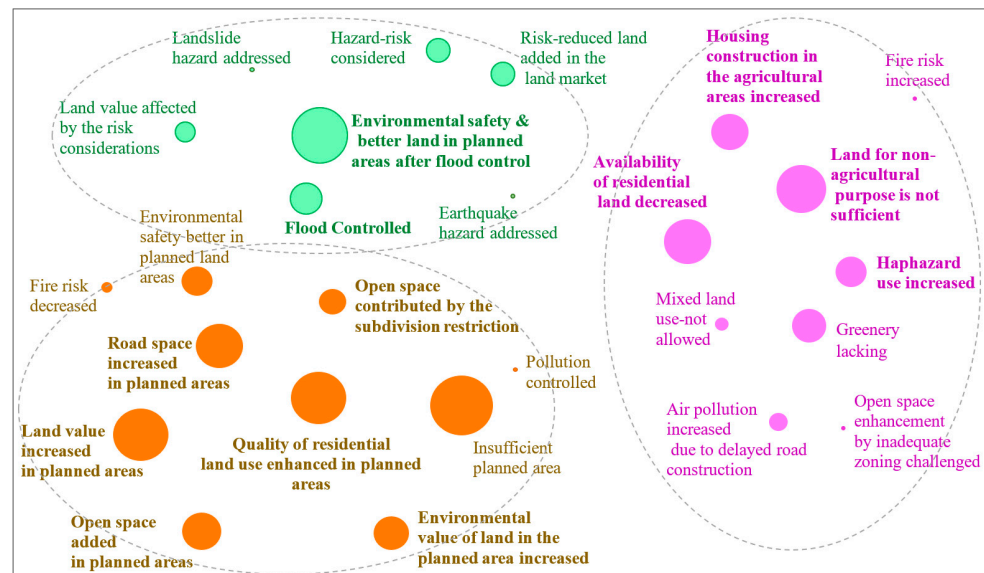


Figure 6. Clusters of responses across the environmental dimension.

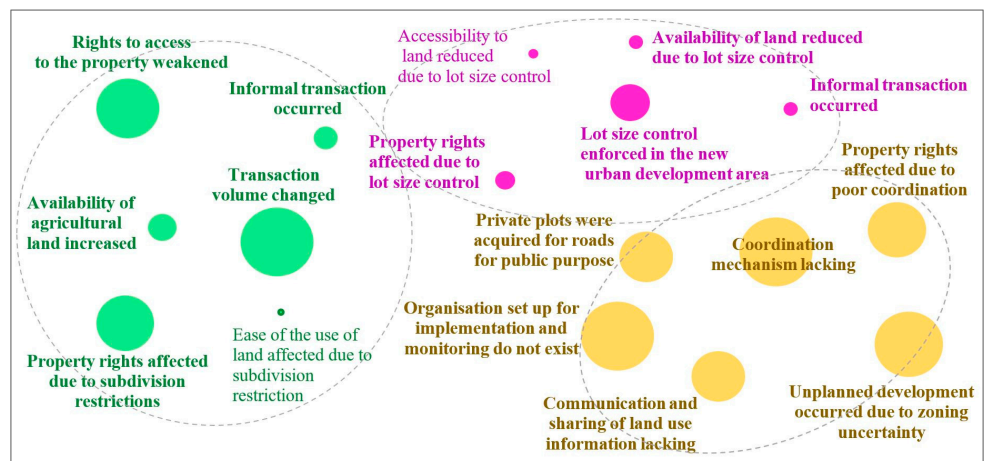


Figure 7. Clusters of responses across the institutional dimension.

4.3. Refinement of Land Market Impact Factors

The impact factors identified through the literature (Figure 3) and those recurring in the interview data from this study (Figures 4–7) were reviewed for their similarity. To arrive at a standard set of impact factors, those which were similar or repeated were reclassified and allocated to economic, environmental, social, and institutional dimensions based on their relevance to the Nepalese land market (Table 3).

The refined impact factors derived in this research reflect the highly populated and developed urban area of Kathmandu Valley compared to the other less populated areas of Nepal. As the land use regulations are nationwide, these results are expected to reflect other urban areas in Nepal. However, due to the lower demand of land in rural areas, some differences are expected for non-urban areas of Nepal.

