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Precautionary Construction Management for Sustainability

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Abstract: *The demands for precautionary principles are increasing so fast in the global construction industry for bringing sustainability in a shorter period. While businesses are looking for high profit margins in a sooner period, sustainability related issues are rising or can be said it is being ignored most of the time. Therefore, several challenges are occurring that have been focused in the research work. For resolving those challenges, how the precautionary principles are helping has been illustrated with a clear overview by selecting several effective journals. The contribution of this work has justified the significance and reliability throughout the analytical journey.*

Keywords: *Building infrastructure, construction industry, resources consumption, carbon discharge, sustainability, Nepal's construction industry.*

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I. Introduction

The life cycle of a building infrastructure or rehabilitation goes through several major stages such as designing, planning, construction, maintenance and more others where sustainability needs to be maintained in each stage. In the words of Mastrucci*et al.* (2017), for guaranteeing regenerative limitation of the natural resources usage, precautionary development in the construction industry is highly needed. As amendment market failure numbers are rising so fast, it has become important to focus on bringing eco-proficiency based on numerous interpretations of sustainable development. So many abilities are there that play the important role in securing the environment of construction building projects by connecting one with another. In that case, complex interaction between the partners regarding materials, significance, and tastefulness can be found with the major activities. While the construction industry is enough to infer each activity within the site explicit operations for human settlement, encompassing manageability has the immense power to enhance the connections (QaziDaghfous& Khan, 2021). As the situation is not the same in different global regions several surveys have been done to see how the regional industries are adopting precautionary principles and how effective those are resulting in real time.

As the number of transformations in the construction project is seemingly speedy, it is somehow affecting the people along with society, economy and environment at the cost of sustainability. The manageability of the construction industry has been categorized into three parts- ***management and organization***, ***product and building***, and ***resources consumptions***. All three characters are based on financial, social, and environmental viewpoints as per the instruction of ***International Council for Research and Innovation in Building and Construction*** (Van de Poel*et al.* 2017).). In this regard, the vital challenge that the industry is facing is directing towards the ***carbon discharge*** at a huge amount (Ameen, Stagner& Ting, 2018). This is enforcing the construction firms to reevaluate its conduction process and bring innovation to deal with the issue. As this issue is connected with all the pre-mentioned viewpoints, resolving in no time has become essential for introducing potential sustainability development. Sustainability development refers to the improvement of the current situation without compromising the future generation objectives. In that context, human life quality must be improved without changing the ecosystem capacity and the supportive nature (Garcia *et al.* 2017). Besides, promoting social progress and economic improvement is also essential in the international market to reinforce the environmental protection and the cohesion of advanced economic policy integration accompanied by parallel progress in other fields.

Various global regions are highlighting the concern of public healthcare while prevention of diseases are providing protection are being prioritized as the principle of precautions. Precautionary actions are indicating the prevention of uncertainty and health related harms while responding to the public health risks and the living

environment (Sandin& Peterson, 2019). For making the sense of precautionary actions fruitful, the decision making process must be effective and major concern must go to the mechanical systems, design features, material selection, maintenance practices and the infrastructure. The comfort level from a social viewpoint and the development of novel technologies are bringing challenges in some places, especially where large scale development probes are less and slow as well. In those areas, human health has become a major issue for the biological community. Industrial development in construction building projects has improved rapidly after World War II that is focusing on the maintainability of human health and venture dimensions. Technological development is needed to be fast as well as their adaptation speed so that construction projects can minimize the use of natural resources (Wang *et al.* 2018). The entire construction life cycle cost must be based on the precautionary policies in which governments can add incentives for their better performances. As performance, level is based on the project designs and their fees, incentives can help in enhancing their project goals in respect of environmental impacts and resource consumptions.

II. Contribution

The special issues that are collected for meeting the purpose of this study have been collected in number of 21, consisting of 5 review papers and 1 case report. By using various methodological tools and technologies, the analysis has shown that those papers are contributing towards the benefit of social, economic, technological, and environmental measures.All the papers have been focused on describing various uses of precautionary action plans and the principles to mitigate the issues rose in various countries as per their requirements.

