

# Preparing Youth for Disasters: The Need for a Contextualised Disaster Risk Reduction Curriculum in Schools

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## Abstract

This study draws from detailed qualitative case studies of three schools that practise disaster risk reduction (DRR) education initiatives in their curriculum in Nepal. Using curriculum mapping and discourse analysis, it aims to elaborate the significance of relevant disaster risk reduction (DRR) content in school curriculum to prepare youths for disaster response and recovery. It elaborates the nature of the current DRR content covered in curricula and textbooks and provides suggestions to address the identified disaster-related issues in the school curriculum. It further elaborates that incorporation of local and contextualised DRR content in school curricula contributes to the establishment of the “culture of resilience” in disaster prone context like Nepal. It concludes that more organised and holistic approach is essential to develop disaster and management knowledge, skills and attitudes to youths.

## Keywords

Disaster Risk Reduction Curriculum, Disaster Prevention, Disaster Mitigation, Disaster Response, Disaster Recovery

## 1. Introduction

Education is an active means for social development and transformation. Therefore, education is linked either directly or indirectly with the events that may occur in society [1]. Since disaster management is one social issue, education provision also needs to address it through proper awareness to reduce the risks of the possible hazards that may occur in the community [2] [3]. The school curriculum is one of the best opportunities to prepare students for natural disaster events that may occur in their surroundings, therefore, DRR education helps to establish a

meaningful connection to the world beyond the classroom. However, a crucial question for effective DRR education provision is: how relevant and contextualised is the school curriculum? The purpose of this study is to explore the curricular factors which contribute to delivering the quality DRR education in school in disaster prone context. This article begins by outlining the need of relevant and contextualised curriculum provision in school. Curriculum mapping and discourse analysis helped to observe, analyse and generalise various aspects of relevant and contextualised DRR education curriculum in school. Data analysis highlights disaster mitigation, disaster prevent and preparedness, disaster response and disaster recovery are four crucial aspects of DRR education. It argues that in a multi-disaster-prone context, relevant DRR content should be integrated across various subjects in school curricula and would, therefore, be taught more widely and thoroughly.

## 2. Literature Review

A curriculum is a prescribed body of knowledge and methods which must be carried out in a systematic process to address the needs of learners [4] [5]. To develop an appropriate curriculum, Tyler [6] outlines the four basic questions of curriculum development: What shall we teach? How shall we teach it? How can we organise it? How can we evaluate it? These guiding questions help to define the content, pedagogy, scope, and sequence organisation and evaluation areas of an educational plan. However, development of an effective, relevant and useful curriculum is a challenging task [7]-[11]. [11] states the explosion of knowledge, which needs to be stated in a balanced way in the school curriculum, is one of the major issues faced by curriculum developers and teachers. As the curriculum guides the overall education process, it is therefore important to ensure its effectiveness and usefulness. Tanner and Tanner [12] argue that addressing the nature and interest of the learner, the needs of the society, the interrelatedness of knowledge, the provision of theoretical and practical knowledge, and stakeholder involvement in curriculum decision-making process are all crucial to ensure such qualities. Doll [13] suggests richness, recursion, relations, and rigour as the important aspects when making curriculum decisions relating to identifying and organising relevant curriculum content. Furthermore, curriculum relevancy is more concerned with applicability and appropriateness [10].

Relevant DRR content in the curriculum helps to address the existing and possible DRR needs in local and wider communities. Selby and Kagawa [14] explain three major approaches: infusion or permeation approach, limited infusion, holistic infusion to incorporate DRR areas into the curriculum effectively. Petal and Green [15] agree that infusion is a “comprehensive approach that distributes DRR content throughout the curriculum, using lessons, readings, activities and problems, enriching the existing curriculum rather than displacing it” (p. 3). UNISDR [16] states infusion across the curriculum requires “high level policy commitment and guidance” (p. 26) and the dedicated subject approach requires experts and

resources to integrate DRR in the curriculum.

In addition, since one of the major aims of DRR education is to prepare individuals and local communities to cope with catastrophe [17], DRR education initiatives need to be linked with disaster prevention and preparedness, mitigation, response and recovery areas. DRR education in a wider sense covers school-based initiatives, community level mass awareness educational interventions, including the individual and families [18]. As global initiatives of DRR education accept that DRR in education is important for the holistic school development, these initiatives advocate for the importance of, and need for, relevant DRR education. Thus, widening the curriculum provision through disaster preparedness, mitigation, response and recovery-related content is helpful to ensure a culture of safety. These relevant matters in DRR curriculum also link with preparing students for potential disaster and hazards. This gives opportunities for wider learning to understand possible disasters. Therefore, wider DRR content in the school curriculum is also essential in developing students as active agents in the disaster management area in their family and society where they live.

The use of a participatory approach in curriculum development is helpful in identifying the relevant content which can address local needs, ensuring that the resources needed for the effective implementation of the curriculum are available, and developing ownership. Benson and Bugge [19] emphasise the involvement of beneficiaries to identify the local threats and local context to make people aware of disaster management. Relevant DRR content provision in curriculum is essential for addressing the local context in formal and non-formal education opportunities. For such action, the bottom-up approach in DRR curriculum development is realised as an effective approach.

Furthermore, content related to the use of technology in the DRR area is a recently growing field, and students also need to gain opportunities to learn and experience such scientific initiatives in DRR areas. This type of content helps to make them aware of, for example, proper early warning systems. Using technology in education also provides opportunities for a global collaborative learning environment to foster global citizenship among children [20]. Thus, proper DRR content in the DRR curriculum helps to link students' experiences with the scientific phenomenon of disasters, basic coping mechanisms, and the use of technology to understand disaster management effectively and efficiently.

There are several approaches discussed in literature that focus on developing a relevant curriculum that can address these needs. One important approach is curriculum integration. It is helpful in delivering the required knowledge, skills and attitudes to address the individual, social, and political context. The provision of vertical/grade wise and horizontal/lesson wise integration of content across the curricula helps to deliver the required knowledge to the learners as per their needs and interests [9]-[11]. The integrated approach in curriculum development is helpful in blending knowledge in various subjects. It is also a helpful approach to learning and teaching from a variety of world-views, strategies, and resources; and

the tapping of real-life situations for problem solving and critical thinking in the classrooms [21]. Thus, curriculum integration blends content knowledge from different disciplines around a common theme and provides proper learning opportunities to the learners. Drake and Burns [22] point out that an integrated curriculum is about establishing connections across subjects. They explain that curriculum integration helps to ensure the accountability for students learning, ensuring relevancy that addresses the student's concerns and sets the learning environment in a local context, ensuring rigour to help students with the best learning, and ensuring that no child is left behind in the learning process. They discuss multidisciplinary, interdisciplinary and transdisciplinary approaches in curriculum integration.

### 3. Various Aspects of DRR Education

Ensuring proper DRR content is covered in the curriculum helps to enhance student capacity to cope with and understand disaster management. UNISDR [16] defines disaster management as the organisation, planning and application of measures preparing for, responding to and recovering from disasters. This definition also incorporates the crucial role of relevant DRR education in preparing individuals for disaster response and recovery. Mulyasari *et al.* [23] explain that education on disaster risks, mitigation and preparedness strategies help to reduce the negative consequences of disasters. Therefore, DRR education aims to deliver basic knowledge and skills about disaster mitigation, preparedness, response and recovery which are the four recognised phases in disaster management cycle [24]-[27]. Tierney [27] explains that these four areas address the problems of disasters and management. United Nations [28] also explains that the need and importance of DRR education relates to these four areas. Thus, in a broader framework, to develop a relevant DRR curriculum, it is important to incorporate appropriate DRR content addressing these four areas of disasters and management. A brief introduction to these four areas of disaster management and the need for relevant content in DRR education provision is presented below.

#### Disaster mitigation

Disaster mitigation initiatives are associated with the activities that help to reduce the effects of disasters. UNISDR [29] defines disaster mitigation as “the lessening or minimising of the adverse impacts of a hazardous event”. Mitigation measures help to reduce the likelihood of a disaster occurring and the number of casualties [2]. Moreover, these actions aim to reduce disaster vulnerability and provide passive protection during disaster events. UNISDR [29] identifies actions such as: provision and implementation of land-use regulations that help to reduce hazard exposure; development and implementation of building codes to protect structure from wind, water or seismic forces; and conducting public education to make the communities aware of disaster mitigation. Classifying the nature of mitigation measures, it further states that actions dealing with reducing hazards and vulnerability are associated with primary mitigation measures, whereas

actions relating to reducing the effects of hazards belong to secondary mitigation. These initiatives also help to determine active measures and passive measures to reduce the disaster risks and its effects. DRR education plays a significant role in carrying out both types of mitigation measures. Morrissey [30] states that infusing disaster prevention concepts into various subjects in the school curriculum is crucial for preparing future generations. DRR education activities relating to participatory hazard identification and mapping, vulnerability analysis, risk analysis and disaster prevention measures, such as public awareness, contribute positively towards disaster risk mitigation. These disaster mitigation activities and measures help to avoid new and existing disaster risks [2]. Selby and Kagawa [14] state that disaster prevention and mitigation-related content should be systematically treated across the curriculum and through the grade levels. They also point out that consideration must extend the basic science of hazards and safety measures.

