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Analysis of Physical Risks in the Property Insurance Underwriting Process at PT. Asuransi Umum XYZ Jakarta

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ABSTRACT

Climate change has become a critical factor influencing financial and insurance sectors, particularly through physical risks affecting property assets. Indonesia, with its high exposure to hydrometeorological hazards, presents a unique context for analyzing the integration of physical risk into property insurance underwriting. This study aims to explore how physical risk is understood, assessed, and incorporated into the underwriting decision-making process at a national general insurance company, referred to as Company XYZ. A qualitative case-study approach was employed, combining primary data from in-depth interviews and written responses from ten cross-functional informants with secondary data from internal company documents, claims data, and annual reports from 2020–2025. Thematic analysis was used to interpret patterns in the data. Results indicate that physical risks, particularly floods and extreme weather, are recognized as major factors shaping underwriting decisions, with integration occurring across marketing, underwriting, reinsurance, risk engineering, and claims functions. While historical-data-based approaches dominate current practice, forward-looking assessments are increasingly considered necessary. The study concludes that effective incorporation of physical risk requires enhanced data quality, professional judgment, and advanced analytical tools to support adaptive and sustainable underwriting. Findings provide practical insights for insurance practitioners and contribute to understanding organizational responses to climate-related financial risks

INTRODUCTION

Over the last decade, climate change has no longer been viewed merely as an environmental issue, but has developed into a systemic economic and financial issue. Rising global temperatures, changing rainfall patterns, and the intensification of extreme weather events not only affect ecosystems, but also influence asset values, production stability, and the resilience of the financial sector (Bolton & Kacperczyk, 2021; Cisagara, 2024).

The World Meteorological Organization (2024) reports that global temperatures have reached an anomaly of 1.55°C compared with the pre-industrial period, making 2015–2024 the hottest decade in modern history. In Indonesia, a similar trend can be observed, as the Badan Meteorologi, Klimatologi, dan Geofisika (BMKG) recorded an increase in average temperature of approximately

0.8°C compared with the 1991–2020 climate average. This condition indicates that global climate change has had a real impact on Indonesia's regional climate system (Badan Meteorologi, 2026).

Within the framework of financial risk management, climate change is generally classified into physical risk and transition risk. This study focuses on physical risk, namely risks arising from the direct impact of climate change on assets and economic activities, particularly property assets. These risks include events such as floods, extreme rainfall, strong winds, and landslides that directly trigger physical damage and economic losses (Stricker et al., 2022).

The transformation of climate risk into financial risk also encourages changes in the governance of insurance companies and financial institutions. Stricker et al. (2022) emphasize that integrating climate risk into the risk management framework is a prerequisite for maintaining the sustainability of the insurance business. Thus, climate change affects not only claims and premiums, but also decision-making structures and underwriting policies (Addoum et al., 2020; Yin et al., 2025; Zhang et al., 2023).

Indonesia is a country with a relatively high level of physical risk in the context of global climate change. Based on the World Risk Index 2025, Indonesia ranks third among countries with the highest physical risk in the world after the Philippines and India (Otoritas Jasa Keuangan, 2026a). This is due to its geographical location in the tropics and at the meeting point of two oceans and two continents, which increases Indonesia's exposure to floods, landslides, extreme weather, extreme waves, and droughts that can trigger forest and land fires.

Based on data from the Badan Nasional Penanggulangan Bencana (BNPB) in 2025, there were 3,233 disasters recorded during the period January–December 2025. Of these, more than 90% were hydrometeorological disasters, particularly floods, extreme weather, and landslides.

Based on BNPB data, the large number of damaged houses 216,672 indicates that the property sector is at a very high level of exposure to physical risks. From an insurance perspective, this figure represents the potential for significant aggregate claims if these properties are insured.

To understand the concrete implications of physical risks to property assets and national economic stability, consider the cross-provincial floods and landslides in Aceh, North Sumatra, and West Sumatra in 2025. The disaster was triggered by an extreme hydrometeorological phenomenon (Cyclone Senyar), which caused high rainfall intensity in a short period.

The economic loss of Rp 68.6 trillion includes not only physical damage to assets, but also disruption to economic activities such as logistics distribution and broader impacts on the economic system, including increases in the cost of living. This shows that a single extreme physical risk event can have significant and geographically widespread macroeconomic impacts. The scale of the damage reflects accumulation risk, a key concern in property insurance portfolio management. When similar events occur within a relatively short time interval, an underwriting approach relying solely on historical data may be inadequate to capture actual risk dynamics.

However, not all losses are covered by the insurance industry. Financial Services Authority data (2026) show that only around 7–8% of disaster losses are insured, so more than 90% of losses are still borne independently by the community and the government. This condition indicates a significant protection gap in disaster risk management in Indonesia. In financial and insurance literature, the protection gap refers to the difference between potential losses caused by certain risks and the value of losses covered by insurance or other risk-financing instruments. This gap is caused by three factors:

limited insurance market penetration, high premiums in risky areas, and reduced insurance capacity due to increasing risk (Kousky et al., 2021).

