

Impact of Climate Change on Children in Nepal

Research Report



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Foreword

The impact of climate change is being felt worldwide, and it is children who are often the hardest hit as climate change-induced disasters impede their access to basic services and threaten their right to protection. Nepali children are especially vulnerable when a disaster strikes because of Nepal's high incidence of poverty, widespread exposure to disease, heavy dependence on natural resources, and inadequate access to information about disaster risk management, climate change adaptation, rights and protection. Poor governance with respect to disaster risks and the lack of policies and programmes explicitly targeting children compound children's vulnerabilities.

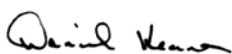
This study was commissioned to assess how children and key stakeholders perceive the impact of climate change on children's wellbeing and evaluate children's access to information about disaster risk management and climate change adaptation. The study also records current practices of adaptation and suggests ways in which to address key climate change issues. This study helped to remedy the existing dearth of research designed to demonstrate how best to reduce the adverse effects of changing climates, particularly on the most marginalised and vulnerable children in South Asian countries, including Nepal.

Climate change has intensified the negative effects of population growth, harmful land use practices, and deforestation and increased the incidence of vector-borne diseases such as malaria, dengue and Japanese encephalitis. Children are separated from their families during disasters and when, as is growing increasingly common, their guardians migrate in search of better income opportunities. Providing children with avenues to explore their potentials and take part in development work will help build a society resilient to climate change.

Recognising that children are very vulnerable to the consequences of climate change, Plan Nepal has adopted child-centred disaster risk management measures designed to protect children's wellbeing, their rights to education and protection, and the means of livelihood and the assets of their families and communities from the possible adverse impacts of hazards before disasters strike. Plan works with communities to reduce their vulnerability and increase their resilience in the face of disasters by incorporating child-centred, climate-smart disaster risk management and climate change adaptation practices.

It is a pleasure for Plan to publish this research report, 'Impact of Climate Change on Children in Nepal.' It provides a clear picture of how children from diverse cultures, age groups and geographical regions are profoundly affected by climate change and the associated disasters and provides specific recommendations for mitigating those effects. In 2011, under its third Country Strategic Plan, Plan Nepal, for the first time, incorporated child-centred disaster risk management and climate change adaptation in a country programme. Plan Nepal believes that the recommendations provided in the report will support the development of a programme framework and advocacy strategy in terms of climate change adaptation in the near future. It is also expected that, at the regional level, this research will assist in widening the scope of climate change adaptation programmes.

A word of thanks is due to all that contributed to this research. All stakeholders deserve commendation for their penetrating insights, thoughtful critiques, and sustained support.



Donal Keane
Country Director
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List of acronyms

CCA	Climate change adaptation
DRM	Disaster risk management
DRR	Disaster risk reduction
FGD	Focus group discussion
ICIMOD	International Centre for Integrated Mountain Development
LAPA	Local adaptation plan of action
NAPA	National adaptation plan of action
UNICEF	United Nations Children's Fund

Executive Summary

The context

Climate change is a natural process, but its exacerbation in recent decades due to anthropogenic activities has created severe problems and challenges and become a matter of debate and discourse. Though children contribute little to the causes of climate change, they are the ones who are hardest hit by it. Poor governance with respect to disaster risks and the lack of policies and programmes specifically targeting children compound children's vulnerabilities.

Research objectives and methods

The study aimed to assess the perceptions of children and key stakeholders with regard to the impact of climate change on children's lives and wellbeing, record extant adaptation mechanisms, and evaluate children's access to information about climate change adaptation. Climate change-related information, education and communication materials and videos were shown to children and drawing competitions and role plays were organised among them to set up a good environment before the children participated in focus group discussions, key informant interviews, and a questionnaire survey and helped make seasonal calendars and timelines.

Children's experiences regarding changes in precipitation and temperature and their impacts

Children feel that in the winter there is less total rainfall than there used to be and that rain falls infrequently in high-intensity downpours instead of as mild drizzle. They are unhappy that the monsoon, in their view, lasts longer and are not able to enjoy outdoor festival activities. They said that hail falls in unexpected months and its frequency and size are increasing, to the detriment of winter crops and forest seedlings. Children also said that winds are stronger and that they blow unseasonably. In their view, it is difficult to predict the falling of rain, frost, dew and snow.

Children think that temperatures are rising and that summers are getting hotter, so hot an umbrella provides no relief and even the nights are hot. A few years ago people didn't use mosquito nets, but now mosquitoes are ubiquitous. The intensification of cold waves and harmful frost damaged crops. Less

dew but more fog in the winter prevented them from enjoying winter vacations.

About 85% of children feel that climatic hazards now occur twice as frequently and 67% claim that climatic hazards are strongly correlated with climate change. They experience nightmares, depression, constant fear, and trauma, mostly due to windstorms and lightning in the hills and to floods in the Tarai (Gautam et al., 2007). They believe that the increase in the incidence of climatic hazards results in loss of biodiversity, declines in agricultural productivity, increased health risks, and large-scale human migration. Ultimately, they predict, there will be insufficient food and hunger will prevail.

Impacts of climate change

Climate change impacts children's education. Schools are used as shelters, hampering regular schooling. Road and bridges often collapse during heavy rainfall, forcing children to walk long distances. Damage to electricity transmission lines caused by strong winds makes it difficult to study at night. The increased hardship and poverty associated with recurrent natural disasters limits the ability of parents to pay for their children's education and when they have to choose, it is usually girls who are short-changed. When it rains, children at schools with tin roofs experience disruptively loud noise and since classroom windows lack panes, books and notebooks are often soaked, distressing sensitive children. When water sources are depleted because of long droughts, access to drinking water and sanitation is poor. Many girls skip school when they are menstruating because of poor sanitation facilities at school. The number of days off has increased by up to 65% in both the hills and the Tarai due to climate-induced disasters.

Children reported that their health had been compromised by the changing climate. During the hot season, the walk to and from school in the heat deterred some children from attending, and weariness, loss of appetite, vomiting and fainting are common among those who do attend. The soporific effect of heat made it hard for children to concentrate in class. Erratic rainfall caused flash floods and the associated transmission of fecal-oral diseases. Water pollution resulting from improper

disposal of industrial waste caused skin irritation and itching. Children feel that climate change, combined with changes in land use, population growth and deforestation, contributed to an increase in the incidence of vector-borne diseases such as malaria, dengue fever, and Japanese encephalitis. Children who live in overcrowded slums and marginal lands are particularly vulnerable.

The changing climate poses a challenge to child protection. They are separated from their families during disasters and if their guardians migrate in search of better income-generating opportunities. Some are forced to drop out of school and engage in the worst forms of child labour. They feel unloved and uncared for and are sometimes subjected to domestic violence and family disputes. Droughts result in famine, increasing the workload of children and increasing the threat of child labour and trafficking. Because of climate-induced disasters like forest fires, children have to walk long distances to collect firewood and grass, putting them at risk of sexual harassment. Traditional wells, stone spouts, springs, and streams are drying up so children have to travel long distances to fetch water.

The impacts of climate change on family livelihoods affected children indirectly. Because water sources have been depleted, agriculture is rain-fed and the productivity of winter and summer crops has declined. Extreme weather events and gradual environmental change has increased the number of migrants, both temporary and permanent, and migration invites child labour and trafficking. Unpredictable rainfall forced most families to give up planting millet, barley, and buckwheat, a loss which has a negative impact on children's nutrition. The irregularity and scarcity of winter rain has seen the grain size of winter crops getting smaller and the husks more profuse. Children's health may be negatively affected by the excessive use of chemical fertilisers, which contaminate water and can be inadvertently consumed in various foods.

