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Future Trend in Education: Disaster Management and Architectural Awareness

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Abstract—*There has been a considerable concern over disasters and disaster management at the global level. Even as substantial scientific and material progress is made, the loss of lives and property due to disasters has not decreased. Observing the ten year time frame disasters have continued to have a heavy toll on the safety of countries, communities and people as a whole. There were total 574 disasters which have been reported worldwide in the year 2015 out of which 67 percent of people killed lived in the continent of Asia which was above its decade annual average of 50.5 per cent. It is said 'disasters don't kill people, buildings do', as was also the case in recent Nepal earthquake analysis that three fourth of deaths were not due to quake but due to building collapse. Similarly, many hazards turning to disasters can be controlled with proper resilient planning and design.*

Disasters, most of which are inflamed by climate change and which are increasing in frequency and intensity, significantly derange progress towards development. It has been evident that vulnerability of people as well as assets all around the globe has increased and because of this there is a steady risk to economic, social, cultural and environmental losses.

India has been traditionally vulnerable to natural disasters on account of its unique geo-climatic conditions. Floods, droughts, cyclones, earthquakes and landslides have been recurrent phenomena. Not only that, the unplanned urban fabrication and sprawling has also added to the vulnerability of hazards both natural and man- made changing to disasters. The unregulated building construction has also added to the risk. Architects are the design leaders of any community therefore they can fully contribute and be effective in building disaster resilient society. This paper draws the attention of its readers to explore the area of research in the domain of disaster management and proposes that disaster management may be included as a subject of study in the curriculum of architectural education..

1. INTRODUCTION

India is vulnerable, in varying degrees, to a large number of disasters. More than 58.6 per cent of the landmass is prone to earthquakes of moderate to very high intensity; over 40 million hectares (12%) of its land is prone to floods and river erosion; close to 5,700 kms, out of the 7,516 kms long coastline is prone to cyclones and tsunamis; 68% of its cultivable area is vulnerable to droughts; and, its hilly areas are at risk from landslides and avalanches. Moreover, India is also vulnerable to Chemical, Biological, Radiological and Nuclear (CBRN) emergencies and other man-made-disasters. Disaster risks in India are further compounded by increasing vulnerabilities related to changing demographics and socio-economic conditions, unplanned urbanization and development within high-risk zones, environmental degradation, climate change, geological hazards, epidemics and pandemics. Clearly, all these contribute to a situation where disasters seriously threaten India's economy, its population and sustainable development.

2. NEED FOR DISASTER EDUCATION: PREVENTION, MITIGATION AND RECOVERY

The recent AMCDDR (Asian Ministerial Conference for Disaster Risk Management) echoed that India has high risk and is vulnerable to disasters. Dr**. Robert Muir-Wood, Chief Research Officer of RMS** and a world authority on catastrophe risk reduction, had said that "India has the highest number of people exposed to flood risk of any country worldwide, and the fastest increase in flood risk from development and climate change." The lack of preventive planning and design—both before the disaster and afterward—is a critical problem which the design world has been facing.

Fig. 1: Role of an Architect in Disaster Management (Source : Role of Architects in Disaster Response and Recovery -Rachel Minnery, AIA, NCARB, LEED AP)

The earthquake of Nepal was not an unknown threat still lack of resilient design caused inevitable destruction. On the contrary in Concepcion, Chile, the 2010 earthquake was the sixth largest on record, but fatalities remained under 1,000, in large part due to effective implementation of building regulations. Though disaster mitigation is a multi disciplinary subject, architects have a key role to play. It has been observed that there is still no career path that prepares students to work as design professionals who design and intervene at a crucial moment in the mitigation or recovery process to produce enduring solutions in this domain.

3. DISASTER MITIGATION IN ARCHITECTURAL EDUCATION AT UNDERGRADUATE LEVEL

Disaster mitigation, preparedness and related topics have been evolved in the architectural education at undergraduate level in certain countries. Undergraduate architectural curriculum, having subject of disaster management has been analyzed and quoted as examples here. Architectural curriculum of some universities of USA, Japan and Italy has been quoted. The first example includes four famous architectural departments of University of South California, Cornell University, California Polytechnic State University and University of Texas. The total number of the courses and number of compulsory courses and the contents of the courses have been studied according to those selected universities. Based on content of the courses, the relations between disasters and disaster management concept are investigated and illustrated at Fig. 2.