To understand the impact of physical risk on the general insurance industry more concretely, analysis is needed at the level of insurance companies as entities that directly manage property insurance risk through underwriting portfolios. In this study, the researcher selected a case study at a national general insurance company in Jakarta, hereinafter referred to as Company XYZ, which showed an increasing contribution of physical risks—namely floods, heavy rain, strong winds, and landslides—in the property claims portfolio over the past five years.

Stricker et al. (2022), in the Journal of Financial Economics (Q1), show that exposure to physical risk increases uncertainty in estimating insurance company losses. This presents a serious challenge for property insurance because changes in rainfall patterns, storm intensity, sea-level rise, flood frequency, and other hydrometeorological phenomena have a direct impact on the value and sustainability of property assets. This uncertainty has implications for increasing claims volatility and the potential underestimation of risk if the underwriting approach is not adjusted.

An underwriting approach that relies on past loss statistics is increasingly considered inadequate for dealing with climate risks that are dynamic and long-term in nature. Therefore, physical risk requires a transformation of the underwriting paradigm from a historical-data-based approach to a more forward-looking approach. Forward-looking analysis refers to risk assessment that considers future climate-risk projections, climate-change scenarios, and the physical resilience of insured assets.

Although various studies have discussed climate risk in the context of finance and insurance, most still focus on quantitative approaches and macro-level analysis. These studies emphasize the measurement of risk factors, simulations of aggregate losses, and policy implications at the industry and financial system levels (Kousky et al., 2024; Stricker et al., 2022). Meanwhile, research exploring how physical risk is integrated into underwriting practice at the operational organizational level, especially in developing countries such as Indonesia, remains relatively limited. In particular, few studies explore the integration mechanisms within insurance organizations at the operational level.

1. How underwriters understand the characteristics of physical risks
2. How is the process of analysis and acceptance of physical risks?
3. What factors influence the decision to accept or reject a risk?
4. What are the implications for corporate risk management?

Based on the overall description above, it can be concluded that Indonesia is one of the countries with high physical-risk exposure, as reflected in its position in the global risk ranking and the increasing occurrence of hydrometeorological disasters at the national level. The high frequency and impact of these disasters cause significant economic losses. This also occurs in the general insurance industry, where the case study of Company XYZ shows, based on empirical data, that physical risk has become a major contributor to property insurance claims. If not managed carefully, this condition will directly affect declining underwriting results and company profitability. On the other hand, changes in rainfall patterns, storm intensification, and increasing flood events make risk distribution more dynamic and no longer fully consistent with historical patterns, thereby requiring a new forward-looking underwriting approach. In addition, many studies still focus on quantitative and macro-analytical approaches related to the impact of physical risk. Therefore, these conditions encourage

the researcher to conduct a deeper study on the integration of physical risk in the property insurance underwriting process through a qualitative case-study approach.

The research gap addressed in this study lies in the limited operational-level evidence on how physical risk is actually processed within an underwriting organization. While prior studies have examined climate-related physical risk mainly through quantitative, macro-level lenses estimating aggregate losses, pricing implications, or systemic exposure relatively little is known about the micro-level organizational practices through which underwriters, risk engineers, claims officers, reinsurance specialists, and marketing personnel jointly interpret and act upon physical-risk information in their daily decision-making. This study addresses that gap by examining, through an in-depth qualitative case study, how physical risk is understood, processed, and translated into underwriting decisions within a national general insurance company in Indonesia. The novelty of this study lies in its cross-functional, process-based perspective, which reveals that the integration of physical risk into property underwriting in Indonesia remains predominantly reliant on professional judgment, owing to the limited availability of granular hazard data, analytical tools, and forward-looking risk-assessment frameworks—an empirical finding that has not been explicitly documented in the existing literature on climate-related underwriting practice in emerging-market contexts.

RESEARCH METHODS

Research Design and Type

This study uses a qualitative approach with a case-study design to understand in depth how physical risk is integrated into the property insurance underwriting process at the operational level of an organization (Tomaszewski et al., 2020). The focus of the study is not on statistically testing causal relationships between variables, but rather on exploring processes, meanings, and professional considerations that shape risk-acceptance decisions.

A qualitative approach is appropriate when the phenomenon under study is not only complex, but also highly context-dependent and involves decision-making considerations that cannot be fully represented in numbers (Tomaszewski et al., 2020). In the context of physical risk, which is non-stationary and highly uncertain, underwriting decisions often involve interpretation, professional judgment, and negotiation between technical and business considerations (Dahwa, 2024). A case-study design is used because this research focuses deeply on one organization and remains relevant when the study aims to understand organizational processes and internal decision-making mechanisms (Côté-Boileau et al., 2020).

In this study, the case study focuses on the property insurance underwriting process at the head office of a national general insurance company disguised as Company XYZ. The focus on the property underwriting unit allows a more integrated analysis of several important aspects, namely:

1. Characteristics of physical risk as the external context;
2. The underwriting process as a risk-selection mechanism;
3. The role of professional judgment in decision-making;
4. Implications for corporate risk-portfolio management.