Adaptation practices

To reduce the impacts of climate change some adaptation practices have been initiated. In the education sector, some issues have been incorporated in school curricula. To escape from extreme weather, many schools have made more suitable calendars, adjusting both daily routines and summer and winter

holidays. Some have adopted a "morning shift" to escape the extreme heat of summer afternoons. Temporary bamboo bridges and community-managed boats make it easier for children to get to school. To lessen the health impacts associated with warmer temperatures, a few local hospitals have distributed insecticide-treated nets that prevent the outbreak of kala-azar. Many villages have declared themselves open defecation-free areas and adopted community- and school-led total sanitation programmes to control water-borne diseases.

Energy-efficient technologies have been promoted to reduce the workload of children. These initiatives have made children's lives easier by reducing the time they spend collecting firewood. Families have started cultivating climate-smart crops. The practice of using fewer hazardous pesticides and promoting organic farming through integrated pest management is slowly increasing. People cultivate seasonal fresh vegetables along riverbanks for personal consumption and for sale. Digging wells deeper, conserving watershed areas, protecting water sources, facilitating plantation, controlling grazing, and initiating agro-forestry are some of the initiatives that have been taken to protect water sources.

Conclusion

Providing children with avenues to explore their potential and take part in development work would help build a society resilient to climate change. If children are given orientation they can mobilise the media and the government and persuade them to prepare climate change adaptation plans and programmes. Children are effective agents for adaptation and mitigation. However, while many stakeholders say they believe that children can play a role, children rarely participate in drafting or implementing and children's issues are rarely addressed in policies, plans, or programmes.

Climate change may put children at considerable risk of violence, abuse, and multiple forms of poverty, particularly through displacement, migration and the erosion of assets and livelihood alternatives. As climate change impacts children differently depending on their age, social status, gender, geography, and schooling status, it is not possible to decide what is best for all children. However, this research can serve as a foundation for adopting forward-looking plans and promoting listening to children's voices.

Recommendations

Radio programmes on local disaster and weather warnings should be developed and broadcast. Children should be involved in a variety of climate change-based extracurricular activities like thematic drawing, singing, dancing and drama. Local-level adaptation plans should be formulated after the needs and aspirations of children are identified and prioritised. Because climate change is set to have different impacts on girls and boys, both directly and indirectly. Different trainings should be provided to improve the lifesaving skills of children, including tree climbing and swimming, separating boys, girls, and the differently-abled according to their particular needs. So plans and programme should be designed keeping gender and age aspects in mind. The capacity of non-governmental organisations and governmental actors should be improved so that gender- and age-responsive climate change policies and programmes are practiced. There is a need for initiatives designed to create safe and resilient communities in which children and young people contribute to managing and reducing the risks associated with changes in the climate. One such initiative is the documentation of community adaptation practices in the form of a video.

Children and their communities should work together with local governments to design small but effective interventions under village development committee grants. Local non-governmental organisations should collaborate with national and international organisations to enable children to participate in climate change conferences that address children's issues. Non-governmental organisations should mobilise farmers to adopt drought-, windstorm- and flood-resistant crops in coordination with the Nepal Agriculture Research Council. Watersheds and water sources must be protected. People should be encouraged to apply green manure and bio-pesticides to their land and to control disease, insects and pests through integrated pest management. To improve family income and curb migration, skills should be developed and off-farm income-generating schemes initiated at the local level. Renewable energy technologies should be scaled up to reduce the time children spend collecting firewood. Advocacy and campaigns should be organised and knowledge of the impacts of climate change and of community-based adaptation practices documented.

To boost farm income, the government should improve irrigation by installing treadle pumps and carrying out artesian boring and encouraging the revitalisation of traditional irrigation systems. Galvanised tin roofs should be replaced to avoid excessive heat in the summer and excessive noise during rainstorms, and windows in school classrooms should be fitted with glass. The Ministry of Education should draft a policy regarding the convention of schools during extreme weather conditions and consider adjusting the timing of the monsoon vacation. The existing curriculum should be modified so that it is solution-centric rather than problem-centric and textbooks should present the causes and consequences of climate change but focus on adaptation and mitigation strategies. Curricula on DRM and CCA should be developed in local dialects and in terms tailored to the specific needs of the girls and boys of different groups. To address the issues of children and shape policies and programme frameworks in favour of children, periodic dialogue between duty bearers and children should take place.

The government should take a lead role in mobilising relevant stakeholders for policy-level debate and discourse. If children feel that their voices are being heard, they will be motivated to share their learning with friends and family members as well as to take action. Social protection and resilient livelihoods are essential for community-based adaptation to climate change because social protection has a crucial impact on children's survival when families struggle to manage to secure food and healthcare, pay school fees, and invest in livelihood assets. The government should prepare a social protection policy to strengthen the climate resilience of those communities that are now vulnerable. The government should facilitate the revision of the National Adaptation Plan of Action so that it addresses children's issues and concerns and formulate appropriate plans and programmes which take into account climate change impacts on both girls and boys and allocate adequate funding to put those plans and programmes into action, thereby directly addressing their needs. Government representatives who participate in national and international climate change conferences should raise the issues of children and incorporate measures to address their issues in both national and international policies.

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1. Background

Climate change is a natural process, but one whose exacerbation in recent decades due to anthropogenic activities has created severe problems and challenges and become a matter of debate and discourse. Temperatures in Nepal have increased more than the global average temperature rise of 0.74°C over the last 100 years (between 1906 and 2005) and 0.13°C per decade in the last 50 years (between 1956 and 2005) (IPCC, 2007). In addition, Shrestha et al. (2000) noted significant variability in the rainfall recorded in Nepal between 1959 and 1994 along both an annual and a decadal time scale. More generally, changes in the amount, intensity, frequency, and form of precipitation

are occurring across the country. Nepal is among the countries most vulnerable to climate change primarily because of high exposure and sensitivity and poor adaptive capacity. As a result, the increase in temperature and the shift in rainfall patterns toward both more seasonal and more spatial extremes are likely to increase the incidence of climate-induced disasters within its boundaries.

Nepal is one of the 20 most disaster-prone countries in the world. It is exposed to multiple geophysical and hydro-meteorological hazards, such as earthquakes, floods, landslides, cold waves,



windstorms, hailstorms, fires, glacial lake outburst floods, and avalanches. Between 1971 and 2007 Nepal recorded more than 27,000 deaths due to natural disasters, or an average daily loss of more than two lives.

Analysis of data released by the Department of Hydrology and Meteorology for the period from 2001 to 2009 reveals that precipitation is likely to vary in intensity, seasonality and duration and that temperature is likely to increase (Practical Action 2009). Natural resources, agriculture and livelihoods will be affected, primarily negatively. Nepal is already experiencing rapidly worsening drought conditions caused by erratic rainfall during the summer monsoon season and very little rainfall during the winter. Unusual rainfall patterns have also caused floods. It is estimated that, in the next few decades, almost each year at least a few parts of the country will experience either a short or a long dry period, even during the wet season.

Climate change is having, and will continue to have, a devastating impact on millions of children worldwide. Disaster events affect all people negatively, but the poor, marginalised and vulnerable are disproportionately hurt. Among the ultra-vulnerable it is children who are most at risk as disasters impede their access to basic services and threaten their right to protection, exposing them to child labour, trafficking, sexual predation, early and forced marriage, and other forms of abuse. Unless there is concerted action, it is estimated that every year in the next decade 175 million children will be affected globally by sudden climate-related disasters and that they will be at increased risk from infectious disease, malnutrition, water scarcity, disasters, and the collapse of public services and infrastructure. If climate change goes unchecked, it could cause up to an additional quarter of a million child deaths in South Asia alone¹. Globally, between 1990 and 2000, 66.5 million children were affected each year by natural disasters such as floods, droughts and extreme heat- and cold-induced

phenomenon. In Nepal, approximately 352 people, about 40% of whom were children, were killed by climate-induced disasters from 2002 to 2011².