#### Disaster prevention and preparedness

UNISDR [29] defines disaster preparedness as “the knowledge and capacities developed by governments, response and recovery organisations, communities and individuals to effectively anticipate, respond to and recover from the impacts of likely, imminent or current disasters”. It encompasses actions undertaken before a disaster impact that enable a community to respond actively when disaster does strike. Disaster preparedness actions include planning, public education and training potential service providers. The introduction of disaster preparedness and hazard reduction initiatives to a community contribute positively to reduce longer-term social and economic disorders caused by hazard impacts [2] [30]. DRR education on the development of emergency response plans, the establishment of a warning system, conducting drills, exercises, and the provision of emergency equipment, supplies, and materials (such as tarpaulins, household kits, water purification tablets, shelter materials, cooking utensils and blankets) all play a significant role in establishing a disaster-resilient community. It is crucial to prepare institutions for organisational disaster preparedness and individuals for household disaster preparedness [31]. The disaster preparedness interventions reflect ongoing multisector activities, specifically: the development of a plan, coordination for risk analysis, implementation of rules and regulations, establishing proper communication mechanisms, effective public education initiatives, using news media to disseminate the news and information, and disaster simulation exercises. Similarly, it also consists of the actions that relate to capacity development including trauma and psycho-social care [32]. DRR education is crucial for students to develop disaster preparedness knowledge, skills and attitudes and demonstrate how to react in times of disasters [33]. These learning behaviours contribute to raising their disaster resilience capacities. Thus, disaster prevention and preparedness ideas in a school curriculum help to establish disaster-resilient communities.

#### Disaster response

UNISDR [29] defines response as “actions taken directly before, during or

immediately after a disaster in order to save lives, reduce health impacts, ensure public safety and meet the basic subsistence needs of the people affected". Disaster response activities during the disaster include public warnings, emergency operations and search and rescue. Based upon the crisis situation disaster response, actions such as mass evacuations, rescues and triage are essential for emergency response. Moreover, detecting threats, disseminating warnings, evacuating threatened populations, searching for and rescuing trapped disaster victims, and the provision of emergency medication, food and shelter, are common actions that need to be conducted in the disaster response stage [16]. Morrissey [30] states the provision of training for developing emergency response skills and plans to school and families is one important educational measure in disaster management. It further elaborates that in the case of landslides, schools use their efforts to clear debris and make a quick plan to reconstruct the physical facilities to allow students to go back to school. He further explains that disaster response-related DRR education prepares schools to activate emergency plans to shelter or evacuate pupils with minimal effects on individuals. Similarly, provision of first aid, care of the victims on the spot, identification of the dead, controlling communicable disease epidemics, water, hygiene, sanitation and waste management, and care of mental health actions are also linked to the disaster response area. DRR education opportunities contribute to enhance disaster response skills in individuals. Such opportunities also prepare young people to perform citizens' roles in the disaster situation. Moreover, such curriculum provisions create innovation and creativities in individuals in their response to the crisis for collaborative action [34]. Thus, DRR education curriculum provision also aims to achieve the society's aspirations through preparing responsible citizens who can help each other during and after the crisis situation.

#### Disaster recovery

UNISDR [29] defines recovery as "the restoring or improving of livelihoods and health, as well as economic, physical, social, cultural and environmental assets, systems and activities, of a disaster-affected community or society, aligning with the principles of sustainable development and 'build back better', to avoid or reduce future disaster risk". This definition informs us that disaster recovery relates to the activities following a disaster, such as long-term assistance for rebuilding to the affected community. Moreover, it is concerned with repair, rebuilding and reconstruction of the damaged properties and restoring normal community life, including addressing psychological wellbeing. Provision of water and sanitation, health and food, introducing measures for child protection, the management of education in emergencies, basic shelter and actions relating to humanitarian protection are some interventions that need to be carried out for proper disaster recovery. DRR education helps students to be aware of these disaster recovery actions. Moreover, such learning opportunities prepare them for better adjustment and allow them to develop coping capacities in a post-disaster situation. Similarly, such learning opportunities can also contribute to

developing positive attitudes towards collaborative actions to re-establish normal community life.

Anderson [35] suggests that the provision of disaster preparedness, mitigation, response and recovery-related content in the curriculum contributes to developing a student as an active DRR messenger. **Table 1** shows the summary of the possible DRR content that can be incorporated into the school curriculum to address the global, regional and local disaster issues.

**Table 1.** Possible DRR content for school curriculum.

| Areas of DRR/disaster management     | Possible relevant DRR content for DRR education                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Disaster mitigation                  | <ul style="list-style-type: none"> <li>- land-use regulations that help to reduce hazards exposure</li> <li>- building codes to protect the structure from wind, water or seismic forces</li> <li>- conducting public education to make people aware of disasters and mitigation</li> <li>- hazards identification and mapping</li> <li>- Vulnerability analysis</li> <li>- risk analysis</li> <li>- disaster prevention measures</li> </ul>                                                                      |
| Disaster prevention and preparedness | <ul style="list-style-type: none"> <li>- DRR planning, including the development of an emergency response plan</li> <li>- introduction to early warning systems</li> <li>- management of emergency equipment, supplies and materials such as tarpaulins, household kits, water purification tablets, shelter materials, cooking utensils and blankets</li> <li>- conducting drills, public education, training potential service providers</li> <li>- training including trauma and psycho-social care</li> </ul> |
| Disaster response                    | <ul style="list-style-type: none"> <li>- public warning during disasters</li> <li>- emergency operation, search and rescue</li> <li>- emergency medication, food and shelter</li> <li>- first aid, care of victims</li> <li>- water, sanitation and hygiene</li> <li>- waste management</li> <li>- mental health actions</li> </ul>                                                                                                                                                                               |
| Disaster recovery                    | <ul style="list-style-type: none"> <li>- collaborative action</li> <li>- rebuilding-repair, rebuild and reconstruct</li> <li>- ways of restoring community life</li> <li>- health, nutrition and sanitation</li> <li>- child protection</li> <li>- emergency education/continuing education</li> </ul>                                                                                                                                                                                                            |

Source: Author's illustration on the basis of the above literature.

Similarly, to incorporate DRR education provision into the school curriculum, Selby and Kagawa [14] explain the five dimensions of DRR education. The first dimension relates to why, how and where the disaster may strike. Traditionally

this content is covered in science and geography subjects, but Selby and Kagawa [36] argue that there is need to extend the content. The second dimension relates to introducing students to the signs and signals of hazards, early warnings, and the dissemination of proper information for evacuation and sheltering provisions. The main aim of this dimension is to make students aware of essential health and safety measures during and after a disaster. The third dimension describes the needs of structural and non-structural safety-related content. Students need to be aware of the physical, social, economic and environmental reasons that may contribute to the increasing vulnerability of the community. They further suggest that the social science curriculum can include this content in a context-specific manner to increase DRR learning. The fourth dimension, understanding how to build resilience, relates to building the capacity of students to cope with potential disasters. Under this dimension, they suggest educating students about the use of proper methods and strategies for disaster mitigation, vulnerability assessment, development and implementation of resilience action plans, and practising participatory citizenship education while delivering DRR education. Under the fifth dimension, it is suggested that the DRR initiatives also need to make students aware of the active role of schools in DRR in the community to establish a culture of safety and resilience. In their research, Selby and Kagawa [14] find that dimensions 3, 4 and 5 are less frequently and rarely addressed in a school curriculum. To address these dimensions, they suggest incorporation of relevant safe school initiatives, such as improvement in infrastructure, DRR policy development, publication of a school bulletin on DRR, and engaging students in school vulnerability assessment activities in the school curriculum. **Table 2** presents a summary of the identified DRR content by [37].