This is in line with the development of modern risk-management practices, which emphasize the importance of integrating data, models, and human interpretation in dealing with increasingly complex risks, including climate risk.

In addition, this study uses an interpretive perspective, which views organizational reality as being formed through the way actors within the organization understand and give meaning to the situations they face (Kohtamäki et al., 2022). In the underwriting context, risk-acceptance decisions are not merely technical outputs, but the result of interactions between formal guidelines, professional experience, risk perceptions, and business pressures. This perspective is particularly important in the context of forward-looking physical risk, where future uncertainty cannot be fully explained by historical data.

The interpretive approach is highly relevant in studies on climate risk because such risk is not only technical in nature, but is also influenced by perceptions, future expectations, and risk-governance dynamics within organizations (Yang et al., 2025). Thus, this study does not use statistical hypotheses, but rather qualitative research questions aimed at exploring how the integration of physical climate risk takes place in property-underwriting practice.

In this study, the analysis focuses on several interrelated main dimensions, namely:

1. Underwriters' Understanding of Physical Risk

The first dimension focuses on how physical risk is understood by underwriters in the context of property exposure. The physical risks referred to include acute physical risks, such as floods and extreme weather, as well as chronic physical risks, such as sea-level rise and changes in rainfall patterns. Therefore, this study not only identifies the types of risks considered, but also examines how these risks are interpreted and prioritized in underwriting practice.

2. The Property Underwriting Process as a Risk-Selection Mechanism

The second dimension focuses on the underwriting process as a mechanism for selecting and evaluating risk. In this context, underwriting is understood as an organizational process involving risk analysis, the use of data and tools, consideration of authority limits, the role of professional judgment, and coordination with related parties such as reinsurance. Previous research shows that the insurance sector faces challenges in transforming historical-data-based approaches into more forward-looking approaches in addressing climate risk (Kousky et al., 2024). However, how this transformation occurs at the operational level remains relatively limited in qualitative research.

3. Risk-Acceptance Decision-Making

The third dimension focuses on the risk-acceptance decision-making process, particularly in the context of hierarchical authority limits. In insurance organizations, acceptance decisions are influenced not only by technical analysis results, but also by authority structures and internal risk governance. Risk-governance literature shows that risk integration in decision-making involves interaction between formal rules and the interpretation of organizational actors (Kohtamäki et al., 2022). Therefore, this study explores how decisions are accepted, rejected, or renegotiated, and how climate risk influences these dynamics.

4. Risk-Management Perspective and Implications for Insurability

The fourth dimension focuses on how the integration of climate risk in underwriting is viewed from the perspective of corporate risk management. Physical risk affects not only individual claims, but also portfolio accumulation and potential pressure on insurability. Recent studies show that increasing climate risk may cause risk retreat, coverage restrictions, or premium increases in certain areas (Kousky et al., 2024; Roper et al., 2025). In this context, this study explores how underwriters

view these long-term implications, including the need for a forward-looking approach in risk management.

The forward-looking approach is not positioned as a separate dimension, but as an analytical perspective embedded in all research dimensions, particularly in understanding how risk is projected and considered in the underwriting process.

Thus, the combination of a qualitative approach, case-study design, and interpretive perspective in this study is expected to provide a deep and contextual understanding of how physical risk is integrated into property insurance underwriting practice, while also identifying the gap between the traditional historical-data-based approach and the need for a more forward-looking approach.

Place and Time of Research

This study was conducted at one national general insurance company in Indonesia, which is disguised in this study as Company XYZ. The research location was selected purposively by considering that the company has a significant business portfolio in the property insurance line and is exposed to physical risks, particularly floods and extreme weather. In addition, the company has a clear underwriting organizational structure supported by treaty reinsurance, claims, risk engineering, and marketing functions, allowing comprehensive exploration of the underwriting decision-making process.

The selection of one organization as the research location is in line with the case-study approach, which aims to understand a phenomenon in depth within a real organizational context. In qualitative research, organizational context is an important factor because decision-making processes are influenced not only by risk characteristics, but also by internal policies, authority structures, and operational dynamics within the organization (Yang et al., 2025). Therefore, the selection of Company XYZ is expected to provide a representative picture of underwriting practice in addressing physical risk in the general insurance industry in Indonesia.

In terms of time, this study uses two main time frames. First, the secondary-data period covers company property-claims data and internal documents from 2020 to 2025, which are used to understand risk trends and loss dynamics related to physical risk. Second, primary data were collected through essay-question responses and, if necessary, deepened through interviews, planned for April to May 2026. This time frame was selected to ensure sufficient data availability and to enable in-depth information exploration until data saturation was reached (Hennink & Kaiser, 2022). In qualitative research, a gradual and iterative data-collection process allows researchers to adapt the focus of exploration according to initial field findings (Byrne, 2022).

The use of different periods for historical data and primary data collection also supports a more comprehensive analytical approach. Historical data are used to understand risk patterns, while primary data are used to explore the perspectives and interpretations of underwriting actors in responding to changes in risk. This approach is in line with qualitative research practice in risk studies and the insurance industry, which emphasizes the importance of integrating empirical data with contextual understanding in explaining complex phenomena.