It is a truism that children in developing countries like Nepal have contributed least to the causes of climate change yet are the ones who are hardest hit. Nepali children are especially vulnerable when a disaster strikes because of Nepal's high incidence of poverty, exposure to disease, dependence on natural resources and inadequate access to information on climate change adaptation (CCA), disaster risk reduction (DRR), rights, and protection. Children as a whole are highly vulnerable to climate change and disaster impacts, but those living in marginal communities and destitution are more vulnerable still. It is also important to note that any given aspect of climate change can have different impacts on girls and boys. The perception of children regarding these issues is highlighted in Section 4.

Recognising that children are very vulnerable to the consequences of climate change, Plan Nepal has adopted child-centred disaster risk management measures designed to protect children's wellbeing, their rights to education and protection, a means of livelihood, and the assets of their families and communities from the possible adverse impacts of hazards before disasters strike. Plan is considering working with communities in the near future to reduce their vulnerability and increase their resilience in the face of disasters by incorporating child-centred, climate-smart DRM and CCA practices.

There is little question that children are at increased risk of infectious disease, malnutrition, water scarcity, and disasters due to climate change (UNICEF and Plan International. 2010). However, there is a dearth of research to demonstrate how best to reduce the adverse effects of changing climates, particularly on the most marginalised and vulnerable children in South Asian countries, including Nepal. This research was conceptualised to help fill the gap.

¹ Save the Children. (2008). In the face of disaster: Children and climate change, London, the United Kingdom.: International Save the Children Alliance.

² Ministry of Home Affairs and NRCS. (2011).

2. Research Objectives and Methods

2.1 Research objectives

This research was carried out to fulfil the following objectives:

- To assess the perceptions of children and key stakeholders of the impact of climate change on the lives of girls and boys, specifically on their access to education, health, nutrition, and protection from gender-based violence, trafficking and child labour in Nepal,
- To use the findings of the International Panel on Climate Change to assess and explain the impact of climate change on children in Nepal,
- To identify both the positive and the negative mechanisms that households have adopted in order to cope with and adapt to the changing climate and assess the implications these mechanisms have for child rights,
- To assess the level and quality of information about CCA amongst girls and boys and to document their access to information on DRM and CCA,
- To identify good practices for working with children to implement child-centred CCA so that these practices can be replicated,

The context and the research objectives described above generated the following key research questions:

- What do girls and boys and key stakeholders think about the impacts of climate change on children's lives, specifically on their access to education, health, nutrition, and protection?
- What are the positive and negative coping and adaptation mechanisms that households have adopted in order to minimise the adverse impact climate change has on child rights?
- Do girls and boys have access to good-quality information about DRM and CCA and, if they do, how do they get it?

- What practices work well in terms of facilitating children to implement child-centred CCA and can they be replicated? If so, how?

This report compiles (i) children's perceptions about the impacts of climate change on education, health, livelihood and protection, and (ii) existing and needed coping and adaptation mechanisms.

2.2 Research methods

This research used child-friendly participatory research tools, that is, ones that enable children to actively participate in all types of discussions and consultations. The research methodology involved the following six major components:

- a) Review of relevant literature and research reports: In accord with the agreed terms of reference, the research team reviewed all relevant research reports and literature in order to familiarise themselves with climate change issues in general and their impacts on children in particular.

Box 1: Techniques used to stimulate children's interest

- Showed video related to climate change impacts on children
- Organized role plays of various possible impacts of climate-induced disasters, showing the situation for children before, during, and after those disasters. These role plays covered views on impacts as well as on local actions to reduce those impacts.
- Encouraged children to draw on paper past, current and future scenarios regarding disaster and climate change and its impacts on the children of their village and on children in general
- Had children prepare poems, songs and comic strips on the impacts of climate change
- Had children carry out a daily analysis of the tasks girls and boys perform at home and in the community.

in order to establish an environment conducive to consultation before any FGDs were conducted or questionnaires administered (Box 1 below). Before this material was shared, however, a short pre-test was conducted to see what children already knew. To get children to open about the context of disaster and changing weather and climatic patterns, historic timeline and seasonal calendars were introduced. Interviews and consultations were instrumental in capturing children's perceptions, the likely impacts of disasters and climate change on their lives and wellbeing, and the positive and negative coping practices adopted at the local level.

- f) Consultations with government and bilateral national-level agencies: The team consulted agencies working in DRR and CCA in Nepal to garner their ideas, especially about programme interventions and advocacy strategies which can reduce the impacts of climate change on children.

Table 1 shows the number, age and gender of the children who participated in the survey and FGDs

respectively. Eighteen of the 27 FGDs were conducted within Plan working districts and nine were conducted outside. To validate the views of children and ascertain adult perspectives on the impacts of climate change on children, 54 village-level stakeholders (27 men and 27 women) were consulted.

This research covers 15 districts, seven of which are Plan working districts. The majority of the districts are situated along major river basins, including the Koshi, Karnali, Gandaki, Mahakali and Bagmati river basins (Map 1). Two of the 15 districts are urban; the rest are rural. Plan's DRR project has been introduced in only one of its working districts—Sunsari—and that project began only in 2011.

Eighteen villages within Plan Nepal's working districts and nine villages in other districts where Plan does not work were selected for detailed field consultations (Table 1 and 2). The 27 villages were selected purposively based on agreed-upon indicators, including the need to represent a variety of ecological zones, hazards, caste and ethnic groups, and wellbeing statuses.

Table 2: Research districts by ecological zone with major hazards

Ecological zone	Altitude (masl)	Climate	Average temp.	District (Villages)	Major hazards
Tarai	60-200	Humid tropical	> 25°C	Sunsari* (Panchkanya, Babiya, Prakashpur) Morang* (Kerabari, Banigama, Pokhariya) Banke* (Chisapani, Holiya) Bardiya* (Bhimapur) Rautahat* (Rangapur, Samanpur, Basantapatti) Kapilvastu (Motipur)	Floods Cold waves Earthquakes Epidemics
Siwalik	200-1500	Moist subtropical	25°C	Makwanpur* (Palung, Serikhet, Handikhola) Sindhuli* (Ranibas, Ranichuri, Bhimsthan)	Landslides Floods
Middle Hills	1000-1500	Temperate	20°C	Kaski (Lumle) Kathmandu (Kathmandu-16, Balaju) Lalitpur (Sunakothi)	Earthquakes Thunderstorms Hailstones
High Hills	2200-4000	Cool to sub-alpine	10-15°C	Dadeldhura (Mastamandau)	Landslides Floods
Himalaya	4000-8848	Alpine to arctic	< 0 to 5°C	Mustang (Lomangthan) Taplejung (Phuling) Kalikot (Jubitha)	Avalanches Glacial lake outburst floods Epidemics

Source: Gautam et al. (2008)
Note: *Plan working district

All the information derived from the various sources was then tabulated, synthesised and analysed to arrive at the final conclusions and produce this research report.

3. Climate Change Scenario in Nepal

Nepal is divided into three broad ecological zones: i) the Tarai, an extension of the Indo-Gangetic plains, in the south, ii) hills and valleys in the middle, and iii) the Himalaya in the north. The mountain, hill and Tarai regions are home to 7%, 46%, and 47% of Nepal's population respectively (Central Bureau of Statistics, 2004). The Tarai is a low-lying plain highly vulnerable to floods during the monsoon while the hills and mountains are subject to periodic landslides and other mass movements and floods. The entire country lies in a seismically active zone.