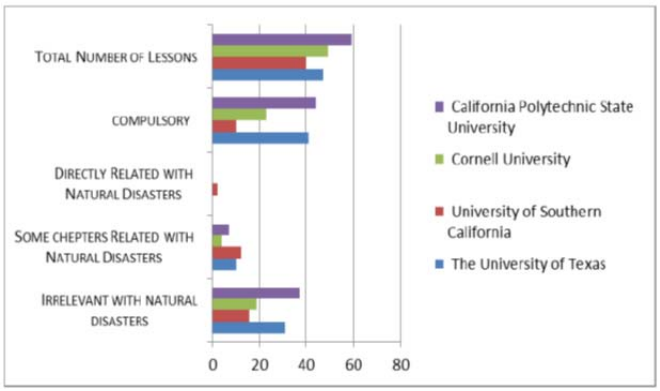

Fig. 2: USA Architecture Schools Curriculum chart (Source: The Role of Architecture Education in Natural Disaster Mitigation- Ozdogan Fatma and Guney Deniz ,ICASCE'16)

In the second example the universities of Japan have been examined and it is observed that an ordinary architect student gets enough knowledge and information about disaster management during his/her design studios and other courses. Most of compulsory and elective courses have enough subjects in their content. The four universities examined are Chiba, Kyoto University, Tokyo University, Waseda University.

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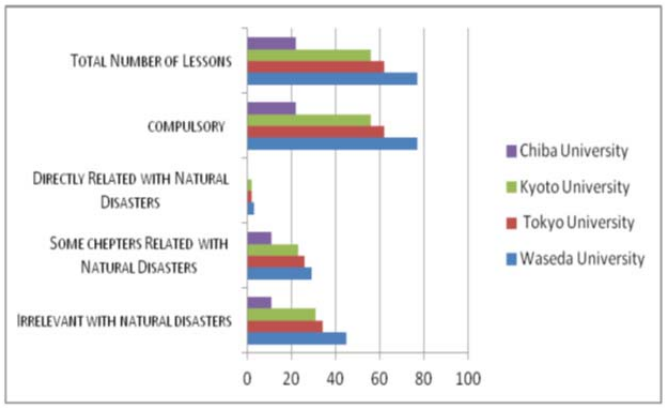

Fig. 3: Japan Architecture Schools Curriculum chart (Source: The Role of Architecture Education in Natural Disaster Mitigation- Ozdogan Fatma and Guney Deniz ,ICASCE'16)

The country of Italy has been quoted as a third example, Sapienza Universita di Roma, Universita Degli Studi Firenze, Politecnico di Milano and Politecnico di Bari. It has been observed that the architectural course of Italy though does not have direct subjects of disaster management still have subjects and coursework related to the domain of disaster mitigation.

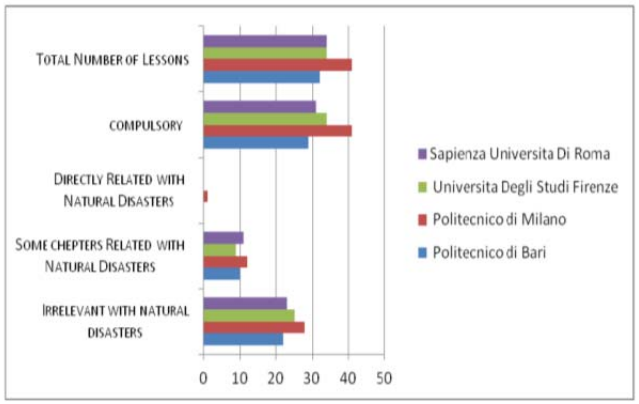

Fig. 4: Italian Architecture Schools Curriculum chart (Source: The Role of Architecture Education in Natural Disaster Mitigation- Ozdogan Fatma and Guney Deniz ,ICASCE'16)

4. PROPOSAL FOR CURRICULAR OPPORTUNITIES

Disaster education, preparedness and mitigation all add up to sustainable construction in any community. India today aims at sustainable construction and sustainable societies. Any society which is disaster resilient automatically increases the sustainability quotient. The inclusion of disaster resilience and response in the educational curriculum will explore the area further. There can be various methods and opportunities

through which the subject can be included in the domain of architectural education.

- Subject for theoretical examination
- Short course on the subject
- Online short course
- Inclusion as an elective subject
- Workshop/seminar on awareness of the subject

5. CONCLUSION

As seen above, there is a strong relation between education, disaster preparedness & mitigation. Unfortunately, there are currently a few lessons in architecture departments in India which include natural &man - made disasters, disaster response, disaster management, disaster risk-reduction and development in their undergraduate curriculum. The policies of disaster management explain the role of architects after a disaster has taken place to provide sustainable relief though the architects can play an important role in mitigation and policy making operations. Over the past years though there has been a paradigm shift in the approach to disaster management still there is a need to access the role of architects and architectural educationists in this domain. If we reinvest in architecture, against the disruptive force of hazards, it can be a source of discovery and change.

Examples from USA, Japan and Italy have highlighted that architectural education has an important role for smooth running of disaster mitigation system. It has been observed that vulnerability is reduced with thoughtful design and construction methodologies. If the architectural education trains the student to design buildings with reduced vulnerability to disasters from day one, the loss after disaster can be reduced to a great extent.

Therefore, there is a need for educationists to research this field and the students to understand from the very beginning of their education the importance of **'build disaster resilient'** than **'build back better'**.

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