Thus, the selection of the research location and time is designed to ensure that the data obtained are not only empirically relevant, but also able to provide an in-depth understanding of how physical risk is integrated into the property insurance underwriting process within a real organizational context.

Data Sources

This study uses two types of data sources, namely primary data and secondary data, which are combined to obtain a comprehensive understanding of the integration of physical risk in the property insurance underwriting process. The use of various data sources in qualitative research is important for enriching perspectives and increasing the validity of findings through triangulation (Kousky et al., 2024)

Primary data were obtained through in-depth interviews supported by written responses from respondents, allowing initial exploration as well as further probing of informants who have direct roles in the underwriting and risk-management processes in the company. Informants were selected purposively based on the relevance of their roles and involvement in decision-making related to property insurance risk. In this study, the list of informants, including initials, position, division or department, age, education level, and length of service, is presented in Table 1.

Table 1 - Informant Table

No	Initials	Position	Division/Department	Age	Education Level	Length of Service
1	TE	Head of Department	Marketing	51	S1	25
2	RI	Section Chief	Marketing	37	S1	16
3	YA	Head of Department	Property Underwriting	33	S1	10
4	AR	Section Chief	Property Underwriting	26	S1	3.5
5	FR	Staff	Property Underwriting	25	S1	2
6	AP	Head of Department	Treaty Reinsurance	49	S2	20
7	KN	Staff	Risk Engineer	28	S1	3
8	HA	Staff	Risk Engineer	28	S1	3.5
9	DA	Section Chief	Property Claims	45	S1	20
10	AM	Section Chief	Property Claims	32	S2	3

Source: Primary data collected through in-depth interviews and written responses from Company XYZ employees, 2026

The selection of cross-functional informants aims to capture the dynamics of the underwriting process more comprehensively, considering that decision-making in insurance is influenced not only by technical underwriting analysis, but also by claims experience, risk-survey results, reinsurance, and business considerations. Recent studies show that, in the context of climate risk, decision-making in the insurance industry involves various organizational actors with different perspectives, making a multi-source approach important for understanding this complexity (Yang et al., 2025).

In addition, a qualitative interview-based approach involving various stakeholders is also widely used in climate-risk studies to explore how risk is perceived and interpreted in practice, especially under conditions of high uncertainty (V. Boivin et al., 2025). Therefore, the use of

interviews in this study is expected to produce data that are not only descriptive, but also reflective of the decision-making processes that occur within the organization.

Interview questions were arranged based on the conceptual framework and focused on four main dimensions :

1. Underwriters' understanding of physical risk;
2. Risk integration in the underwriting process;
3. Risk-acceptance decision-making mechanisms;
4. Challenges and implications for risk management and insurability.

Interviews were conducted from April to May 2026, both face to face and through written responses or essay responses. Written responses were considered valid as long as they allowed adequate narrative elaboration and further clarification when needed.

In addition to primary data, this study uses secondary data to complement and strengthen the analysis of property insurance underwriting practice. Secondary data are used to provide an overview of the risk profile, loss trends, applicable underwriting policies, organizational structure, and portfolio-risk characteristics that influence underwriting practice in the company. The use of secondary data in qualitative research allows researchers to understand phenomena more contextually and connect current practices with the underlying policies (Settembre-Blundo et al., 2021).

Several types of documents used as secondary data sources in this study are presented as follows.

Table 2 - Document Types

Document Type	Data Source	Purpose of Use
Company underwriting guidelines and procedures	Internal company documents	To understand the stages of risk analysis and underwriting-acceptance mechanisms
Underwriting organizational structure	Company organizational documents	To understand authority structures and underwriting decision-making processes
Claims data and property portfolio-risk profiles	Internal company reports	To describe physical-risk exposure in the company portfolio
Company annual reports	Company publications	To understand the company's business position and property-insurance portfolio

Source: Internal company documents and reports, including underwriting guidelines, organizational charts, claims data, and annual reports, 2020–2025.

In qualitative research, the researcher serves as the main instrument because the process of collecting and interpreting data is carried out directly through interaction with informants and review of research data. However, to help ensure that the data-collection process runs systematically and purposefully, this study also uses several supporting instruments and tools during the research activities.

The main instrument used in this study is a semi-structured essay interview guide prepared based on the focus and objectives of the research. The interview guide contains a list of open-ended questions aimed at exploring the informants' views, experiences, and considerations regarding the integration of physical risk in the property insurance underwriting process. The questions are arranged

flexibly so that they can be used both as initial written responses and as a guide for follow-up interviews when deeper exploration of certain answers is required.

In its implementation, informants were first given a list of essay questions to answer in writing according to their respective experiences and perspectives. The researcher then conducted limited and in-depth follow-up interviews with several informants or on certain questions that were considered to require clarification, additional exploration, or deeper information. This approach was used to obtain richer and more contextual data while maintaining the efficiency of the data-collection process. In qualitative research, the use of semi-structured interviews with an exploratory approach is acceptable because it provides room for researchers to probe information considered important or not yet optimally explored (Nowell et al., 2017).