At the global level, Nepal falls within the sub-tropical climate zone. However, because of its unique physiographic and topographic features, it possesses enormous climatic and ecological diversity within a north-south span of 130-260 km. Its climate types range from sub-tropical in the Tarai to arctic in the high Himalaya. The presence of the east-west-extending Himalayan massifs in the north and the monsoonal alteration of wet and dry seasons contribute greatly to local variations in climate. The temperature and precipitation scenario in Nepal is briefly discussed below.

3.1 Temperature

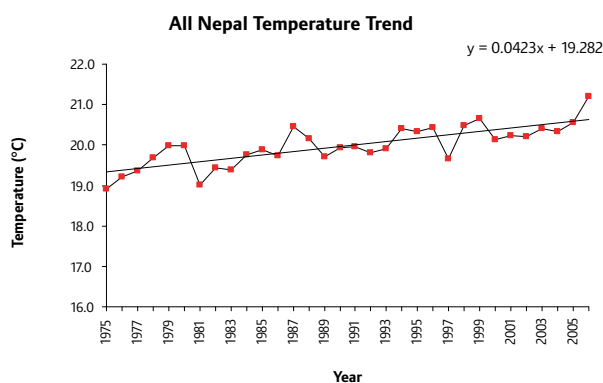
Temperature is directly related to season and to the altitude of the location in question. The onset of the monsoon in early June checks the increase in daily temperature, so the maximum temperature of the year is usually in May or early June. Temperatures start decreasing from October and reach their annual minimum in December or January. The annual mean

temperature over Nepal increased steadily at a linear rate of 0.4°C per decade between 1975 and 2005 (APN, 2007). ICIMOD (2007) states that the temperature rose 0.2–0.6°C per decade between 1951 and 2001 and that increases were particularly evident during autumn and winter. The trend in average temperatures between 1975 and 2006 is shown in figure 1.

The mean maximum temperature in the Tarai belt is above 30°C. This figure gradually decreases as one moves northward and altitude increases. Over the Siwalik range, the maximum temperature is 26–30°C; in the middle hills, it is 22–26°C; and it drops to less than 22°C in the high hills and high mountains. Spatial variations in the annual mean temperature are increasing, ranging from a low of -0.06°C to over 0.08°C per year. In most places, the maximum temperatures are increasing during all seasons and their rate of increase is faster than it is for minimum temperatures.

Warming is greater in the mountains and hills than in the Tarai. Mean maximum temperatures increased 0.068–0.128°C annually in most middle-mountain and Himalayan regions but just 0.038°C annually in the Tarai region (Shrestha et al., 1999). During the period between 1976 and 2005, the annual mean temperature increased by different amounts in each of the five development regions: -0.04°–0.06°C in the Far-Western, 0.02–0.04°C in the Mid-West, 0.02–0.08°C in the West, 0.04–0.08°C in the Central, and -.06–0.09°C in the East (Practical Action 2009). Shrestha et al. (1999), in their analysis of the trend of maximum temperatures found that the average annual warming between 1971 and 1994 was 0.06°C. Increases in maximum temperatures are more pronounced at high altitudes. In the past decade or so, winter has seen pervasive fog in the southern plains (Manandhar, 2006), a phenomenon associated with fog across the entire Indo-Gangetic plain; such fog reduces the maximum temperature significantly. In the last decade, fog has become more frequent and more long-lasting, enduring for more than a week and sometimes even a month at a time.

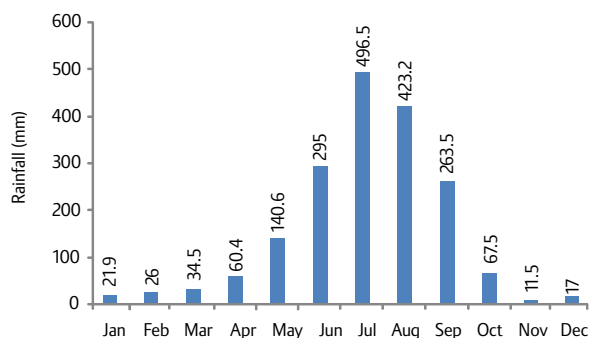
Figure 1: Temperature trends (1975–2006)



Source: Department of Hydrology and Meteorology, 2009

It is projected that the temperature will have increased by 1.3–3.8°C by the 2060s and 1.8–5.8°C by the 2090s with an inter-model spread of 1.5–2°C by the 2090s (UNDP 2007). The general circulation model also projects an increase in the frequency of hot days (11–28%) and hot nights (18–28%) and a considerable decrease in the frequency of cold days and cold nights. Baidya et al. (2008) found that both days and nights are becoming warmer and that cold days and cold nights are becoming less frequent. In addition, hot days, hot nights, and heat waves have become more frequent (Baidya, et al., 2008). The decrease in the number of cool days and the increase in the number of warm days are very clearly seen at high elevations (Baidya et al. 2008). The annual numbers of cool days and cool nights increased by five and nine days respectively between 1971 and 2006, whereas the number of warm days and warm nights increase by 16 and 7 days respectively during the same period (Baidya et al. (2008).

Figure 2: Nepal’s monthly rainfall (average of 1976 - 2005)



Source: Practical Action, 2010

3.2 Precipitation

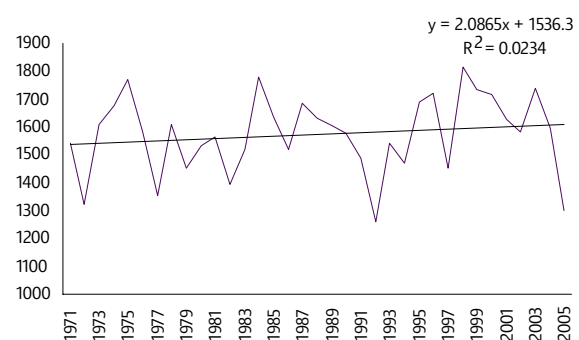
The annual mean precipitation in Nepal is 1,857.6 mm. There is a marked variation in the amount of monsoon precipitation which falls from east to west and from south to north. Generally, eastern Nepal receives monsoon rainfall first and rains slowly moves westward. Precipitation also varies significantly from place to place both on the micro and the macro scales due to extreme topographic variations. Nepal’s precipitation is affected by two major air movements:

about 80% of its rain when monsoon winds from the Bay of Bengal sweep across the country from east to west and 20% falls in the winter as westerly winds from the Mediterranean reach the country, bringing precipitation primarily to the western region.

About 80% of Nepal’s annual precipitation falls between June and September under the influence of the monsoon circulation system. Nepal’s monthly rainfall distribution averaged over the period from 1976 to 2005 is presented in Figure 2. Precipitation data for the period from 1976 to 2005 revealed that post-monsoon (October and November), winter (December to February) and pre-monsoon (March to May) seasons received 4.25%, 3.49%, and 12.68% of the total annual rain respectively. Nepal’s rainfall patterns and their trends by development region are summarised in Table 3 and the monsoon trend between 1991 and 2006 is shown in Figure 3. A review of school calendars revealed that the one-month-long monsoon vacation normally runs from the first week of July to the first week of August so that children do not have to attend school at the season’s peak, when the most rain falls.

There has been no significant change in either the total annual precipitation or the total monsoon precipitation in Nepal (APN, 2007; Shrestha et al., 2000) between 1976 and 2005, but there has been a clear decline in

Figure 3: Nepal’s monsoon trends (1971 - 2006)



Source: Department of Hydrology and Meteorology, 2007

³Global circulation models are computer models used to simulate the earth’s climate systems. They are the main tools used to project future climate changes due to the continued anthropogenic input to the volume of greenhouse gases released into the atmosphere. The major advantage of using such models as the basis for creating climate change scenarios is that they estimate changes in climate for a large number of climate variables, including temperature, precipitation, pressure, wind, humidity, and solar radiation, in a physically consistent manner.