Table 3. Impact issues identified from the desktop review and interviews.

Dimension	Preliminary Impact Factors from Desktop Review	Key Theme from the Interview	Refined Impact Factor	Impact Indicators Relevant to the Nepalese Land Market Based on the Interview Responses
Economic	Transaction cost	Changes in the transaction cost occurred	Transaction cost	Changes in the cost of the transaction Changes in the time of transaction
	Valuation	Changes in land value or price occurred differently	Valuation	Changes in the price of residential land Changes in the price of agricultural land Price speculation due to land categorization or subdivision restriction
	Mortgage availability	Mortgage availability reduced by land use regulation	Mortgage availability	Accessibility of land property as collateral Number of blacklisted landowners Changes in the financial strength of the financial institutions Number of landowners who received loans from financial institutions
	Taxation	Changes in taxation occurred	Taxation	Changes in land tax Penalties for no use of land
	Compensation	There was inadequate compensation to landowners for loss due to land use regulation	Compensation	Sufficiency of compensation paid for loss due to subdivision restriction Sufficiency of compensation for loss due to road expansion Time required for payment of compensation
	Social	Willingness & Acceptance	Low level of awareness of land use regulation created conflict between stakeholders	Awareness
Expectation		Social expectations not met, as revealed by court cases for subdivision approval	Expectation	Ease of subdivision approval process Number of court order cases for subdivision approval
Proximity		Landowners dissatisfied with allocation of resettlement	Proximity	Satisfaction of landowners due to distance to workplace Satisfaction of landowners due to travel time to workplace Changes in number of landowners/buyers in the land market

Table 3. Cont.

Dimension	Preliminary Impact Factors from Desktop Review	Key Theme from the Interview	Refined Impact Factor	Impact Indicators Relevant to the Nepalese Land Market Based on the Interview Responses
Environmental	Risk reduction	Risk considerations in land use planning changed supply and value in the land market	Risk reduction	Changes in the area at risk of flooding in Kathmandu Valley Changes in the supply of flood-safe plots in Kathmandu Valley
	Quality of residential land	Changes in quality of residential land made a difference to the land market by changing value and supply of such land	Quality of residential land	Supply of residential land with added open space in land pooling areas Change in supply of residential land with added enhanced road and utility infrastructure Change in land value of quality residential plots compared to surrounding unplanned areas
	Suitability of zoning classification	Inadequate classification did not address the land requirement and promoted haphazard use	Suitability of zoning classification	Sufficiency of land allocated for non-agricultural purpose Changes in the amount of housing construction in agricultural land of Kathmandu Valley
Institutional	Lot size	Lot size affected the availability of land and accessibility to land rights	Lot size	Number of available parcels qualified for the market transaction Changes in number of transactions of parcels bigger than the threshold size Changes in accessibility to land rights
	Rights on land/subdivision restrictions	Subdivision restriction affected availability of land and accessibility to land rights	Subdivision restrictions	Changes in amount (count) of parcels subdivided Access to adjoining parcel to use for road purposes (ease of the use of land) Number of informal transactions
	Coordination	Poor coordination mechanism affected property rights	Coordination	Number of private lots partly taken by road expansion Number of court cases registered against KVDA to secure property rights

5. Discussion

The focus of this paper was to explore the land market impact factors in the context of the introduction of land use regulation. This study identified 14 land market impact factors in the urban land market of Kathmandu Valley including the economic (5), social (3), environmental (3), and institutional dimensions (3).

There was agreement on the classification of impact factors across the four dimensions, except for two factors within the social dimension: 'willingness' and 'acceptance'. A refined factor, 'awareness', was therefore introduced into the refined list. The decision to exclude 'willingness' and 'acceptance' from the list of impact factors stemmed from the consideration of these elements as prerequisites for social dimension in land use planning and, therefore, as not suitable for inclusion. Instead, the success of land use planning and its influence on the land market relies on stakeholders' level of awareness and the extent to which social expectations are met by the regulations.