**Table 2.** Potential DRR content proposed by UNESCO & UNICEF (2014).

| Dimensions                | Suggested content areas                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 <sup>st</sup> dimension | <ul style="list-style-type: none"> <li>- Understanding science and mechanism of natural disasters—types, causes</li> <li>- Learning and practicing safety measures and procedures (pre-, during and post)</li> <li>- How do hazards become disasters?</li> <li>- How do we build disaster resilience?</li> <li>- Building a culture of safety and resilience (traditionally this content is incorporated into science and geography subjects)</li> </ul> |
| 2 <sup>nd</sup> dimension | <ul style="list-style-type: none"> <li>- Introduction to the signs and signals of hazards</li> <li>- Early warning systems</li> <li>- Proper information for evacuation and sheltering provisions</li> <li>- Awareness of health and safety measures before and after a hazard</li> </ul>                                                                                                                                                                |
| 3 <sup>rd</sup> dimension | <ul style="list-style-type: none"> <li>- Context-specific content: Structural and non-structural safety</li> <li>- Reasons of vulnerability (physical, social, economic, environmental) (traditionally social science subjects can contain this content)</li> </ul>                                                                                                                                                                                      |

**Continued**

|                           |                                                                            |
|---------------------------|----------------------------------------------------------------------------|
| 4 <sup>th</sup> dimension | - Building capacity in DRR areas to cope with potential disasters          |
|                           | - Strategies for disaster mitigation                                       |
|                           | - Vulnerability assessment                                                 |
|                           | - Development of resilience                                                |
| 5 <sup>th</sup> dimension | - Participatory citizenship education                                      |
|                           | - Role of schools in DRR                                                   |
|                           | - Relevant safe school initiatives—improvement of structure and facilities |
|                           | - School vulnerability assessment                                          |
|                           | - DRR plan and policy development                                          |
|                           | - Evacuation plan                                                          |
|                           | - Establishment of a culture of safety                                     |

Source: UNESCO & UNICEF, 2014, p. 11.

All these dimensions are crucial to making pupils aware of DRR. However, comparing these with the four areas of disaster management there are still very limited ideas relating to recovery and response. Thus, in a wider sense, DRR education opportunities must prepare learners for all aspects: disaster preparedness, mitigation, response and recovery issues.

#### 4. Methods and Materials

This qualitative study is based upon constructive paradigm and case study approach to study the real-life context in a disaster setting [38]–[41]. Interviews, focus groups and document analysis were the major methods of data collection. Three public schools representing urban and rural settings and vulnerable to various natural disasters were selected to analyse their DRR education practices at local level. District and national level authorities were also consulted to validate the data. **Table 3** presents details of the data collection tools administered at various levels.

**Table 3.** Details of data collection tools administered at various levels.

| Level                                                                   | Details                                                                                                                                                                                                                                                    |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>School level</b><br>School 1, 2 and 3<br>(Interview and focus group) | Head Teachers/School Principals (3 interviews)—PC1, PS1, PSN1                                                                                                                                                                                              |
|                                                                         | Teachers (primary, lower secondary and secondary)—TC1, TC2, TC3, TS1, TS2, TS3, TSN1, TSN2, and TSN3 and community representatives including School Management Committee/Parents Teacher Association in each school—CC1, CS1, CSN1 (Total 12 focus groups) |
| <b>District level</b><br>(Interview and focus group)                    | District Education Officer—EO1, DRR Focal Person—EO2, Educational Training Centre trainer—EO3, Local NGO Actor—NR1 (4 interviews)                                                                                                                          |
|                                                                         | Resource Personnel—OE4 (1 focus group)                                                                                                                                                                                                                     |
| <b>National level</b><br>(Interview)                                    | Officer from Department of Education—OD1                                                                                                                                                                                                                   |
|                                                                         | Officer from Curriculum Development Centre—OC1                                                                                                                                                                                                             |
|                                                                         | Officer from National Centre for Education Development—ON1                                                                                                                                                                                                 |
|                                                                         | Representatives from INGO and Association of International non-government organisations—NA1, NO1, NU1 (Total 6 interviews)                                                                                                                                 |

As presented in the above table, total 13 interviews and 13 focus groups were carried out. The secondary data sources that include rules and regulation, official documents such as School Sector Reform Plan (SSRP), National Curriculum Framework, local curriculum development framework, Teacher Capacity Development guidelines and manual were also consulted. Curriculum mapping and discourse analysis was carried out to examine various aspects of DRR education.

## 5. Findings and Discussion

Disaster risk reduction (DRR) education focuses on disaster prevention, mitigation, response and recovery related education acts that take place in any formal and non-formal education settings [29]. Documents such as textbooks and curriculum are analysed, and stakeholders' perceptions are examined in order to find out to what extent the DRR content meets the actual social and individual needs in the following section. Interview data show that understanding the incorporation of relevant DRR content in existing school curricula is viewed differently by different research participants. The national level participants shared that the basic ideas about DRR are now incorporated in the school curriculum, whereas most of the local level research participants pointed out that the current school curriculum is not DRR-sensitive. It lacks the provision of a wider sense of disasters and management and does not even provide knowledge to link student experiences to context-specific hazards and their mitigation, preparedness, response and recovery.

The interview data related to the provision of the DRR curriculum and its practices are analysed and presented under the four main areas of disaster management. Similarly, the five dimensions of the DRR curriculum model discussed by Selby and Kagawa [14] are also considered while analysing the provision of DRR content.

### 5.1. Disaster Mitigation

All of the participating schools in this study indicated that the existing disaster mitigation-related content presented in the school curriculum and relevant textbooks is limited and is still not enough to address the school's needs. National and local level participants pointed out the content and pedagogical gaps in addressing disaster mitigation support, including disaster awareness. Research participants were concerned more about the provision of disaster awareness learning opportunities provided to the students. Most of the primary level teachers mentioned that there is very limited disaster awareness content in the curriculum and few relevant textbooks at primary level. For example, one of the primary teachers from school 2 indicates:

*Specifically in primary level curriculum, there is very limited disaster-related content and it is not enough to raise disaster risk reduction awareness. (TC1)*

Raising awareness about disasters is one of the major areas of disaster mitigation; there needs to be proper public education in order to make individuals aware

of disasters [2] [42]. A similar view regarding lack of disaster awareness was also shared by another female primary teacher from study school 1. She says,

*There is no disaster-specific content given in the textbooks up to grade three. An introduction about the sun, earth, environment, and pollution are given in the social studies curriculum of grade three but nothing specific about disaster mitigation, preparedness...is given in Science, Social, Nepali, Maths, or English...how can our students learn the basic ideas of disaster risk reduction? (TS1)*

A DRR subject expert from the Curriculum Development Centre shares:

*From a recent study, we realised that there is rarely any DRR-related information presented in primary level curricula and textbooks, we need to address such gaps soon. (OCI)*

Current DRR education in the primary school curriculum is limited and lacking basic information relating to disaster mitigation and awareness. Curricula and text book analysis results also show that there is very limited DRR information presented in some lessons of social studies at primary level. Since awareness raising is the core part to all disaster mitigation initiatives, it is important to integrate DRR concepts into children's activities from early grades [2] [43].

Teachers from upper grades, like those from primary levels, pointed out that the lower secondary and secondary level school curriculum also did not address disaster awareness-related content properly. One female lower secondary level teacher from school 2 states:

*In the lower secondary level, basic information about some natural hazards such as earthquakes, storms and wind are included in the social studies curriculum and textbooks, however information relating to current DRR policies, roles and the responsibilities of local authorities in disaster mitigation are not included. Nothing about DRR is included in maths, English and Nepali subjects. (TS1)*

The recently revised secondary level school curriculum also lacks DRR content and adequate information about disaster mitigation, and awareness raising is not included. It also shows that DRR content is not integrated with other learning disciplines, and that, as in the primary level curriculum, the lower secondary level curriculum is still not comprehensive enough to introduce students to the local disaster context and disaster management mechanisms.

Secondary level teachers argued that the revised secondary school curriculum attempts to introduce some disaster topics such as tsunamis, volcanoes, and tornadoes which are not relevant in the context of Nepal. The secondary curriculum still lacks the relevant and contextualised DRR information and skills to prepare students for disaster mitigation measures. The school principal of study school 2 states:

*At secondary level, the DRR content is still not enough and is presented haphazardly, therefore it seems less effective in raising awareness of disaster mitigation measures to students. This content is mainly descriptive. Students also need to learn about how they can contribute to mitigate the disasters and its consequences. Current provisions do not seem appropriate to address all areas of*

*disaster management with respect to our geographical context too. (PCI)*

Similarly, the school principal from study school 3 pointed out that DRR-related content is not incorporated and organised effectively in lower grades. He states:

*In grade nine, geography contains some natural hazard-related lessons such as plate movement, tsunamis, volcanoes and hurricanes but these disasters do not occur in Nepal, ... disaster lessons need to be context-specific, ... a brief introduction to such natural hazards is enough. Mitigation measures for earthquakes, landslides, flooding, fire, heat and cold waves, avalanches and storms, which are quite common in the context of the country, are not addressed properly. (PSN1)*

Furthermore, secondary level curriculum is also not enough to address the DRR educational needs of the students. These quotes illustrate that the recently revised secondary level curriculum is also not seen as comprehensive enough to address the mitigation measures, including proper awareness about identified common natural hazards that occur in the country. Students can take a proactive role in understanding risks and minimising the impact of disasters and if they are educated well, they can work as a good channel for transferring DRR ideas and skills to families [2] [44].