⁴The highest mean annual rainfall—5,402.8 mm—was recorded in Lumle, Kaski District; the lowest—143.6 mm—was recorded in Lomanthang, Mustang District.

⁵Owing to the nation’s great topographic variations, mean average rainfall ranges from more than 5,000 mm along the southern slopes of the Annapurna range in the western development region to less than 150 mm to the north of the Annapurna range near the Tibetan plateau.

the number of annual rainy days in the same period (APN, 2007). The average annual precipitation difference (whether an increase or a decrease) between 1976 and 2005 was 10–20, 40–20, 30–40, 20–10, and 10–20 mm in the eastern, central, western, mid-western, and far-western regions respectively (Practical Action 2009). Precipitation varies greatly in terms of when, where, and the forms in which it falls. Complex processes which govern precipitation

extremities indicate that in the future Nepal is likely to face more weather-related extreme events like floods and landslides. The changes in temperature and precipitation patterns contribute significantly to climate change processes. Children's perceptions about the impacts of climate change on education, health and nutrition, child protection, and food security and livelihoods are presented in Section 4.

Table 3: Rainfall patterns and their trends by development region

Rain pattern	Development region	
	Increasing	Decreasing
Annual rainfall	eastern, central, western, and far-western	mid-western
Pre-monsoon season	eastern, central and western (over 9 mm/yr)	mid-western and far-western (up to 4 mm/yr)
Monsoon season	eastern, central, western, and far-western (over 30 mm/yr)	mid-western (up to 30 mm/yr)
Post- monsoon season	mid-western, and southern parts of eastern, central, and western (over 4 mm/yr)	western and northern (up to 7 mm/yr)
Winter rainfall	Increased almost all over the country (over 2.8 mm/yr) (Sankhuwasabha, Taplejung and Achham areas recorded the greatest increases)	

Source: Practical Action, 2010

4. Research Findings and Analysis

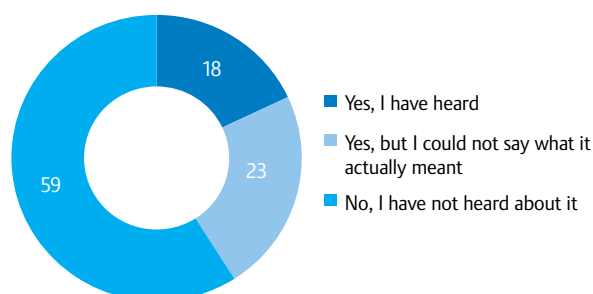
4.1 Children’s general understanding of climate change and associated issues

Global climate change has brought about a myriad of alterations in the climatic parameters of Nepal in recent decade. Most children have experienced these changes but few know what climate change actually means.

All the qualitative data was obtained from FGDs and semi-structured interviews and the quantitative analysis was based on responses to the questionnaire. Knowledge about climate change is limited: only 18% of the children said that they have heard about it; the majority (59%) profess ignorance (Figure 4a). More boys than girls have information about climate change because they are more exposed to information in general, have more leisure time to listen to the radio and watch television, and interact more frequently with teachers at school and adults at home and in the community than girls do. However, more boys than girls report not being able to say what climate change is (Figure 4b).

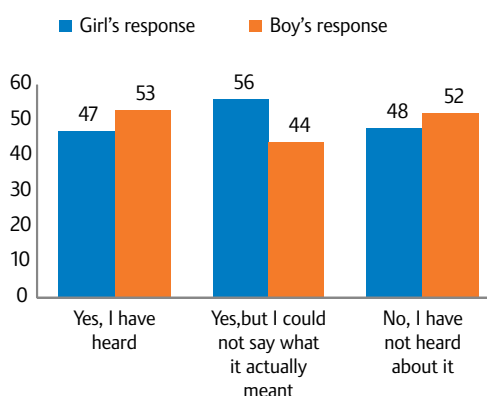
The greatest proportion of children surveyed (50%) attributed climate change to population growth. Just 18% correctly identified the increased emission of carbon dioxide gas as the reason. Other reasons given include environmental degradation (11%), urbanisation (11%), and extreme weather events (7%) (Table 4). In terms of understanding the correct causes of climate change, boys are slightly ahead of girls. To make up for the disparity and improve their understanding, girls need to be more involved in climate change-related debate, discussion and interaction.

Figure 4a: Knowledge about climate change



Source: Survey, 2012

Figure 4b: Knowledge about climate change



Source: Survey, 2012

Half of all children identified deforestation as a factor contributing to climate change; one-quarter, the burning of fossil fuels (Table 5). Girls are more knowledgeable than boys about the factors which contribute to climate change, a fact suggesting that girls are more attentive than boys in their observations of changes in the environment. If girls get more

Table 4: Factors contributing to climate change

SN	Reasons	No. of responses	Percent	Response/(Percent)	
				Girl	Boy
1	Population growth	156	50	80/ (51)	76/ (49)
2	Environmental degradation	34	11	16/ (47)	18/ (53)
3	Urbanisation	34	11	17/ (50)	17/ (50)
4	Extreme weather events	23	7	11/ (48)	12/ (52)
5	Increased carbon dioxide	57	18	25/ (44)	32/ (56)
6	No idea at all	11	3	8/ (73)	3/ (27)
Total		315	50	157/ (50)	158/ (50)

Source: Survey, 2012

Table 5: Factors contributing to climate change

SN	Factors	No. of responses	Percent	Response/(Percent)	
				Girl	Boy
1	Deforestation	156	50	66/ (42)	90/ (58)
2	Burning fossil fuels	78	25	40 / (51)	38/ (49)
3	High population pressure	9	3	6/ (67)	3/ (33)
4	Changing weather patterns	45	14	31/ (69)	14/ (31)
5	Industrial pollution	17	5	10/ (59)	7/ (41)
6	Physical construction	4	1	2/ (50)	2/ (50)
7	Release of greenhouse gases into the atmosphere	6	2	3/ (50)	3/ (50)
Total		315	100	158/ (50)	157/ (50)

Source: Survey, 2012

exposure and more chances to participate in climate change-related debate and discourse, they can increase their knowledge tremendously.

The depletion of water resources, low agricultural productivity, the emergence of new diseases and pests, the loss of biodiversity, and the increased incidence of disasters were identified as some of the major effects of climate change. Warm environments favour rapid insect reproduction, giving rise to more insect generations per year and thus to larger populations of pests. Chase et al. (1999) found that the impact of climate change on biodiversity will occur in concert with well-established stressors such as habitat loss and fragmentation, invasive species, species exploitation, and environmental contamination.

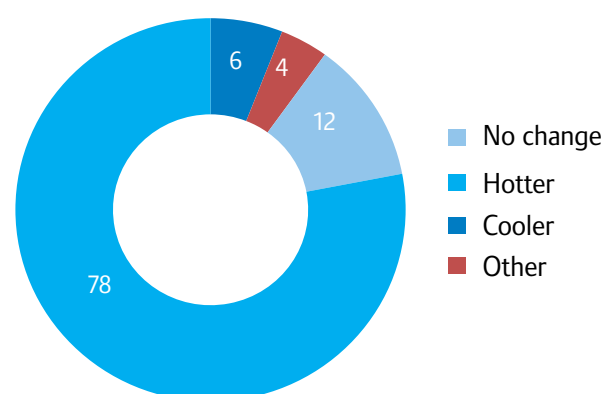
a. Changes in rainfall patterns: Children reported that precipitation patterns had changed. Some reported that there is less rainfall in winter. Children of the villages of Palung and Sarikhet in Makwanpur District and Basantapatti, Rautahat, reported that although rain falls only occasionally it falls with great intensity. Their experiences correlate with rainfall data. According to precipitation data recorded between 1976 and 2005, the foothills of the Siwalik and the Mahabharata ranges and the southern parts of the central and western development regions receive high intensity rainfall. The most intensive rainfall, which is expected once in every 100 years, equals or exceeds 523.2 mm in Makawanpur and 61.6 mm in Mustang.