In addition to the interview guide, this study used a mobile-phone voice-recorder feature and note-taking media during the interview process, with the consent of the informants. The recording tool was used to help maintain data accuracy and minimize the risk of losing important information during the interview process. The recordings were then transcribed as part of the data-analysis process.

To support data processing, the researcher used a computer or laptop for preparing interview transcripts, grouping coding results, processing documents, and conducting the overall data-analysis process. In addition, this study also used internal company documents, such as underwriting guidelines, standard operating procedures (SOPs), and property-claim data as supporting materials to understand the context of underwriting practice and assist the data-triangulation process.

Thus, the use of research instruments in this study is designed to support a flexible yet systematic data-collection process, enabling the study to produce in-depth and relevant data in accordance with the research objectives.

Data Collection Techniques

Data collection in this study was carried out through a combination of semi-structured interviews and documentation studies. The use of various data-collection techniques in qualitative research is important for increasing the depth and validity of findings through triangulation (Kousky et al., 2024).

In-depth semi-structured interviews, supported by written responses from respondents, were used as the main technique to explore the informants' perspectives, experiences, and professional considerations in the underwriting process. This approach provides flexibility for researchers to explore issues that emerge during the interview process while maintaining consistency with the established research focus. In the context of climate risk, interviews are a relevant method because they allow an understanding of how organizational actors interpret risk under conditions of uncertainty and data limitations (Yang et al., 2025).

As an interview guide, a list of closed and semi-open questions was prepared, enabling respondents to assess certain aspects, such as the level of risk understanding, the use of data and tools, and the implementation of a forward-looking approach. This strengthens data consistency and simplifies the comparison process among respondents (V. Boivin et al., 2025).

Documentation studies were then conducted on various internal company documents, such as underwriting guidelines, standard operating procedures (SOPs), and property-claim data from the

2020–2025 period. This documentation study aimed to understand the context of applicable underwriting policies and practices, and to identify the suitability between formal policies and field implementation.

The data-collection process was carried out gradually, beginning with secondary-data collection to understand the initial context, followed by in-depth interviews to explore more specific insights. This approach allowed the researcher to develop understanding iteratively and ensure that the data obtained reflected actual field conditions.

Thus, the combination of data-collection techniques in this study is expected to produce data that are not only descriptively rich, but also analytically deep, so that they can comprehensively explain how physical climate risk is integrated into the property insurance underwriting process.

Data Analysis Techniques

Data analysis in this study uses a thematic-analysis approach, which aims to identify, group, and interpret patterns of meaning that emerge from qualitative data. This approach was selected because it is suitable for understanding complex and contextual phenomena, particularly in exploring how physical risk is perceived and integrated into the property insurance underwriting process. Thematic analysis is widely used in qualitative research because it provides flexibility in interpreting data while maintaining analytical depth (Braun & Clarke, 2023).

The data-analysis process was carried out gradually and iteratively, beginning with data reduction, namely the process of selecting and focusing on data relevant to the research objectives. At this stage, data from interviews and documentation were reviewed to identify information related to the research focus. This stage is important for simplifying data without removing the main meaning contained therein (Nowell et al., 2017).

Next, the coding process was conducted by assigning codes to parts of the data considered significant. These codes were then grouped into broader categories based on similarity of meaning. In this study, the coding process referred to the research focus, such as understanding physical risk, risk integration in the underwriting process, risk-acceptance decision-making, and implications for insurability. This approach allowed diverse data to be arranged systematically, thereby facilitating interpretation.

The next stage was theme development, namely identifying the main patterns that emerged from the categories formed. These themes represented the main insights from the data and served as the basis for compiling the research results. In the context of this study, the themes that emerged were expected to explain how the underwriting process is still dominated by a historical-data-based approach, as well as how the need for a forward-looking approach has begun to emerge in practice.

The data-interpretation process was then carried out by connecting empirical findings with the conceptual framework and relevant literature. At this stage, the researcher not only described the findings, but also gave meaning to the findings in a broader context, particularly in relation to the integration of physical risk in the insurance industry. This interpretive approach is important because, in the context of climate risk, decision-making is not only based on data, but also on how the data are understood and interpreted by organizational actors (Yang et al., 2025).

To ensure the validity of the research results, data triangulation was carried out by comparing information obtained from various sources, such as interviews and internal documents. Triangulation

aimed to increase the credibility of findings and ensure that the resulting interpretation did not depend on only one data source. In qualitative research, triangulation is one of the important approaches for strengthening the reliability of research results (Kousky et al., 2024).

Thus, the data-analysis technique in this study does not only focus on systematic data processing, but also on efforts to understand the meaning behind the data. This approach is expected to produce findings that are not only descriptive, but also provide a deep understanding of how physical climate risk is integrated into the property insurance underwriting process and how a forward-looking approach can be developed in practice.