Provision of relevant DRR education also benefits parents and the wider community. Such content contributes to raising public education, thus making students and community people aware of disasters and mitigation measures [15]. Since students play an active DRR messenger role, such content empowers them to deliver DRR knowledge effectively. For example, although there are very few DRR lessons given in the textbooks, people in the communities realised that this content helped them to gain the basic ideas about DRR issues. Parents also pointed out that the existing school curriculum does not include enough information about the potential disaster risks and their mitigation.

One of the parents from study school 1 says:

*While our children learn about fire, floods and landslides from their books, we think they are learning about disasters. Such provisions are relevant to us, we are also learning from them, but there is not enough information given, there are some pictures of flooding and landslides given in some text books, which is good. However, it is very important to be aware of potential disasters too such as lightning and earthquakes. (CS1)*

Even if there is limited DRR information relating to disaster awareness and mitigation in school textbooks, parents, students and the wider community find this limited information helpful. This quote also expresses the concerns raised by parents about preparing their children for every potential disaster. Petan and Green [15] suggest that formal and informal DRR education provisions through schools are essential for preparing communities for disaster mitigation. The goal of an educational system for school level students is preparing them not only to respond to natural disasters but also equipping them to plan for the mitigation of the consequences [30].

## 5.2. Disaster Prevention and Preparedness

It is hard to manage disaster, but the disaster risk reduction initiatives can be helpful in minimising risks. Giving students a practical, life skill-based DRR education can help to prepare them to reduce such risks [14]. Disaster preparedness skills are essential in order to handle potential hazards. Such learning opportunities also help to develop safety and disaster resilience capacities. A lack of disaster preparedness activities may lead to several problems during disasters and afterwards [2] [16]. If the community is well prepared and can reduce disaster risks then there is likely to be less disaster loss [28]. Disaster preparedness is critical in the context of the multi-hazard-prone situation of Nepal. Various DRR actors, including the government of Nepal, realised the importance of DRR education and have given it value in recent years [45]. Most of the national level research participants agreed with the current curriculum attempts to address disaster preparedness-related needs. The officer from the Curriculum Development Centre argues:

*DRR is a newly introduced concept in the curriculum. We have introduced some DRR preparedness concepts into the existing curriculum; disasters and its management are described briefly in some lessons. Recently we incorporated DRR and Climate Change lessons in our grade 9 and 10 curriculum. There are quite a few topics in the grade six to eight curriculum. (OCI)*

There are some initiatives carried out to introduce disaster preparedness in the school curriculum. During the field visit it was observed that schools are getting partial assistance from local NGOs to carry out some identified disaster preparedness initiatives in schools, and are mainstreaming these in the school curriculum. For example, with the help of local NGOs, the three schools which participated carried out earthquake drills once a year and developed preparedness plans. However, the schools realised that these are one-off events and not enough to develop the required disaster preparedness competencies for students and communities.

A lack of adequate DRR preparedness learning opportunities at school and community contribute to increasing disaster vulnerability at a local level [23]. The interview data shows that there are very limited disaster preparedness-related provisions given in the existing school curriculum. It is argued that conducting one-off events are just not enough to address the local and national disaster issues. Schools need to mainstream DRR activities on a regular basis, and for this schools need further assistance to carry out an active role in disaster preparedness in the community. A local NGO representative states:

*Nepal is in 20<sup>th</sup> place as a disaster-prone country in the world, 11<sup>th</sup> position on earthquake risk, 4<sup>th</sup> on climate change, 30<sup>th</sup> on flood. We are surrounded by the possibilities of disasters; the current school DRR initiatives and the curriculum are not enough to address the disaster issues, there are very limited disaster preparedness initiatives carried out by schools and limited lessons presented in textbooks. (NOI)*

Disaster preparedness is still not valued significantly in the education sector.

Schools are not well prepared to address the multi-disaster-prone context and vulnerabilities. Existing DRR education initiatives carried out by schools are not enough to address the needs of local communities and the country.

The provision of DRR learning opportunities in schools also contributes to preparing the wider community for disaster preparedness and to cope with a disaster situation. Significant numbers of the parents seemed to be unaware of the existing DRR curriculum, and some of the parent representatives shared that there are very limited DRR learning opportunities available for students and people of the community at a local level. One of the parents from school 3 describes:

*We don't know what exactly is written in the curriculum and textbooks about DRR, but we know that it is a very important area. How can we send our children to school if it is not safe and secure? It is important that we all need to know about the possible disasters to cope with the situation. (CSN1)*

The community people are isolated from the curriculum development process. However, they are still very concerned about school and child safety issues. It is a school's responsibility to assure the parents that the school facilities are safe and the school is committed to looking after children appropriately.

Children are agents of change; they can deliver basic DRR knowledge and skills to family and the community if they get the opportunity to learn DRR at school [46]. Children can play a significant role in responding to disasters and warning others of impending threats [44] [47]. For instance, a 10-year-old girl, Tilly Smith, who had learned about tsunamis in her geography class, saved dozens of lives when she noticed the signs and signals while visiting the coast of Thailand in 2004 [47].

In the context of a lack of DRR awareness in the community, the school can play a significant role to make parents and community members aware through incorporating DRR initiatives into the curriculum. All the research participants pointed out the importance of engaging students in regular drills to make them aware of, and well able to cope with, context-specific possible disasters. People of the community from the study schools also realised the importance of providing regular drills in school. They shared that their children taught them the earthquake drill which they found helpful during the recent earthquake. One of the parents from study school 1 describes the importance of the provision of disaster preparedness activities in the school curriculum:

*Our children have shared the ideas of duck-cover-hold to protect ourselves during an earthquake. We realised that if children learn effectively in school, they can use the learning everywhere. Such disaster preparedness activities are helpful in preparing them for the disasters and in developing possible disaster prevention skills. (CS1)*

Relevant disaster preparedness activities carried out in school are helpful in developing disaster prevention skills for students and community [48]. Disaster preparedness-related initiatives in the school curriculum are important for making people aware and preparing them to cope with the possible disasters. Disaster

preparedness is given the greatest importance among the four areas of disaster management; nevertheless, the existing content provision in curriculum and textbooks is still not inadequate. The curriculum and textbook analysis results also show that textbook lessons are more focused on disaster preparedness areas compared to other phases of disaster management. Such a situation suggests that more disaster preparedness actions need to be carried out through community collaboration.

### 5.3. Disaster Response

Disasters can create a worse situation if they are not managed properly [49]. People, especially from the vulnerable groups, may face various challenges in a post-disaster context. Disaster-affected children are vulnerable to various mental health issues [47] [50]. Most of the research participants have shared some difficulties, such as getting proper shelter, rescue, and rehabilitation, including suffering from psychosocial problems, that they have encountered after the earthquake. Schools were officially closed for 37 days; however, being a part of the community, school teachers were involved in response initiatives. Teachers from the three study schools mentioned that it was a very hard time for schools to manage the circumstances after the great earthquake of 2015. For example, the school principal of study school 3 pointed out that the existing secondary level curriculum does not address how students can contribute to disaster response areas.

Most of the teachers mentioned that the existing school curriculum lacks disaster recovery-related content that can help to develop post-disaster knowledge and skills to students. Content such as psychosocial support to disaster victims and lessons related to coping with the disaster stress are not delivered in any level of education. Moreover, they felt that the current DRR lessons are more theoretical, descriptive, and less realistic, and hence not effective in making a positive change to student behaviour. Some teachers shared their stories during the interview time. For example, one of the secondary level teachers of school 2 shares:

*After the earthquake, students trusted the messages and rumours which they had heard from others that another quake would come this time tomorrow...but they did not even trust their teachers, ...they seemed to be more stressed, fearful and unhappy, we have tried to convince them that it is not possible to predict an earthquake but they did not put their trust in us. (TC3)*

The existing school curriculum does not cover the wider and more useful information to help students to overcome such disaster rumours. Similarly, it indicates the unavailability of post disaster syndrome-related information in the curriculum, which is crucial to making pupils aware of how to have a healthier recovery.

Provision of clear and concise DRR messages are helpful in raising awareness about disaster issues for learners. It is important to incorporate these messages in the textbooks and other available DRR learning resources. Most of the teachers responded that the DRR content presented in the existing curriculum and

textbooks does not follow the standards and lacks consistency. They argued that given DRR messages seem short, unclear and poorly contextualised. [44] and [37] describe the importance of “key DRR messages” and its consistency over the available learning resources. [51] states the availability of printed materials such as posters, pamphlets and signage are important ways to share DRR messages at a local level.