Climate change will affect not only crop productivity but also river flows and ground water recharge. Water shortages will become more acute, creating conflicts between different groups. Rising temperatures have

increased the rates of evapo-transpiration, reducing moisture in the ground and causing water springs to dry up. In addition, because rainfall is sporadic and intense, groundwater is not recharged effectively (Goswami et al., (2006). Climate change will make water availability more uncertain, both in time and space. While overall trends are difficult to decipher, there are clear indications that the frequency and magnitude of high intensity rainfall events are increasing, with negative implications for infiltration and groundwater recharge as well as for long-term soil moisture and water accessibility for plants.

The level of the water table in the Tarai region has gone down markedly. In Bhimapur, Bardiya, and Basantapatti, Rautahat, hand pumps installed some 7-9 years ago at depths of 15-20 feet are defunct, a fact which may be due to the unsustainable pumping of groundwater. The majority have either been dug deeper or simply abandoned. As a result of this decline, the soil is totally dry during the dry season, whereas earlier even when there was no rain, people

Figure 5a: Changes noticed in the temperature



Source: Survey, 2012

Water woes

“When I was nine years old, water used to spring up from everywhere inside the Chure forest. Clean and pure drinking water was easily available anywhere in the woods. I still remember that I used to drink water from broadleaf ‘cups’ and that the water was very tasty. Now these sources are drying up in an unprecedented way. A week ago, I went into the forest to collect berries. I tried to quench my thirst but I couldn’t find water anywhere. It was so hot that I fainted! Fortunately, my neighbours came to my rescue. Otherwise, God knows what would have happened.”



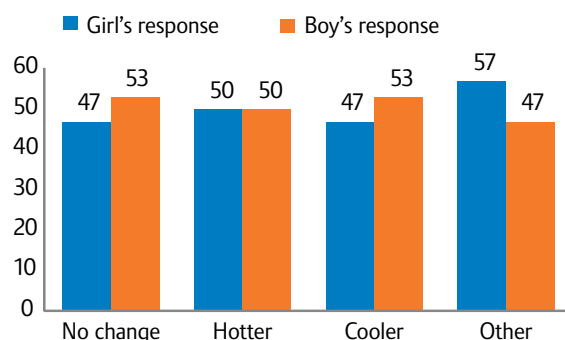
were able to grow crops relying on soil moisture alone. The scarcity of water for both irrigation and drinking purposes is worsening by the year. Paradoxically, the number of flash floods has also escalated in recent years. In Sarikhet, Makwanpur, people are experiencing the scarcity of both drinking water and water for irrigation. Until 1993, drinking water was not a problem; there were abundant clean sources that did not require any treatment before drinking. The flood of 1993 and subsequent floods, however, destroyed all these water sources and deposited a huge amount of silt and boulders on the land, making it difficult to fetch drinking water and to channel water for irrigation. Similar experiences were recorded in two study villages in Sindhuli. Overall, 60% of the farmer-managed irrigation systems in Makwanpur and Sindhuli are defunct because of frequent flooding and the associated sedimentation.

Many children interviewed said that the nature of rainfall has changed from a mild drizzle (jhari) continuing for several days to more intensive rain lasting only for a few hours. There used to be uninterrupted rainfall throughout the monsoon but now there is heavy rainfall for short periods. Evidence of these changes lies in the fact that people only infrequently use chhtari (a local umbrella made of broadleaves), which protects users from drizzle. One child commented that if the trend continues, Maghe and Bhadaure jhari (drizzle in the months of February and late August) could become history. “Previously, it used to drizzle continuously for about a week. For the last couple of years, it has rained less often but with more intensity. This is not good for agriculture. According to my mother, all of our ‘khet’ (paddy land) was on the bank of

the East Rapti River. It was totally devastated by the flood of 2003. We became landless. Before 2003, our family was considered a relatively well-off family in the village. Now I cannot continue my education. Instead, I have to help my family by taking care of the goats. Goat-rearing is now our means of survival. I’m thinking of applying for a driving licence when I turn 16 so that I can support my family,” said 15-year-old Amrit, a grade 4 dropout from Hadikhola, Makwanpur.

Rainfall is becoming increasingly unpredictable. In Bardiya, children expressed their dissatisfaction with the recent delays in the onset of the monsoon season. They said that rainfall used to stop in mid-September but that it now continues throughout the Dashain and Tihar festivals in October and November and they are not able to enjoy festive activities outdoors.

Figure 5b: Changes noticed in the temperature



Source: Survey, 2012

Hail is falling in unexpected months. Children of Lumle, Kaski, commented that both the frequency and size of hailstones are increasing. In Taplejung, children believe that more frequent hailstorms are affecting winter crops and forest seedlings negatively. They said that it hails even in June and July. The precipitation data between 1976 and 2006 demonstrates that although Nepal gets occasional pre-monsoon thunderstorms and hailstones associated with thermal convection in March and May, the occurrence of hailstones in June and July is unusual.

b. Changes in temperature: Children were asked about any rise in temperature that they had observed in the form of hotter days, longer summers, or shorter winters. About 78%, regardless of sex, said the temperature is rising (Figure 5a). Even though girls have less time to acquire additional information from different media, they are more perceptive than boys about what is actually happening (Figure 5b). Girls also claimed that summers were getting hotter. One participant in the FGD held in Bhimeshan, Sindhuli, commented that it doesn't feel cool even when he carries an umbrella. The children of Dadeldhura said that summers had been getting hotter since 2003. The children of Kathmandu and Lalitpur said that using ceiling fans and increasing the height of rooms from 8.5 ft to 10 ft are two practices that have been adopted to cope. Though they are ignorant about the cause, children perceive that both days and nights are getting hotter. The temperature data between 1976 and 2005 also record an increase in average maximum temperatures in the areas around the districts of Dadeldhura, Dhankuta and Okhaldhunga. Children living in Kerabari, Morang, said that they didn't have to

use mosquito nets some two years ago but that now mosquitoes are ubiquitous. "In 1964 the government of Nepal announced that malaria was eradicated and in 2008 declared Nepal malaria-free. However, cases of malaria are have been recorded in various places of Nepal, including Samanpur, Rautahat, where health post data indicates that from 2003 the cases of malaria are increasing," said Mr. Rabindra Kumar Jha, the Health Post In-charge in Samanpur, Rautahat.

While some children observed that winters were getting milder, some reported that winters were colder and referred to the intensification of cold waves and the greater severity of harmful frost. Children suggested that winters are not like winters used to be as the number of cold days is decreasing. They also said that there is less dew but more fog in winter and that they are not able to celebrate winter vacations as they used to, by engaging in outdoor activities like hide-and-seek and tag. The children of Palung, Makwanpur, believe that the decline in dew and frost has caused flowers and plants to grow more slowly, especially in the areas of Daman and Simbhanjyang. In Lumle, Kaski, and Jubitha, Kalikot, children said that winter showers are not difficult to endure even during the peak of winter, whereas, in the past, they used to be unimaginable.

The children in the Tarai, in contrast, described winters as colder than before, an observation borne out by data: the annual minimum temperatures for the period from 1976 to 2005 do, in fact, demonstrate that most of the Tarai does experience cold waves and foggy conditions during winter months.