Data Validity

In qualitative research, data validity is not only determined by the amount of data obtained, but also by the extent to which the data can describe the actual conditions and meanings that occur in the field. Therefore, qualitative research emphasizes credibility, trustworthiness, and consistency of the research process to ensure that research results can be academically accounted for (Nowell et al., 2017).

To maintain data validity, this study uses several validation techniques, namely data triangulation, member checking, and an audit trail. The use of several validation techniques aims to increase the credibility of the research results and minimize potential bias in the data-collection and interpretation processes.

1. Data Triangulation

Data triangulation was carried out by comparing and reviewing the suitability of information obtained from various data sources and informant perspectives. In this study, triangulation was conducted through:

- essay-response and interview data;
- internal company documents, such as underwriting SOPs and acceptance guidelines;
- property-claim data;
- informant perspectives from various functions, namely underwriting, claims, risk engineering, and marketing.

This approach was used to obtain a more comprehensive understanding of how physical risk is understood and integrated into the property insurance underwriting process. Triangulation also helped the researcher identify consistencies and differences in views among informants so that the research results did not depend on a single source of information.

2. Member Checking

Member checking was conducted by confirming certain interview results or interpretations with the relevant informants. This process aimed to ensure that the researcher's interpretation was consistent with the informants' intended meaning and views. In this study, member checking was conducted in a limited manner on certain information or findings requiring further clarification, particularly regarding underwriting practice and risk-decision-making.

Through this process, the researcher could minimize interpretation errors and increase the credibility of the research results. In qualitative research, member checking is an important technique to ensure that research results truly represent the experiences and views of informants (Braun & Clarke, 2022).

3. Audit Trail

An audit trail was conducted by systematically documenting the entire research process, starting from data collection, interview transcripts, coding groups, theme development, and data interpretation. This documentation was kept as part of the research records to maintain transparency and consistency in the data-analysis process.

Through the audit trail, the research process can be traced back, thereby helping to increase the dependability and confirmability of the study. In addition, systematic recording of the research process helps the researcher maintain consistency among research objectives, data obtained, and the resulting interpretations.

In addition to these three techniques, the researcher also attempted to maintain objectivity through reflection during the research process. Considering that the researcher has background and experience in the insurance industry, the researcher recognized the potential for subjectivity in data interpretation. Therefore, the analysis process was conducted by consistently referring to empirical data, interview results, and supporting documents obtained during the study.

Thus, the application of various data-validity techniques is expected to increase the credibility, consistency, and quality of the research results, so that the findings can provide a more trustworthy picture of the integration of physical risk in the property insurance underwriting process.

RESULTS AND DISCUSSION

The results of this study were compiled based on primary data obtained through essay responses and interviews with ten informants from five functions directly related to property insurance risk management at Company XYZ, namely marketing, property underwriting, treaty reinsurance, risk engineering, and claims. Informants were selected purposively by considering work experience, involvement in the underwriting process, and understanding of property insurance risk management.

The involvement of informants from various functions allowed the study to obtain a more comprehensive perspective on how physical risk is understood, assessed, and integrated into the underwriting process. Informants from the underwriting function provided perspectives on the analysis and risk-decision-making process; the risk-engineering function provided technical assessments of risk characteristics; the claims function provided views based on actual loss experience; and the marketing function provided perspectives on market needs and interactions with insured parties and insurance brokers.

In addition, this study involved an informant from the treaty reinsurance function, which plays a role in managing reinsurance capacity and risk placement. The involvement of treaty reinsurance was considered important because property insurance underwriting decisions are influenced not only by the characteristics of the risks to be insured, but also by the company's retention capacity, reinsurance support, and the reinsurer's risk appetite for the risks faced.

A summary of the composition of research informants is presented in Table 3.

Table 3 - Composition of Research Informants

Function	Number of Informants	Role in the Study

Marketing	2	Perspective on business acquisition, insured parties' needs, and relationships with brokers
Property Underwriting	3	Perspective on risk analysis and risk-decision-making
Treaty Reinsurance	1	Perspective on reinsurance capacity and risk-placement support
Risk Engineer	2	Perspective on technical risk identification and evaluation
Property Claims	2	Perspective on loss experience and claims trends
Total	10	

Source: Primary research data, processed by the researcher (2026).

Based on Table 3, most informants are structural officials and professionals with work experience ranging from 2 to 25 years in their respective fields. This composition provides the diversity of perspectives needed to understand the integration of physical risk in property insurance underwriting more comprehensively. In addition, the involvement of informants from various functions also supports the source-triangulation process, thereby increasing the credibility and depth of the research findings.

Understanding Physical Risk in the Property Insurance Underwriting Process

The analysis of essay responses and informant interviews shows that all informants understand physical risk as one of the main risks in the property insurance portfolio. Physical risk is perceived as risk associated with potential asset damage caused by natural events, especially floods, extreme rainfall, strong winds, landslides, and various other hydrometeorological phenomena that, in recent years, have shown an increasing trend in both frequency and loss impact.