A secondary level teacher from study school 3 mentions:

*A few days after the earthquake, DRR messages were disseminated by radio and TV which were helpful. The Department of Education and Curriculum Development Centre added school safety and disaster management related national objectives in the national curriculum...after a month District Education circulated information to carry out post-disaster relief activities in school. Various NGOs came and assisted schools to carry out different activities such as trauma healing, educational materials distribution. These all encouraged school and community to carry out relevant activities for children at a local level; however, not all disaster-affected schools received the support equally, some schools are still not aware of what to do after disaster strikes. (TS3)*

The national level school curriculum had not given importance to disaster response before the earthquake. Since schools were not well informed about disaster response initiatives, it was observed that there was confusion about what to do to respond in the post-disaster context. The collaboration and coordination among like-minded organisations played a significant role in disaster response and recovery phase at the local level.

Most of the schools in Nepal are vulnerable to disasters [52] [53]. Most of the school buildings are not earthquake-resistant [54] and schools are vulnerable to local level small scale disasters [52]. Development of local DRR curriculum and its implementation is essential for addressing the local disaster context. The Curriculum Development Centre has allocated 30% of the local curriculum provision at primary level [53]. However, various reports explain that the local curriculum provision is not yet carried out effectively by schools [55]. Curriculum Development Centre records shows that some organisations, for example UNICEF in Dhadedhura, and Plan Nepal in the Rasuwa district, developed a local DRR curriculum. However, the implementation of such initiatives is still not carried out. In the context of Bhaktapur, a District Education Officer notes that local DRR curriculum helps to unpack local disaster issues:

*Addressing local disaster issues in the local curriculum is important; it provides a great learning opportunity to understand the local context. However, still no schools of the Bhaktapur district have developed their local curriculum to address local disaster issues. (EO2)*

Such content also contributes to preparing pupils for effective disaster management. For example, schools which are vulnerable to floods can develop such a concept and prepare students for effective mitigation, preparedness, response and recovery.

Describing the current status of local curriculum provision in the country, a representative from the Association of INGOs says:

*Local curriculum provision and policy are there. These provide for the incorporation of local language, culture and other local needs in the school curriculum. However, schools still do not value DRR, teachers are not confident in developing such a curriculum and most of the schools prioritise other subjects, such as additional English, in a local curriculum. (NAI)*

Since DRR is a neglected area in education and the schools themselves are not confident enough to develop the local DRR curriculum, and also because of the parents' expectations, there is less chance to introduce local DRR to the curriculum.

#### 5.4. Disaster Recovery

Educating people about ways to restore community life in a post-disaster situation is one of the major roles of education. The interview data suggests that the existing school curriculum has comparatively less content for this area than the other areas of disaster management.

The District Education Officer expressed that with the help of the subject experts, the Curriculum Development Centre has incorporated DRR education into the school curriculum; however, it is not adequate for preparing students for disaster recovery. On the basis of the recent experience of earthquakes and floods, he has pointed out that the current curricular provisions are not enough to address the disaster response and recovery needs. He explains:

*There are very limited disaster recovery issues in the school level curriculum, comparatively there are more DRR issues presented in the secondary level curriculum but there are still some gaps at lower levels, ...there is provision for curriculum revision, it is important to revise it soon. (OEI)*

One of the School Management Committee members of study school 2 also notes:

*There are some lessons on disasters in textbooks, but these lack dissemination of relevant knowledge and skills for disaster recovery. The contents are not adequately addressing the issues such as health and safety after a disaster situation. (CCI)*

The existing school curriculum and textbooks do not provide opportunities for students to learn about recovery from disasters. Organised DRR content addressing major areas of disaster management is helpful in developing DRR skills and abilities [52]. Because of limited funding for DRR education and the lower value given to DRR activities in schools, most of the schools were not well prepared to face the recent earthquake both emotionally and physically [56].

Most of the local level research participants shared that they had never imagined and expected such a severe disaster situation before. They shared that it revealed a feeling of unity; sharing each other's burdens and helping each other are the fundamental things they have experienced which helped them to overcome

such a difficult situation. School and community people worked together to provide relief for such a situation. One of the primary teachers from study school 2 shares:

*We were very happy to share so that our school buildings were used by community people. For those who lost their property for more than a month, the school provided shelter to them in a difficult time. (TC1)*

Specifically, the above quote reflects a school's roles in the disaster response and recovery process. During the field visit it was observed that the school buildings were partially destroyed by the current earthquake. If school buildings are structurally strong, in a time of crisis these become temporary homes for disaster-affected people [48] [28]. In the context of Nepal, some previous studies show that because of a lack of disaster awareness, most of the school buildings are structurally vulnerable and hence not convenient to use as temporary shelters during a disaster [53] [54].

The current school curriculum seemed insufficient to prepare school families to respond and recover from the disasters. One of the Parent Teacher Association members from study school 1 states:

*We experienced various challenges after the earthquake struck...we were stressed, felt isolated, disappointed...it was a very hard time...our school curriculum neither taught how to carry out first aid, immediate rescue, and disaster recovery actions nor provided ideas about what to do immediately after a disaster to make him or herself and others safe. And how should we tackle the emergency situation? (CS1)*

Preparing students for disaster recovery is highly important to motivate them to continue their education and help them to overcome the stress, anxieties and other psychosocial disorders. Based on the current experiences of mega-disaster, the above quote expresses that the current practices to enable students for better recovery are not sufficient. It also suggests that there are not enough learning opportunities in the school curriculum to empower students in disaster preparedness, mitigation, rescue, recovery and rehabilitation.

Children can also contribute positively to responding to disasters [57]. School leadership needs to develop their capacities and provide relevant training to shape disaster responding skills. A local NGO representative shared that the Junior Red Cross Circle performed well in responding to, and recovering after, the earthquake in 2015. Similarly, actions carried out by children's clubs, after the disaster situation, seemed positive in three study locations. The school principal of study school 2 shares:

*Child club members played an active role in communicating important post-disaster messages to students, they also helped the organisations while they distributed relief supplies in the school and community. (PC1)*

Similarly, one of the secondary school teachers from study school 1 shares:

*After the disaster when the school opened, we have encouraged children to be patient and relaxed. We have increased their engagement in activities to get them*

*out of the fear and stress from the earthquake. Child club members are encouraged to assist their teachers while conducting extra-curricular activities, such as drawing, writing, entertainment activities (such as dance and sharing jokes), peer counselling and caring for children of earthquake-affected families. (TC3)*

Children can play crucial roles in pre and post disaster situations. DRR-related content must empower children for their active role in the disaster management cycle. The curriculum needs to provide DRR curricular and extra-curricular activities in school curricula which are essential in empowering children in risk reduction areas. [47] explains that if children are educated well and given proper DRR learning opportunities, they may have practical and creative ideas to help families and communities to recover from a disaster. Since disasters put negative consequences into the space where children play, live and enjoy [51], there needs to be a child-friendly approach to educate and empower them to participate in the development of a good recovery plan [43].

In conclusion, the research participants pointed out the content-specific gaps in the DRR curriculum in addressing the possible disasters and management that may occur in the three ecological belts of the country. The DRR content is more related to disaster awareness and preparedness; comparatively, disaster response and recovery ideas are somewhat lacking in the curriculum. Considering the five dimensions of DRR education suggested by [14], the interviews data suggests that the existing DRR education curriculum in Nepal is quite narrow and insufficient to address the needs. The curriculum and textbooks are more focused on the first two dimensions; however, with the help of local NGOs some selected schools had the opportunity to address a few activities that belong to the other remaining dimensions. It is not always possible to mention all the areas in the prescribed curriculum; however, the curriculum must assure teachers and students of its importance and give hints about further learning resources.

What is mentioned in DRR education related documents?

Some available national level documents related to DRR and disaster management sectors are analysed. [58] states the importance of national laws and policies in managing proper DRR education and continuing education during crises and emergencies. In order to address the broader disaster needs, the prescribed DRR curriculum, national policies and other curriculum documents must be interrelated. In the context of Nepal, a relief and response focused act, the Natural Calamity (Relief) Act, was introduced in 1982 and was the first legal document of Nepal in this area. To replace this act, the parliament approved the Disaster Risk Management Act in 2017; it was tabulated in 2012. It addresses most of the common disaster management and DRR issues of the country; however, it does not contain much about climate change-related disaster management. It suggests the formulation of relevant educational policies to reduce disaster-related risks in schools and communities. The Ministry of Education is now in the process of developing the education sector policy and strategic action plans [59].

The National Strategy for Disaster Risk Management (2009) is a widely accepted

document which enforces DRR activities in the absence of supportive legislative context [54]. After its implementation, a DRR focal person in relevant ministries, departments and local level government agencies was instated, and it also assisted in the development of their disaster management plans. The National Society for Earthquake Technology took the lead role to develop the National Strategy for Disaster Risk Management in 2009, which also identifies DRR as a national and a local priority [54]. Under the priority action 2, better knowledge management for building a culture of safety addresses education. The following table (Table 4) shows the guidelines mentioned.