It used to drizzle more...

"When I was younger, summers were much cooler. These days, my shirt is wet with perspiration by the time I reach school. Back then, it used to rain more often, which is why it used to be cooler. I remember that I used to leave my books at school so that they wouldn't get wet in the rain."



Bishal, grade 7, age 14
Makwanpur

Famous for its cold climate, Palung could lose its identity...

“In the winter, the surface of the ponds used to freeze. Water used to freeze in the tap and we would have to wait till late morning for it to melt. There used to be frost all around the tap. Winters used to be foggier. All this has changed. Some six years ago, snowfall could be measured in feet, but now it snows very little (in inches). Some years it doesn’t snow at all and some years it is hard to predict in what month snow will fall. If this continues, I’m afraid that, for future generations, snowfall will be limited to children’s bedtime stories. Furthermore, this will also result in a loss in the unique biodiversity of a cold region like ours. Palung, which is famous for its cold climate, could lose its identity.”



Rojina, grade 10, age 15
Makwanpur

Very little snow falls on the hills...

“The rise in temperature has been more pronounced for the last 5-7 years or so. Very little snow falls on the hills and what does fall disappears within 7-10 hours. We remember that there used to be snow up to 4-6 feet. Now it snows so little that it disappears within a few hours. This shows that the temperature is increasing here. We also realise that it is difficult to work on the farm throughout the day. Now it requires two shifts (morning and evening).”



Ankit, grade 9, age 15
Kalikot

c. Trends in climate-induced disasters: Eighty-five percent of children (81% of girls and 89% of boys) suggested that the incidence of climatic hazards such as floods, landslides, droughts, windstorms, hailstorms, and thunderstorms have doubled. Slightly more boys than girls have correct information about the incidence of climate-induced disasters events in their areas. Their greater awareness is attributable to their greater access to different media and to the fact that they have more free time to devote to outside activities than girls do. Timelines made with the help of the members of child clubs shows that the frequency of climate-related hazards had, in fact, increased in the villages studied. Precipitation data for the period from 1976 to 2005 shows that rainfall is most intense in the foothills of the Mahabharata and the Siwalik ranges lying in the central development region and in the foothills of the Siwalik lying in the western development region. When large amounts of rainfall fall within a short period, the likely outcome is flash floods,

massive landslides, soil erosion and, in the Tarai, inundation. Productive land in downstream areas and on the plains is damaged by katan (the cutting of riverbanks), patan (sedimentation and the deposition of soil and boulders), and duban (inundation).

About 67% of children (60% of girls and 74% of boys) believe that there is a strong correlation between climatic hazards and climate change. More boys than girls understand that there is a correlation as they have more access and exposure to information. Climate change, compounded with land degradation, the decline of ecosystems, and population growth, has resulted in an increase in the incidence of natural disasters. Children are concerned mainly about the increased incidence of floods, droughts, and landslides. Loss of biodiversity, declines in agricultural productivity, increased health risks, large-scale human migration, and economic decline are some repercussions of these hazards. Of all age groups, it

Table 6: Changes observed in wind patterns

SN	Observed change	No. of response	Percent	Response/(Percent)	
				Girl	Boy
1	No change	51	16	26/ (51)	25/ (49)
2	Stronger winds	145	46	65/ (45)	80/ (55)
3	Weaker winds	23	7	14/ (61)	9/ (39)
4	Winds from a different direction	76	24	41/ (54)	35/ (46)
5	Other	20	7	12/ (60)	8/ (40)
Total		315	100	158/ (50)	157/ (50)

Source: Survey, 2012

is children who are at the highest health risk from inadequate water supplies during drought and who will suffer most from the predicted changes in vector-borne diseases. They are also at the highest risk of malnutrition and its long-term negative implications for overall development. Children may also be at risk of early entry into work and exploitation in order to make up for the income lost as agricultural productivity declines (Bartlett, 2008).

Nearly every child interviewed mentioned reduced agricultural production, which, for many, meant insufficient food, hunger and indebtedness. Production is reduced because of delays in the planting of rice; the failure of winter crops like wheat and pulses, damage by floods, frost and hail, and an increase in the incidence of crop pests and diseases. Other effects children mentioned included increases in illness in the family, medical expenditure, and mental stress (Gautam, 2008a).

Children claimed that wind patterns are changing, too. Almost half (46%) said that gusts of wind are stronger than they used to be a few years ago (Table 6), but 7% said that winds were weaker, with significantly more girls than boys making that claim. Stronger wind was validated by the adults interviewed in the study villages. One-quarter of all children said that winds now come from a different direction. Some narrated incidences of winds having blown away the roofs of schools as well as private houses. Children of Taplejung said that strong winds used to blow from March to April and that they came from a certain direction according to the season but that now winds blow from a different direction and occur at any time of the year. The children of both Handikhola, Makwanpur, and Samanpur, Rautahat, said that growth of maize and paddy is adversely affected by strong winds. “There was very little thunder and lightning in the

past couple of years. However, this year has seen an unprecedented number of deaths due to lightning. It’s not funny, you know!” exclaimed 16-year-old Sonu, a ninth grader in Palung, Makwanpur.

4.2 Perceptions of children about the impact of climate change on their lives and wellbeing

Girls and boys have different perceptions of how climate change is altering their environment and affecting their lives. This research attempted to find out how they think climate change has affected their four key rights—the rights to development, protection, survival and participation. The findings are broadly categorised into climate-change impacts on four areas: education, health and nutrition, food security and livelihood, and child protection.

4.2.1 Education

As is laid out in international agreements such as the 1948 Universal Declaration of Human Rights and the 1989 United Nations Convention on the Rights of the Child, every child in the world has the right to education. However, the majority of children interviewed articulated a serious concern over the effects that climate change and the disasters that accompany it could have on their education.

a. Irregular attendance due to climate-induced disasters

Most children have to miss school due to the intensity of monsoon rainfall. The flooding which inevitably follows a heavy rainfall makes it difficult to cross rivers to get to school (Gautam and Dhakal, 2008b). The fact that some children have died while crossing surging rivers is a serious disincentive. In some places, like Kerabari, Morang, parents have to abandon their work to help their children get to school. In many flood-prone areas, people displaced by floods take shelter

in a local school for days or even weeks, and their presence hampers regular schooling. For example, the Koshi flood of 2008 hampered formal education in the villages of Paschim Kusaha, Haripur, Shreepur, Narsing, Babiya, and Gautampur in Sunsari District for three months because all the schools in these villages were being used as shelters. The increasing incidence of unpredictable and high intensity rainfall is also responsible for irregular school attendance.

b. Poor infrastructure and educational disparity

Temporary bamboo bridges often collapse during heavy rainfall. Thus, some students, like those of Prakashpur, Sunsari, must take alternative routes to school, some of which are so long they miss classes. The children of Sarikhet, Makwanpur, complained that trails along riverbanks are destroyed by flash floods. Thus it is that children who live near schools attend classes while those who live across the river do not. This disparity in attendance manifests itself in disparities in educational performance as well, with those living further away doing worse. During disasters, many children are concerned about missing classes and exams, not being able to catch up, performing badly, and not seeing their friends and teachers. Damage to electricity transmission lines caused when trees are uprooted and branches knocked down by strong winds—a phenomenon on the increase in recent times—has a negative impact on children’s studies, especially during exam periods. To minimise the negative effects of climate change, robust and reliable road and electricity transmission infrastructure is a must.

c. Weak community set-up and coping mechanisms

The increased hardship and poverty associated with slow-onset and recurrent natural disasters can limit the ability of parents to pay for their children’s education. Sometimes they can afford to send only one child and are forced to make a difficult choice. It is typically girls who are the first to be pulled out of school in the aftermath of extreme events: their education gets less priority than that of boys and they are put to work doing household chores or holding down a job in order to support their families. Children also reported that poor families hit by crop failure because of unpredictable rainfall send their children away to work as domestic helpers. The increased variability in weather-related shocks and stresses resulting from climate change increases the risk of production failure, particularly for those farmers who practice rain-fed agriculture (International Panel on Climate Change, 2007). Having to work in the domestic services not only overburdens children with work but also deprives them of basic child rights like education. Girls and children from poor families are more vulnerable to the destructive effects of climate change due to the inability of families to cope.

d. School infrastructures and facilities are not climate-friendly

Most schools have tin roofs and when it rains the noise disrupts classes. It is difficult to arrange class schedules to avoid this problem as rainfall is growing ever more unpredictable. Since there is no glass in the windows of the classrooms of many schools, books and notebooks are often soaked and torn by the rain, distressing children, especially those from

Riverbank-cutting is a major problem....