The in-country interviews highlighted that subdivision restrictions had increased social disparities among land market participants, resulting in increased conflicts and legal disputes. The social findings revealed that stakeholders engaged in the land market at a social cost, evidenced by the need for families to subdivide land due to court orders, family inheritance issues, and divorce proceedings. These outcomes support the findings of Deininger [68] that land policy implementation outcomes need to be assessed on their social impact. Concerns regarding the impact of a lack of awareness of the introduced subdivision restrictions in Nepal and unexpected legislative process of acquiring a subdivision approval were also reported by the Commission for the Investigation of Abuse of Authority in Nepal to the government of Nepal after reviewing the impact subdivision restriction [111]. The

third factor identified in the social dimension was 'proximity', which highlighted the unintended consequences of land use regulation in the context of the displacement of landowners due to natural disasters and is also evident in the Nepalese case [109].

Similarly, among the four initial impact factors within the institutional dimension (Figure 7), the issue of property rights was observed as an outcome of lot size control, subdivision restrictions, and coordination. Consequently, it was treated as an indicator rather than an independent impact factor.

The provision of lot size threshold affects the land input in the market [112] and therefore reduces the availability of accessibility to land in the market. Similarly, subdivision restrictions in Nepal, as identified by the stakeholders, limited access to land for potential buyers because it reduced land availability and promoted the informal land market, as specified by Deininger and Goyal [113] (p. 61). The third impact factor across the institutional dimension was the lack of 'coordination' among stakeholders that related to the loss suffered by landowners while giving up part of their privately owned land for road extension. Planning agencies did not coordinate with the land registry and cadastral offices about the road extension plan [114]; it remained unknown to landowners and buyers. The purchased land had to be returned and structures built on it were forcibly demolished by the implementing agencies without proper compensation, thus challenging property rights and promoting informality in the land market. Informality and increased tariffs due to the lack of coordination were identified by Deininger and Goyal [113], while weaknesses in coordinating works by involved parties introduced middlemen in the service supply system, as discussed by Ameyaw and de Vries [115].

This study has identified five impact factors identified across the economic dimension: valuation, taxation, mortgage availability, transaction costs, and compensation. Stakeholders perceived that the implementation of land use regulation was not supported by a policy provision for compensation for financial loss [30]. This finding is further supported by Ghimire et al. [116], who identified an existing gap in land acquisition and compensation in Nepal. Similarly, additional time delays in transacting land matters resulted in additional costs. The literature also suggests the importance of considering 'transaction costs' as an essential factor during land use planning [117,118].

Subdivision restrictions introduced as part of land regulation impacted land developers who could not sell their developed land, causing financial hardship. The situation impacted credit providers, such as banks and financial institutions and reduced mortgage availability, as identified by Dhakal [119] and Kvartiuk and Petrick [120]. Stakeholders also emphasized increased transfer taxes after land use restrictions and, therefore, taxation was confirmed as another impact factor. The penalty introduced in the National Land Use Policy 2015 [30] for not using land further justifies taxation as an important impact factor and has been supported through other literature, such as Hirte et al. [121].

Many of the stakeholders who were interviewed strongly indicated that there were changes in the price or land value, as well as the supply and demand of land, due to land regulation in Nepal, consistent with its high-ranking in the desktop-based results. Recent literature [7,9,16] has also confirmed that the changes in land value or price due to land use regulation therefore support 'valuation' as an impact factor applicable in land market assessment. However, the way land value changes depend on the nature of the land use regulation in force, the type of restriction, and the type of land market itself such as urban or rural, residential, or agricultural. In Nepal's case, the subdivision restrictions on agricultural land did not have that level of price changes compared to the residential land, as seen by the number of responses shown in cluster diagram for the economic dimension.

Stakeholders observed that environmental considerations in land use planning have had significant impacts on the Nepalese land market. The Land Use Policy 2015 introduced 'land pooling' as an alternative to traditional subdivision control methods to supply safer and value-added residential land parcels. This approach, characterized by larger areas of open space and improved utility services, was perceived as providing better quality residential land with higher environmental value, implicitly enhancing the land's overall

value [109]. Furthermore, risk-based land use planning in Nepal has offered an opportunity to go beyond merely planning for natural hazards [122,123]. Conversely, poor land zoning has had adverse effects on land supply and has also resulted in stagnant land values. In the Kathmandu Valley, the inappropriate zoning of large areas of land as agricultural has impacted the potential supply of residential land and has encouraged haphazard development due to a scarcity of land available for housing [124].