**Table 4.** Strategy activities to mainstream DRR in education in Nepal.

| Strategic activity | Description                                                                                                                                                      |
|--------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12                 | Develop/modify the National Policy on education and implement it so that it gives recognition to schools as important centres for promoting disaster awareness   |
| 13                 | Implement disaster education                                                                                                                                     |
| 14                 | Develop curricula on DRR training for different target groups and implement training programmes for all stakeholders                                             |
| 15                 | Develop and implement a comprehensive national programme for disaster awareness                                                                                  |
| 16                 | Develop plans, programmes and facilitate the use of mass communication media for dissemination of information on disaster risk and risk reduction                |
| 17                 | Develop/strengthen and encourage awareness raising programmes on DRM at the local level                                                                          |
| 18                 | Encourage and support NGOs, CBOs and other stakeholders in developing and implementing awareness raising programmes on disaster risk reduction and preparedness. |

Source: The national strategy for disaster risk management, 2009.

These guidelines are helpful in introducing DRR education in the school curriculum; however, various reports point out that the current school curriculum is not comprehensive enough to address these strategic activities, thus there is a need to update school curricula to reflect risk assessment, including hazards, exposure and vulnerability [53].

After the Government of Nepal showed its commitment to the Hyogo Framework of Action, the Curriculum Development Centre incorporated DRR issues in the national school curriculum in 2007 [56]. NSET [54] points out that the existing natural hazards-related content in the textbooks of science, social studies and some other subjects aim to deliver the physics of the hazards and is not focused on how to reduce disaster risks and keep safe from hazards. To address such gaps suggested by [54], the Curriculum Development Centre revised the primary curriculum in 2010 and the secondary level curriculum in 2013 [59]; however, it has

still not carried out any evaluation study to identify the effectiveness of the DRR education provision. On the basis of the four areas of the disaster management cycle, the existing primary, lower secondary and secondary level curricula have been analysed. **Table 5** shows a brief analysis of the incorporation of DRR education in various subjects in the existing school curriculum and textbooks.

**Table 5.** DRR content in various learning subjects in school curriculum in Nepal.

| Subject areas                                                    | Content                                                                                                                                                                                                                                                                                   | Addressing area                                                                                      |
|------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Nepali                                                           | There is not specific content dealing with natural hazards, climate change and risk reduction given in the Nepali curriculum and textbooks<br>At primary level there are a few figures, words and sentences incorporated in some lessons                                                  | Disaster awareness                                                                                   |
| English                                                          | Nothing included about natural hazards and risk reduction areas directly in the English curriculum and textbooks                                                                                                                                                                          |                                                                                                      |
| Mathematics                                                      | The Mathematics curriculum and textbooks do not deal with any DRR education areas                                                                                                                                                                                                         |                                                                                                      |
| Social studies and creative arts (Primary level)                 | Limited concepts relating to natural hazards, floods, landslides, fire, earthquakes and accident are provided (grade 4 and 5)                                                                                                                                                             | Disaster awareness<br>Disaster prevention and preparedness<br>Disaster response<br>Disaster recovery |
| Science and environment (Primary level)                          | There are some lessons that directly relate to DRR and climate change issues (grade 4)                                                                                                                                                                                                    | Disaster awareness                                                                                   |
| Science and environment (Secondary level)                        | The topics of environment, earth and space include some lessons on natural hazards: floods, landslides, soil erosion, fire, earthquakes, volcanoes, cyclones, glacier lake outbursts, what to do pre-, during and after a disaster (grade 8, 9, 10)                                       | Disaster awareness/mitigation<br>Disaster preparedness<br>Disaster response                          |
| Health and Physical education (Primary level)                    | There is some direct and indirect DRR-related content presented in Health and Physical education textbooks and curricula                                                                                                                                                                  | Disaster awareness                                                                                   |
| Health, Population and Environmental education (Secondary level) | Floods, landslides and soil erosion (grade 6)<br>Earthquakes, cyclones, floods, landslides, soil erosion (grade 7)<br>Environmental degradation and the consequences of floods, landslides and soil erosion (grade 8)<br>Introduction to risks, the concept of safety education (grade 9) | Disaster awareness<br>Disaster mitigation                                                            |

Source: Author's illustration on the basis of revised national school level curriculum.

**Table 5** also shows that DRR content is introduced mainly in science, geography, social studies, health and physical education, and population studies courses in school education in Nepal. There is very limited natural hazard and disaster-related information present in the primary level curriculum. The content does not seem organised, and it also lacks horizontal and vertical balance among the textbooks. For example, new DRR ideas are introduced in grade 9 but not continued in the grade 10 curriculum. The emphasis of the curricula and textbooks is on the application of DRR concepts; however, the curricula lack the proper integration

of DRR content with the learning subjects. Bearing in mind the four areas of disaster and management, the secondary level curricula and textbooks include some disaster mitigation, prevention, awareness raising and preparedness concepts but are still lacking in their ability to address disaster response and recovery areas. Similarly, on the basis of the dimensions described by [14], the existing school curricula and textbooks provide very limited information. The interviews data also shows that the current DRR curricula and textbooks are not well organised and are unable to address the essential areas of disaster management properly.

The Curriculum Development Centre has also developed teacher guides to help teachers to teach these subjects. From the analysis of the available teachers' guides, it is observed that the teachers' guides mainly address the disaster awareness and preparedness areas and they do not cover disaster response and recovery areas.

**Table 6.** DRR learning resource.

| S.N.                                  | Areas                                                                                                                                                                                                                                                                                                                                                                                                                              |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Part 1: Disasters                     | Introduction, types, causes of disasters and ways to keep safe from disasters                                                                                                                                                                                                                                                                                                                                                      |
| Part 2:<br>Disaster Management        | 1) Introduction to Disaster Management<br>2) Legal and other policies discussing disaster management aspects of the country<br>3) Disaster management cycle<br>4) Various types of disasters and their management: Earthquake, tsunami, volcano, flooding, fire, avalanche, debris flow, storms, landslides, cyclone, drought, cold wave, heat wave, lightning, epidemic, acid rain, ozone layer depletion, attack by wild animals |
| Part 3:<br>Disaster preparedness plan | 1) Introduction<br>2) Planning steps<br>3) Implementation of plan in crisis/emergency                                                                                                                                                                                                                                                                                                                                              |
| Part 4:<br>Emergency Education        | 1) Introduction<br>2) Objectives of emergency education<br>3) Importance of emergency education<br>4) Structure of safe school                                                                                                                                                                                                                                                                                                     |

Source: Curriculum Development Centre & UNESCO, 2015.

In 2012, the Curriculum Development Centre developed a disaster management and emergency education student learning resource. It is a small book that presents five lessons which cover disaster management and emergency education, earthquakes, floods and landslides, fire and epidemics. These lessons are very general and informative and so are useful for raising disaster awareness for the students and community. However, they do not present wider DRR knowledge in a local context. There is a need for integration of DRR learning content in the local and national level curriculum [46]. Proper integration of DRR content in the local and national curriculum helps to address the overall disaster context of the country. During the field visits, it was observed that teachers, school principals and

District Education officials were not aware of this material. After the Gorakha Earthquake 2015, UNESCO helped the Curriculum Development Centre to develop resource materials on disaster management to address the current needs of DRR content that is lacking in the secondary level curricula and textbooks. **Table 6** shows the areas of DRR education presented in these resource materials.

This resource material is helpful for providing learners with the basic ideas of disaster management. The lessons are presented briefly to make the learners aware of various disasters; however, similar to the previous learning resource, this information is not enough to address the four areas of disaster management. It also lacks information about disaster response and recovery. It is also noticeable that there are still gaps in addressing the contextualised disaster issues in most of the lessons. Although the Curriculum Development Centre published this resource in 2015, it was not available in any of the study schools which are quite close to the Curriculum Development Centre. This situation implies that the schools situated in the remote areas of the country may not have easy access to such resources.

One of the major indicators of a good quality curriculum is the provision of high-quality content that is relevant, demanding, well-organised, balanced and integrated [37]. The content of the curriculum can be deemed useful when it addresses both local and broader issues and needs. Research participants shared their views on the gaps that they identified in the existing DRR education curriculum both in content and delivery. The stakeholders' perceptions and suggestions to enrich the content in DRR curriculum are presented below.