This understanding is relatively consistent across all informant groups, although there are differences in emphasis according to each function. Underwriting and risk-engineering informants tend to highlight technical aspects and risk characteristics; claims informants emphasize actual loss experience; while marketing informants highlight the insured parties' increasing attention to protection against natural disaster risk. These findings show that physical risk is understood as a relevant factor in the property insurance underwriting process at Company XYZ.

Physical Risk as the Main Property Risk

The research results show that flood is the most dominant physical risk and the one most frequently considered in the property insurance underwriting process. Almost all informants, from underwriting, marketing, risk engineering, claims, and treaty reinsurance, mentioned flood as the risk with the most significant frequency and loss impact compared with other physical risks.

The Head of the Property Underwriting Department (YA) stated: "The climate risk that most often affects the underwriting process is flood risk because the losses are more widespread." A similar view was conveyed by the Treaty Reinsurance informant (AP), who stated: "Flood, because its consequences are massive." From the claims perspective, informant AM explained that the frequency of flood-related claims has shown an increasing trend, and the affected areas have also become wider compared with previous years. Some areas that were previously not known as flood-prone have also begun to experience flood events in recent years.

This view is in line with Company XYZ's internal data, which show that physical risk contributed significantly to the property-claims portfolio during the 2020–2025 period. In 2024, for example, physical risk contributed 32.03% of the frequency of property claims and 21.73% of the total value of company property claims.

Based on the perspectives of underwriting and claims informants, the increase in flood and extreme-weather events in recent years has caused physical risk to no longer be viewed as an additional or secondary risk, but rather as one of the main factors that must be considered in the underwriting decision-making process.

Physical Risk as Strategic Risk in Property Underwriting

Beyond its role as a technical underwriting consideration, informants across functions increasingly framed physical risk in strategic terms. Informants from the underwriting and treaty reinsurance functions explained that the rising contribution of flood and extreme-weather losses to the property portfolio—reaching 32.03% of claim frequency and 21.73% of total claim value in 2024—has begun to influence portfolio-level decisions, including risk appetite for certain geographic areas, retention levels, and the structuring of reinsurance treaties. Several informants noted that areas previously regarded as low risk are now being re-evaluated, and that accumulation exposure in flood-prone zones has become a recurring discussion point in portfolio-review meetings.

This finding is consistent with the argument of Stricker et al. (2022) that the transformation of climate risk into financial risk reshapes not only claims and pricing, but also the governance and decision-making structures of insurance companies. At Company XYZ, this transformation is visible in the way physical risk has moved from being treated as a routine underwriting input to becoming a factor that is actively monitored at the portfolio level and discussed across functions, including treaty reinsurance. In this sense, physical risk has acquired a strategic character: it shapes not only individual underwriting decisions, but also the company's broader exposure-management and risk-retention strategy.

Integration of Physical Risk in the Property Underwriting Process

The findings show that physical risk is integrated into the underwriting process through the contributions of several functions rather than through a single, codified assessment tool. Underwriting informants explained that property risk acceptance is informed by risk-survey reports prepared by risk engineers, which describe site-specific exposure to flood, extreme rainfall, and other hazards. Claims informants contribute historical loss information by area and property type, while marketing informants relay information on client perception of disaster risk and, in some cases, requests for additional flood-related protection. Treaty reinsurance informants, in turn, indicated that physical-risk concentration in certain regions is factored into discussions on facultative placements and treaty capacity.

However, several informants acknowledged that this integration is largely informal and coordination-based rather than systematized. There is no single, standardized scoring instrument that consolidates flood-hazard data, historical loss ratios, and site-survey findings into a unified physical-risk rating for each property. Instead, underwriters combine these inputs case by case, drawing on the risk-survey report, internal claims history for the surrounding area, and their own familiarity with the location. This pattern is in line with Kousky et al. (2024), who note that insurers continue to face difficulty transforming historical-data-based approaches into structured, forward-looking assessment

frameworks. In Company XYZ, the cross-functional integration of physical risk information is evident, but it remains at an emergent stage: information flows between functions, yet has not been consolidated into a standardized underwriting tool specifically designed for physical-risk evaluation.

Professional Judgment as the Dominant Underwriting Decision Mechanism

A recurring finding across informants from underwriting, risk engineering, and claims is that final acceptance decisions for properties with significant physical-risk exposure depend heavily on the underwriter's professional judgment. For risks that fall outside straightforward categories—such as properties located in areas with no prior claims history but situated near rivers or low-lying land—informants reported that formal guidelines provide only a starting point. The decision to accept, decline, impose additional terms (such as flood sub-limits or higher deductibles), or refer the risk to a higher authority level ultimately rests on the underwriter's interpretation of the risk-survey findings combined with their accumulated experience of how similar risks have performed in the past.