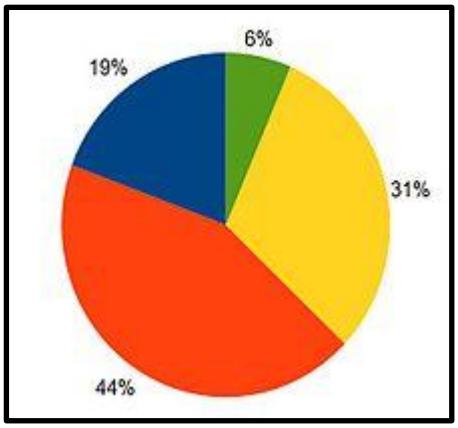

Figure 1: Publications collected from different regions
(Source: Self-developed)
(Here, Red= USA, Yellow= Asia, Green= Australia, Blue= South Africa)

In this journal selection process, 4 major elements have been prioritized such as product and building, resources and management, construction issues and adopted precautionary action plans. Along with it has been focused how all these elements are affecting the economic, social and environmental aspects of the global regions. Technological development, where found different from each other and the people' s perception towards those in the similar way, the risk measures of the construction projects have also been concerned with high priority. While the focus is going on these small variables of this research work, the major concern can never be ignored that is connected with the sustainability measures heavily.

The figure 2 of systematic review is clearly indicating how numerous papers have been published that are based representing the impact of construction projects in social, environmental or technological measures. Based on the key terms of this research paper keeping in mind the matter of reliability and validity, journal and case study those published after 2016 have been selected. Those are helpful to know how modern technologies and social perceptions are facing challenges and enforcing the precautionary adaptation. By considering English as the officially used languages, those published only in this language have been chosen for this research purpose.

Figure 2: Systematic review selection of journals
(Source: Self-developed)

A few papers found those are representing nearly related topical issues such as public health concern, construction managerial role related challenges, and carbon discharge related articles and more others. On the other hand, a large number of journals found those are focused on just showing the need for precautionary actions in the construction industry rather than discussing current challenging situations. The selected review paper has entirely focused on the construction challenges and the needs of precautionary actions are high and immediate. Hence, it is helping in getting better ideas about the need and meeting maximum relevant factors.

The case study of Nepal's construction industry is showing that public health and diseases are the main problems that are imposing the industry to take precautionary steps at the initial phase (Pradhananga, Kasabdji&Elzomor, 2020). The health concern of employees as well as the social people is enough to define how effectively CSR practices are being maintained in an industry. Therefore, the national government is taking steps to help the industry by focusing on sustainability development, where project managers are guided to evaluate public health conditions critically, and their perceptions towards the projects. The financial help is also provided for the same to make the operations effective. In the same context, the standard of living in the country is also given with due priority.

The situation is seemingly the same in South-West Europe as well regarding the precautionary actions in the construction industry. In this region, the major issues have been found regarding proper inspection of material selection, diagnosis, overpricing, and lack of curative conservation among the partners (Ramos *et al.* 2018). In that heritage, care has been prioritized toresolve with precautionary principles while focusing on the peoples' social environment. Therefore, reluctant investment has been introduced through maintenance programs by considering the existing approaches on a serious note. Such a scenario is making the evaluation process easier by turning the limelight upon key indicators.

On the other hand, the major problem of carbon discharge from the construction industry is increasing in an alarming manner in the USA as the government is modifying the carbon policies as a part of precautionary decisions. Emission standard of carbon emission is regulated in the country to define the acceptable pollutant adaptation power (Lu, Zhu & Cui, 2012). Therefore, project managers in this region are asked to submit the potential emission ration before starting the construction process and measure its effectiveness in the social and environmental elements. The policies are made for ensuring the dramatic sustainability upbringing in the USA's construction industry and giving tough competition to the others.

Other journals are also focusing on some factors that are relevant with the topic. While sustainability in the construction industry is the vital concern of this research work, the paper is contributing maximum relevant data that is authentic as well. Collecting data from a single journal and trusting all the information blindly is a poor way of making the work trustworthy. Therefore, based on the key terms, journals have been chosen from the wider range of knowledge pool. These are integrated only that information for meeting the paper's aim with high efficacy. How human health and the carbon discharge problem of construction projects can be reduced, have been prioritized throughout the overall paperwork that added an extra value

It has seemingly created a worthwhile scenario as all the selected journals and papers are somehow focusing on specific construction related issues and giving resolving strategies. In the same context, all the resolving matters are directly connected with the precautionary strategies and the principles so that those can ensure better performance in the near future. As different regions are facing different kinds of problems and dealing with those hard from their sides, it can be saidthat the nature of climate is the major factor that is influencing every situation.

Furthermore, the discussion of the entire topic through various journals, are making the concept clear that the special issues have touched some of the unique points regarding the topic to represent the significance of sustainability in the construction projects. The selected journals have raised questions against the overall architecture community regarding its effect on social, environmental, economic and technological terms as the growth of this industry depends highly on these matters.