### 5.5. Needs for Wider DRR Content

The national curriculum framework should ensure relevant DRR learning opportunities to students [60]. Thus, provision of appropriate and relevant content in curricula and textbooks is essential for DRR education. Most of the research participants argued that the existing school curriculum does not properly address the common hazards that may occur in the country. They suggested that there is a need for the incorporation of wider DRR content that addresses the potential disaster issues that may occur in the specified geographical location, and the place where the community and school are situated. They have suggested the curricula and textbooks be revised to make them disaster-sensitive in a local context. Furthermore, the national level research participants pointed out the need for development of a relevant and appropriate DRR curriculum for formal and non-formal education, provision of wider DRR content in the school curriculum and level-wise textbooks, and the development of a DRR education training package for teachers.

Similarly, they deemed that the current DRR education curriculum is not contextualised. The school principal of study school 1 points out the necessity of curricula and textbook revision to address the local and national DRR needs:

*Earthquakes, landslides, flooding, fire, heat and cold waves, avalanches and storms, which are quite common in the context of the country, should be given*

*more priority. (PSNI)*

Similarly, another primary teacher from school 2 suggests:

*Our national curriculum should contain contextualised basic ideas of disasters and its management from early grades. (TC1)*

A well organised DRR curriculum helps to prepare students for disaster mitigation, preparedness, response and recovery. Since curriculum guides teach appropriate teaching and learning strategies, the curriculum must be broader and also address local issues.

Textbooks are considered a key source of knowledge in most schools of the country. The interview data revealed that since other DRR learning resources are not available at school, most of the teachers and students mainly rely on the textbooks to carry out their teaching and learning activities. Relating the local situation to the given content is useful in making students more familiar with their surroundings. A local NGO worker states:

*Based on the curriculum, textbooks need to contain general ideas of DRR and also give emphasis to addressing the local needs, the existing governmental textbooks lack these ideas, ...they are more general and less localized. They are theoretical and less practical. (NRI)*

Similarly, one resource person says:

*We need well-organised DRR lessons that must contain broader DRR information in the school textbooks. Similarly, to raise disaster awareness among students and community people, key disaster messages must be given in the school level textbooks. (EO4)*

Textbooks play a significant role in establishing links between the general DRR ideas and specific local situation. Therefore, textbooks need to incorporate broader and local disaster issues that encourage students to learn DRR more effectively. Such provision can also help community people to raise the value of DRR education.

In conclusion, most of the research participants suggest that curricula and textbooks need to be more disaster-sensitive and must incorporate learner-centred contextualised DRR lessons along with broader ideas. Analysis of the curricula and textbooks also shows that there is very limited DRR content at primary level. DRR education introducing the four areas of disaster management in the early years of schooling [3]. Aghaei *et al.* [61] find that the DRR educational content should be designed based on target community interests such as family, social and economic status; religion, age, gender, job, residence; and people's perception and understanding of their needs and priorities.

## 5.6. Need for Curriculum Integration

Integration refers to linking all types of knowledge and experiences contained within the curriculum plan, and emphasises horizontal relationships among topics and themes from all knowledge domains. [51] notes that curriculum integration refers to an approach that makes use of specially developed units, modules or

chapters, concentrating on disaster risk reduction. Ideally these are designed to fit into several specific course curricula, at specific grade levels, for a specific duration. "Curricula should be organised around world themes derived from real life concerns; dividing lines between the subject content of different disciplines should be erased." [62] National level research participants suggest that DRR content must be incorporated in various subjects from the early grades.

If DRR content is integrated and incorporated in school curricula appropriately, it also creates better teaching opportunities for teachers [51]. In the multi-hazard-prone context, DRR education needs to be integrated with some common themes across the subjects rather than treating it as a separate subject. Considering DRR as an interdisciplinary issue, school curricula can incorporate DRR-related content into various subjects. Core DRR content can be given in Geography and Science, however common DRR messages can be incorporated as a theme in other subjects of learning [14]. Most of the research participants indicated that existing school curricula provide DRR-related learning opportunities only in certain subjects. Most of the teachers agreed that there is only some DRR-related content in social studies, population study, geography and science. All the teachers noted that DRR content is not integrated properly into other subjects. They argue that linking DRR information in other subjects is helpful in linking DRR learning experiences in the classrooms. One of the secondary teachers from study school 1 says that there is a huge need for integrating DRR themes in other learning disciplines:

*It would be great if the Curriculum Development Centre can also incorporate DRR-relevant information in other subjects such as Nepali, English, maths in its lessons and comprehension. Such integration can help to link the learning experiences and its usefulness in an individual's life and community. It will help children to learn more about what disasters and how they can keep themselves and others safe from disaster and crisis...not only the natural hazards. The Curriculum Development Centre should also integrate the message about man-made hazards such as epidemics, conflict and climate change. (TS3)*

An integrated DRR curriculum can maintain standards through incorporating relevant disaster messages from lower to higher levels of education. It can create frequent learning opportunities, for example disaster drills, which help students to recall the acquired knowledge and skills. One of the lower secondary teachers from study school 2 says:

*I think a DRR integrated curriculum will give us more options to localize the curriculum and make it more useful. If students have the opportunity to learn about disaster-related content in each subject, then it will help them to develop DRR capabilities which make them stronger and confident. (TC2)*

The Curriculum Development Centre has also realised the need for integrated DRR curricula to address local, national and global level disasters and climate change issues. An officer from the Curriculum Development Centre indicates:

*DRR and climate change issues are still not integrated in other learning*

*disciplines, these are mainly incorporated into science and social studies. Now there are some discussions taking place to integrate DRR and climate change in other subjects. (OCI)*

A multidisciplinary curriculum integration approach addressing DRR education is widely recognised as important by the research participants. They deemed the existing curriculum as lacking in addressing life skills and practical skills, and claimed it also has very limited DRR content in some subjects. Since relevant DRR learning resources are not easily available at a local level, the given DRR learning provisions are also deemed more theoretical. It was observed that teachers and students were seriously interested in learning more about disaster management.

Similarly, emphasising the need for a DRR integrated curriculum, the officer from the National Centre for Education Development says:

*Since the compulsory courses are given more importance in schools, and these also have comparatively more training opportunities and other support provisions for teachers, it is important to incorporate DRR content in the compulsory courses for its effective delivery. Besides core subjects such as geography, science and population, Curriculum Development Centre can integrate DRR content in language-related subjects such as English, Nepali and even in maths. There is still a need to give a good allocation to DRR content in the school curriculum. (ONI)*

Linking DRR knowledge to available learning subjects will give enough DRR learning opportunities to students. Such an integrated nature in the curriculum will also reduce how many resources are needed to train teachers in DRR issues.

A curriculum integration approach can also increase the value and importance of the area of study. Since DRR is a newly introduced area in school education in Nepal, integration of DRR content also helps to raise the value and needs of developing DRR capabilities. In the focus group one resource person says:

*Integration of DRR issues in all the subjects, horizontally and vertically, in an appropriate manner can be helpful in increasing the allocation of DRR lessons. Such an approach will also create opportunities to incorporate relevant and contextualized DRR knowledge and skills in the curriculum. (OE4)*

Integrating DRR throughout the curriculum also encourages all the teachers to develop their understanding in DRR areas. It also encourages peer learning. One of the School Management Committee members of study school 3 says:

*An integrated DRR curriculum forces teachers to widen their knowledge in DRR areas, it helps to develop teacher competencies and all of them can link the context and deliver disaster management while teaching their allocated subjects in the relevant classes. (CSNI)*

Teachers need wider knowledge and skills to deliver an integrated curriculum. The above quotes suggest that integrated DRR provisions are also helpful to prepare teachers as major vehicles to deliver DRR education in schools and communities. Moreover, integrated learning opportunities also encourage and motivate students in effective learning. Aghaei *et al.* [61] noticed that significant numbers research on strategies for DRR education point out integration of DRR content

into school curricula is the best approach to educating pupils about DRR.