Informants further explained that authority-limit structures, while formally documented, also rely on judgment in their application: the decision to escalate a case to a higher approval level is itself often based on the underwriter's assessment of whether available data is sufficient to support a decision at their own level. This finding reflects what Kohtamäki et al. (2022) describe as the interplay between formal rules and the interpretation of organizational actors in risk governance. At Company XYZ, formal underwriting guidelines and authority limits exist, but in the specific context of physical risk—where hazard data is incomplete and historical experience may not fully represent future conditions—professional judgment functions as the mechanism that fills the gap left by the limitations of available data and tools. This positions professional judgment not as a deviation from formal process, but as an integral and currently indispensable part of how physical risk is actually decided upon in practice.

Transition Toward Forward-Looking Underwriting

Informants from underwriting, risk engineering, and claims consistently observed that historical loss data is becoming a less reliable guide to future risk. Several informants pointed to areas that had no record of flood claims in past years but experienced significant flooding during the 2025 disaster events, illustrating that risk patterns are shifting faster than historical data can capture. This observation has prompted growing awareness, particularly among underwriting and risk-engineering informants, of the need for a more forward-looking approach—one that incorporates hazard maps, rainfall-projection data, and climate-scenario information into the underwriting process, rather than relying primarily on past claims experience.

At the same time, informants were candid that this transition remains at an early, largely conceptual stage. Awareness of the need for forward-looking tools has not yet translated into their routine availability or use in day-to-day underwriting; access to granular hazard data, external climate datasets, and analytical platforms remains limited, and risk-survey reports, while valuable, are primarily descriptive rather than predictive. This is consistent with the concern raised by Kousky et al. (2024) and Roper et al. (2025) that, without a shift toward forward-looking assessment, insurers risk under-pricing emerging exposures or, conversely, responding through abrupt coverage restriction once losses materialize. The findings of this study therefore depict Company XYZ—and, by extension, the broader Indonesian general insurance industry it represents—as being positioned at the early stage of a transition: the historical-data paradigm is increasingly recognized as insufficient, the

direction toward forward-looking underwriting is acknowledged across functions, but the data infrastructure, analytical tools, and structured methodologies needed to operationalize that transition have not yet been put in place. In this gap between recognition and implementation, professional judgment continues to serve as the primary mechanism through which physical risk is, in practice, incorporated into underwriting decisions.

CONCLUSION

Based on the description above, several conclusions can be drawn. First, physical risk has been understood as one of the main factors influencing the property insurance underwriting process. Physical risk is no longer viewed only as a potential source of loss to the object of insurance, but has become an important consideration in maintaining portfolio quality and business sustainability. The research results show that underwriting actors understand physical risk as increasingly dynamic and containing a higher level of uncertainty than before. This condition creates the need for more comprehensive risk evaluation, especially regarding location characteristics and changes in environmental conditions that can influence the level of risk exposure.

Second, physical risk has been integrated into the property insurance underwriting process and has become an important part of risk-acceptance decision-making. This integration involves various organizational functions and is supported by the use of risk information in the underwriting evaluation process. Although risk integration has been implemented, underwriting practice is still dominated by historical approaches and professional judgment. Therefore, strengthening data quality and more advanced supporting tools is required to improve the effectiveness of physical-risk integration in facing changing future risk characteristics.

Third, property insurance underwriting decisions are influenced by a combination of technical risk factors, risk-evaluation information, the company's capacity to manage risk exposure, and relevant business considerations. These factors are not assessed separately, but are considered comprehensively to produce underwriting decisions that are aligned with the company's risk profile and capacity.

Fourth, the main challenge in integrating physical risk into property insurance underwriting lies in the increasing complexity and uncertainty of risks, which have not yet been fully balanced by data quality, information availability, and supporting risk-analysis tools. This condition causes the underwriting process to remain dominated by historical approaches and professional judgment in decision-making.

The research results also show that the company already has various mechanisms and sources of supporting information for managing physical risk. However, their utilization can still be improved through strengthening data quality, integrating information, and developing a more forward-looking approach, such as the use of more advanced technology platforms based on future-scenario projections. Thus, the challenges faced are not only related to the need for technology or tools, but also to the company's ability to optimize available resources to support a more adaptive underwriting process in response to changes in physical-risk characteristics in the future.

Suggestions

Based on these findings, the central recommendation of this study is that the integration of physical risk into property underwriting in Indonesia remains heavily dependent on professional

judgment because of persistent limitations in data, analytical tools, and forward-looking approaches. Company XYZ, and the general insurance industry more broadly, would benefit from systematically developing standardized physical-risk assessment instruments—for example, structured scoring tools that combine hazard mapping, historical loss ratios, and risk-survey findings into a single, documented rating for each property. Equally important is improving access to granular, location-specific hazard data, including collaboration with national meteorological and disaster-management agencies (BMKG and BNPB), to support climate-scenario-based, forward-looking assessment rather than reliance on historical loss patterns alone. Finally, professional judgment should not be eliminated but rather supported: underwriters and risk engineers would benefit from structured decision-support frameworks and targeted training on forward-looking risk assessment, so that professional judgment operates as a complement to, rather than a substitute for, robust data and analytical tools. Future research could extend these findings through comparative case studies across multiple insurance companies, or through quantitative modeling of how forward-looking risk indicators could be incorporated into pricing and acceptance decisions.

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