III. Conclusion

This paper is entirely designed to contribute highly over the topic of sustainability in the construction industry. The selected topic is a vital one as the global concern is raising speedily towards the construction projects as without proper planning and use of methodological tools, making a plan successful is not easy and it might result in poor infrastructure. While construction projects are found with a high monetary investment for a purpose of long-term, how the challenges of this industry is influencing social, environmental, and technological factors have been clearly described in this study with real time case evaluation and data collected from authentic journals. The clear overview of the precautionary principles and its usages has been giving a significant view to adopt better strategies for removing the challenges during the conduction of the projects.

References

[1]. Ameen, F., Stagner, J. A., & Ting, D. S. K. (2018).The carbon footprint and environmental impact assessment of desalination.*International Journal of Environmental Studies*, *75*(1), 45-58. Retrieved on: 15th March, 2021, from: https://www.tandfonline.com/doi/abs/10.1080/00207233.2017.1389567

[2]. Garcia, D. A., Cumo, F., Pennacchia, E., Pennucci, V. S., Piras, G., De Notti, V., &Roversi, R. (2017). Assessment of a urban sustainability and life quality index for elderly. *International Journal of Sustainable Development and Planning*, *12*(5), 908-921. Retrieved on: 15th March, 2021, from: https://www.witpress.com/elibrary/sdp/12/5/1525

[3]. Lu, Y., Zhu, X., & Cui, Q. (2012).Effectiveness and equity implications of carbon policies in the United States construction industry.*Building and Environment*, *49*, 259-269. Retrieved on: 15th March, 2021, from: https://www.sciencedirect.com/science/article/pii/S0360132311003519

[4]. Mastrucci, A., Marvuglia, A., Leopold, U., &Benetto, E. (2017).Life Cycle Assessment of building stocks from urban to transnational scales: A review.*Renewable and Sustainable Energy Reviews*, *74*, 316-332. Retrieved on: 15th March, 2021, from: https://www.sciencedirect.com/science/article/pii/S1364032117302794

[5]. Pradhananga, P., Kasabdji, G. S., &Elzomor, M. (2020, November).A Sustainable Opportunity to Utilize Hazardous Waste during Post-Disaster Reconstruction Phase: A Case Study of Nepal Earthquake.In*Construction Research Congress 2020: Infrastructure Systems and Sustainability* (pp. 212-220).Reston, VA: American Society of Civil Engineers. Retrieved on: 15th March, 2021, from: https://ascelibrary.org/doi/abs/10.1061/9780784482858.024

[6]. Qazi, A., Daghfous, A., & Khan, M. S. (2021). Impact of Risk Attitude on Risk, Opportunity, and Performance Assessment of Construction Projects.*Project Management Journal*, 8756972820985673. Retrieved on: 15th March, 2021, from: https://journals.sagepub.com/doi/abs/10.1177/8756972820985673

[7]. Ramos, L., Masciotta, M., Morais, M., Azenha, M., Ferreira, T., Pereira, E., & Lourenco, P. (2018).HeritageCARE: Preventive conservation of built cultural heritage in the South-West Europe. In *Innovative built heritage models: Edited contributions to the international conference on innovative built heritage models and preventive systems (CHANGES 2017)*. Retrieved on: 15th March, 2021, from: https://www.researchgate.net/profile/Maria_Masciotta/publication/327535646_HeritageCARE_Preventive_conservation_of_built_cultural_heritage_in_the_South-West_Europe/links/5b9938b5299bf14ad4d53855/HeritageCARE-Preventive-conservation-of-built-cultural-heritage-in-the-South-West-Europe.pdf

[8]. Sandin, P., & Peterson, M. (2019). Is the precautionary principle a midlevel principle?.*Ethics, Policy & Environment*, *22*(1), 34-48. Retrieved on: 15th March, 2021, from: https://www.tandfonline.com/doi/abs/10.1080/21550085.2019.1581417

[9]. Van de Poel, I., Asveld, L., Flipse, S., Klaassen, P., Scholten, V., &Yaghmaei, E. (2017).Company strategies for Responsible Research and Innovation (RRI): A conceptual model.*Sustainability*, *9*(11), 2045. Retrieved on: 15th March, 2021, from: https://www.mdpi.com/2071-1050/9/11/2045

[10]. Wang, P., Wu, P., Wang, J., Chi, H. L., & Wang, X. (2018).A critical review of the use of virtual reality in construction engineering education and training.*International journal of environmental research and public health*, *15*(6), 1204. Retrieved on: 15th March, 2021, from: https://www.mdpi.com/1660-4601/15/6/1204

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