### 5.7. Need for Development of a Local Curriculum to Address Disaster Issues

A centralised curriculum development process seems ineffective in addressing the local needs and context of each school. Most of the research participants pointed out that adaptation of centralised curriculum development process is one of the major reasons why DRR is not valued in the school curriculum. A contextualised curriculum encourages students to learn the local context which will help them with better adjustment. The DRR focal person of the District Education Office says:

*I also feel that there is a need for development of a local DRR curriculum and its effective implementation. A local need-based DRR curriculum can be developed at district or school level. Teachers, students, District Education Office staff, NGOs working in DRR and other relevant line agencies need to be engaged actively while developing such a curriculum and other relevant learning materials. (OE3)*

Likewise, most of the school level research participants also realised that the school needs to be prepared to address local disaster vulnerability. One of the community members from study school 3 states:

*Our school suffers from floods yearly. Therefore, our school needs to teach all the children about the floods so that they can have a good understanding of it. The school needs to encourage students to learn swimming. Fire is quite common in the community, it is important to teach them how these local-level small-scale incidents can be managed. Similarly, earthquakes...and climate change-related ideas also need to be included. (Parent CSN1)*

Similarly, a school supervisor from the District Education Office says:

*Development of local curricula in DRR is a wise idea to address local DRR needs, we can teach our students about local level disasters and traditional skills to cope with the situation. (EO2)*

Likewise, the school principal of study school 3 says:

*In educational policy, there is the provision for local curricula at lower grades, but as far as I know, not only us, but none of the other schools in the district, have developed a local curriculum on disaster issues yet. In our context flood, road accidents, electric shocks and safety, and environmental issues are important issues that can be addressed through this provision. We can work with our community to make it more useful. (PSN1)*

The school principal for study school 1 suggests that there is a strong need for development and implementation of a local DRR curriculum:

*Moreover, there is the need for incorporating local context through the local curriculum. The present curriculum is deemed more theoretical, we need to review it and make it more organised and contextualised, through engaging teachers, students, school leaders, and community people who can play a fruitful role*

*in disaster risk reduction behavioural changes. (PCI)*

Besides addressing local disaster needs, developing and implementing local curriculum is helpful for creating links between school and community. Through this practice, the school can also bring local knowledge and DRR practices into the classroom. It also provides opportunities for developing contextualised DRR learning materials at school. Moreover, the school can engage students in various DRR activities at the community level. However, most of the teachers and school principals indicated that since they do not have enough knowledge in DRR areas and very limited knowledge about local curriculum development, they still have not developed any local curricula.

Most of the national level research participants also recognised that local curricula in the area of DRR can address common hazards and disasters that may occur in different seasons in the plains, hills and mountain regions of the country. NGO representatives suggested that there is a need to incorporate more content that can address local, national, and global DRR needs. Pointing out the needs of such curricula, a representative from the Association of INGOs in Nepal says:

*Our curriculum should consider landslides, floods, fire, epidemics, hailstorms, and earthquakes (as killer hazards) in our context and needs to give more focus to them. The curriculum needs to treat disasters as a multidisciplinary issue. There are particular hazards taking place in particular ecological belts, for example floods in Tarai or plains region, landslides in hills and mountains and avalanches in the mountains. If we incorporate this content at school level, in an organised way, and train DRR in these related issues of hills, plains, mountain regions, the teacher can deliver the most relevant and appropriate curriculum effectively... floods, landslides, snowfalls, cold and heat waves, fire, lightning, and avalanches need to be stressed properly. (NA1)*

Similar to the above quote, a disaster focal person from the District Education Office says:

*Nepal is a very diverse country on the basis of its geographical landscape, for example the landslide that occurs in a hilly district such as Sindhupalchowk, which may cause big loss, is different from the landslide that we have in a valley, for example in Bhaktapur. These issues, which are currently lacking, need to be addressed properly in the curriculum. The disaster issues of our three ecological belts, mountain, hills and plains, need to be addressed in the local curriculum. (OE2)*

There is need for relevant contextualised DRR content to address local disaster issues in the school curriculum in the diversified geographical context of the country. It reflects that the national curriculum should address the common disasters and also provide opportunity to focus on local issues. Colombia's experiences of curricula adaptation and disaster prevention also show that DRR initiatives must focus on the common hazards that may take place in various parts of the country. DRR lessons in school curricula and implementation of education programmes regarding natural hazards are essential for preparing people to cope with common

hazards from the whole country as they may be exposed to differing types because of the geographic mobility [63].

One of the secondary level teachers from study school 3 says:

*There is always a possibility of having a fire in our community, since there are joined houses, and most of the people use gas cylinders and are not aware of the precautions that must be taken while using them, significant numbers of fire incidents have been taking place in our community. Such possible local incidents need to be addressed properly. (TSN3)*

The school curriculum needs to raise awareness about all the possible disaster risks that may take place locally. It is important that such curricular opportunities enhance preparedness, mitigation, response and recovery-related ideas and provide skills to students to cope with such local incidents.

A contextualised local curriculum is also helpful for addressing local disaster issues and their consequences in people's lives. For example, most of the people who work in the brick industries in Bhaktapur migrated from the adjoining districts and live in poor housing conditions. Because of this, Bhaktapur lost comparatively more people and property in the recent earthquake [56]. In such a context, local level research participants suggested that the school should incorporate DRR awareness-raising content which addresses the socio-economic situation and cultural beliefs that relate to disaster vulnerability in the local curriculum. The school principal of study school 2 explains the vulnerability of children, especially from poor and marginalised groups during a disaster:

*In a public school, most of the students are from poor families...these people suffer more when disaster strikes, ...therefore the local curriculum also needs to address the possible consequences of disasters on poor and vulnerable people, such as people who work as labourers in local brick industries and live in slum areas in Bhaktapur. (PCI)*

He also indicates that local curricula can help to address such local level vulnerabilities and make people aware of the need for better preparedness. Students from poor and marginalised communities can get more benefit from the local DRR curriculum if it states the issues and challenges of disaster management at a local level. As Selby and Kagawa [14] state:

...disaster is determined by the extent of a community's vulnerability to hazards and vulnerability is the result of a mix of economic, social, physical and environmental factors. A context-specific local curriculum helps them to identify the vulnerabilities and develop coping mechanisms in their home and community.

An officer from the Department of Education pointed out that development and implementation of a local curriculum provides the best method for engaging local people in addressing local needs. Explaining some DRR local curriculum development initiatives assisted by UNICEF and Plan Nepal in some schools of their working locations, he mentioned the need for a study to identify the effectiveness of such initiatives before recommending them to other schools. He also shared

that from such experiences, the Department of Education has also planned to assist one school from each of six child-centred DRR programme districts to develop local DRR curricula in future.

Community experiences and expertise are helpful in minimising school disaster risks [64] [65]. Community engagement is helpful for identifying the common disaster management issues while developing the local curriculum. It is essential for everyone to share their DRR experiences and knowledge while developing more relevant and useful DRR curricula in schools. Not only the literate, but also the illiterate members of the community can share their understanding and experiences of local level disasters and contribute effectively to local curriculum development. The interview data shows that there were quite a few community members engaged in DRR initiatives carried out in schools. With the assistance of local NGOs, schools have developed and disseminated earthquake evacuation plans. However, a participatory school safety plan is not developed yet [43] [65].

Community members also mentioned that awareness and management of possible local hazards should be included in the curriculum. In the context of Nepal, most of the schools are also vulnerable to both large and small scale disasters that may occur at a local level [56]. Realising the need for local DRR curricula, an officer from the Lead Resource Centre says:

*We have not seen any local DRR curricula which have been developed in Bhaktapur. But I heard there are some such initiatives being taken in other parts of the country. Local curriculum development provisions are there but DRR is still not felt to be a needy area, schools have prioritised other subjects. (OE3)*

Areas such as environmental degradation and climate change, which are also associated with DRR, are also less valued in the school curriculum. However, assessment of the impacts of such curriculum changes has still not been carried out. National level research participants suggest carrying out an impact study to find out the specific needs in order to revise the existing curriculum.

## 6. Conclusion and Prospects for Future Research

This paper sets out to present the findings of the interview data and document analysis about the existing DRR education provision in school curricula. Research participants highlighted the gaps and lack of current DRR education provision and proposed possible solutions to make the DRR curriculum more relevant, contextualised and learner-centred. Schools need to develop adequate DRR knowledge and skills in students [37], thus schools need to incorporate disaster management areas in their curricula, plans and policies [28] [66].

The existing school curriculum and textbooks are not enough to address the four major areas of disaster management. Research participants suggested revising the curriculum and textbooks and incorporating adequate DRR content to address disaster mitigation, preparedness, response and recovery. It was found that the prescribed curriculum needs to give more emphasis to DRR content from early grades with the provision for relevant co-curricular and extra-curricular activities.

Since the country is geographically diverse and vulnerable to various natural hazards, this chapter noted that the national curriculum needs to prepare students for all the possible disasters and reduce social vulnerability. This study identified the need of a relevant and contextualised DRR curriculum, essential for developing DRR-related values, knowledge, skills and attitudes of the learners which help them to prepare better to cope with disasters at local and broader level.

This study highlighted that DRR content is not integrated properly across other subjects from early grades. The data suggested that since DRR is an interdisciplinary area, it needs to be integrated properly across all relevant subjects. Moreover, it was revealed that there is a huge need for development of a local DRR curriculum and learning resources to address local disaster issues. Thus, available DRR learning resources must contain broader DRR information to provide better learning opportunities. Further academic and practical study of DRR education with the aim of identifying effective delivery mechanism in education sector to facilitate contextualised DRR curriculum development and implement process will be the focus of future research.

### **Institutional Review Board Statement**

The University of Auckland Human Participants Ethics Committee approved this research project (Reference number: 017773).

### **Informed Consent Statement**

Informed consent was obtained from all subjects involved in the study.

### **Conflicts of Interest**

The author declares no conflict of interest.

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