The intricate nature of the land market, demonstrated by its diverse impact factors, presents a challenge in applying a single approach for its evaluation [5]. The three-pillar model of the land market supports this approach, encompassing multiple dimensions and being represented by the diverse range of participants involved in transactions and services within the market [48,105]. The complex characteristics of the land market are evident from multiplicity of impact factors and cannot be described through a single theoretical lens.

6. Conclusions

The aim of this study was to identify the land market impact factors in the context of the introduction of land use regulation in Nepal. The study was performed at two different stages: firstly, a desktop study was performed to explore existing literature to identify land market impact factors across multiple dimensions, and then stakeholder perspectives were collected through semi-structured interview across multiple sectors. The desktop-based indicators were then compared with the impact factors derived from the qualitatively analysed interview data. A refined set of 14 land market impact factors and associated indicators were determined across the economic, social, environmental, and institutional dimensions. These factors underscored the significance of stakeholders' viewpoints in gauging the extent and intricacy of this impact across various dimensions. The perspective-based impact factors aligned with those identified in the literature, suggesting their relevance in assessing the land market across multiple dimensions.

Within the economic dimension, factors such as transaction costs, valuation, mortgage availability, taxation, and compensation were highlighted. Institutional factors included lot size, subdivision restrictions, and coordination. Social dimension factors encompassed awareness, expectation, and proximity, while environmental factors included risk reduction, the quality of residential land, and the suitability of zoning classification. The diversity of these impact factors underscores the need for a holistic approach to land market assessment, as relying solely on economic theory may not capture the full extent of the land market's complexity. This study therefore supports the proposition that there cannot be a single theory of the land market and that, therefore, it cannot be adequately assessed through a single theoretical perspective.

The development of land administration systems has supported effective land use and an efficient land market which, in a broader context, aids in the pursuit of sustainable development goals. The inherent connection between land value, land use, and land tenure gives rise to diverse interests that span economic, social, environmental, and institutional dimensions. While efficient land use fosters land development, it also facilitates land transactions within the land market. Land value serves as a fundamental indicator of the land market, with land use regulation forming part of a broader land policy framework.

The practical implication of the findings of this study is a detailed list of key impact factors and indicators that can be employed to understand and assess the influence of regulatory changes to a land market. However, quantifying the impact of these diverse factors presents challenges. Therefore, further research is required to develop an integrated framework for measuring the impacts of land use regulation by utilising these identified factors. As the unit of measurement varies from one impact factor to another, a common scale of measurement applicable to all impact factors and associated indicators may need to be considered. It should also be noted that the impact factors do not possess the same level of importance. Therefore, their importance in the land market should be ranked to better quantify the impact outcome contributed by each of the impact factors. Any impact assessment should also be carefully examined against the existing market conditions,

existing data, and evidence. This would facilitate a more nuanced understanding of the depth and direction of the impact of land use policy interventions on a land market.

This study has contributed to a refined set of land market impact factors and indicators in the context of the introduction of land use regulation in Nepal. However, these factors and associated dimensions can be generalized and adapted for application to other developing economies. The addition of stakeholder perspectives has also provided a deeper understanding of the impacts of land use regulation at the jurisdictional level and has contributed to balancing the often larger institutional or economic perspectives. The integrative approach developed in this research can also be utilised in other studies, particularly where the perspectives of stakeholders need to be considered. Importantly, the outputs from this study will assist implementing agencies to identify impacts that should be considered for the successful implementation of land use regulation strategies and establishing an efficient and effective land market in countries such as Nepal.

The limitation of this study is that its field is focused on a single urban land market in Nepal and therefore may not represent the rural land market situation. The study identified the land market impact factors across multiple dimensions, but it did not attempt to determine their relative importance amongst themselves.

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