“I live in a flood-prone area. Riverbank-cutting is a major problem that my family faces every year. People not affected by the river grow abundant amounts of peanuts, sell what they produce, and send their children to good schools. I wish I were as lucky as those children. Every year several ‘bigha’ of land is eroded by the Bagmati River, adversely affecting families which practice ‘bagare kheti’ (riverside farming). I don’t know if it’s because of the erratic rainfall, but recently the river has started to change its course very often, shifting mainly towards Sarlahi District (the opposite bank). As there is no mechanism like river training to tame the wild river, many landowners have become landless. These people are forced to withdraw their children from good private boarding schools and send them to government schools.”



Pappu, grade 10, age 17
Rautahat

poor families, who cannot afford to replace them. The lack of windows and central heating makes students vulnerable to the effects of the cold waves, a phenomenon intensifying due to climate change, as outdoor ambient temperatures are warmer than indoor ones. There is neither good ventilation nor fans to combat hot weather and tin roofs serve to concentrate the heat. Girls who sweat excessively are mocked by their male classmates, ridicule which may result in stress and loss of concentration.

There is not even enough water for drinking purposes in many schools, and water for sanitation is largely out of the question. In some schools, there is water but it turns hot and unpalatable in the scorching heat due to bad storage facilities. The scarcity of water in what are often already dirty school toilets creates a problem, especially for girls. Most girls don't go to the toilet during school hours. Such abstinence can have a negative impact on their overall health. Many girls of Palung, Makwanpur, and Chisapani, Banke, skip school when they are menstruating, resulting in poor overall attendance. "I have to miss class for four days every month when I have my period because going to school causes far too much discomfort. There is no good toilet facility for us and no water to wash and stay clean. Because of this lack, most girls prefer staying at home when they menstruate," explained Sabitri of Mastamandau, Dadeldhura. Observations of schools and discussions with teachers and guardians revealed that toilet facilities are very poor in most schools. In some schools, only teachers, not students, have access to toilets. Questions

posed to teachers about the correlation between girls' absence during their menstrual periods and their school performance and examination grades revealed that girls' educational performance is very low precisely in those schools which lack good toilet and drinking water facilities. The poor condition and even lack of basic facilities like drinking water and toilets may augment the magnitude of the impact of climate shocks on children, particularly girls.

e. Hot weather often discourages children

During the hot season, the walk to and from school in the heat serves to deter children who live far away from their schools from attending, so their attendance records tend to be low. Children are also inclined to miss schools due to the health effects associated with hot weather, like weariness, loss of appetite, and vomiting. The school records of Makwanpur and Sindhuli districts revealed that 30-40% more students were absent during the hot months of April, May, and June of 2012 than of 2001. Children who do attend say they feel sleepy and are unable to concentrate. According to the children of Bhimapur, Bardiya, and Samanpur, Rautahat, cases of fainting due to the extreme heat are also common. Obviously, students' poor concentration on their studies impacts their grades negatively. Mr. Ram Narayan Yadav, a teacher in Rangpur, claimed that children do worse on their terminal exams, which are held at the end of June or in early July, during the heat before the monsoon vacation, than on their final exams, which are held in March, before the hot weather, even though the former are less comprehensive. He avers that hot



¹ 1 bigha = 0.67 ha

weather is one of the major causes for this discrepancy. The physical and psychological effects of hot weather on children should not be undermined as they make a direct impact on children’s education.

f. Damage to books and stationery

Children are a very sensitive lot and they often develop a strong attachment to belongings, the damage of which can have a devastating effect on their tender psychology. Floods and fires damage children’s books and stationery, among other things, and many poor families find it difficult to replace these materials. With more floods during the monsoon and fires in the summer, such losses are likely to increase. Children of Sarikhet, Makwanpur, and the village of Bhimesthan and Ranibas in Sindhuli mentioned that the number of fires both within their villages and in the forest is increasing.



Devastating scene after fire

Table 7: Worries about the impacts of climate change

SN	Observed change	No. of response	Percent	Response/(Percent)	
				Girl	Boy
1	Loss of life	23	7	10/ (43)	13/ (57)
2	Loss of property/assets	32	10	17/ (53)	15/ (47)
3	Impact on health	112	36	57/ (51)	55/ (49)
4	Impact on education	87	28	28/ (32)	59/ (68)
5	No assets for future generation	45	14	35/ (78)	10/ (22)
6	Other statements*	7	2	5/ (71)	2/ (29)
7	Do not know	9	3	6/ (67)	3/ (33)
		315	100	158/ (50)	157/ (50)

Source: Survey, 2012

*"Other statements" refers to children’s perceptions of climate change that are not directly relevant to the question.

Fear of fire

“I could not concentrate on my studies for more than three months after my house was burned down last year, destroying my school books, uniform and other things. I will never be able to forget the scene of the inferno engulfing my things. It took more than one hour to get control of the fire despite the effort of many neighbours. Had the tube well near my house not dried up, the fire that engulfed my house could have been brought under control more quickly. Why do the so-called wise adults of our community not do anything to conserve and recharge the water resources of our village?”



Laz, grade 10, age 16
Morang

4.2.2 Health and nutrition

Because of their physical, cognitive and physiological immaturity, children are more susceptible than adults to diseases, and they require better health care. Unfortunately, the severe natural disasters induced by climate change have already affected the spread and intensity of diseases, especially those, like diarrhoea, that most affect children (Gautam and Katy, 2008). Disasters associated with climate change culminate in unfavourable environments and badly disrupt the provision of health services that are indispensable for the optimum growth of children.

Over one-third (36%) of all children (17% of girls and 55% of boys) stated that the chief impact of climate change would be on health (Table 7 above). Significantly more girls (78%) worried that climate change would completely deteriorate assets for future generations, a difference which shows that girls are more serious than boys about safeguarding productive assets. Children linked allergies and asthma with pollutants such as nitrogen dioxide, ozone and particulate matter, all of which are increasing with the changing climate. Some expressed their worries that expenditure on treating such diseases would rise.

a. Emergence of water- and air-borne diseases

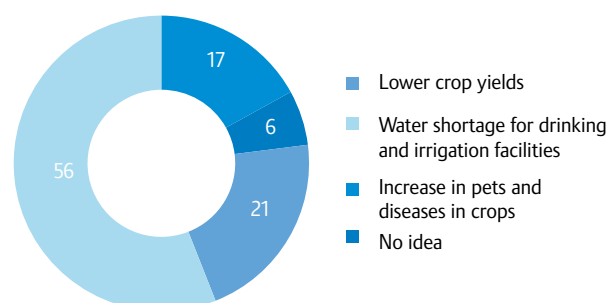
Children's health is a major concern as tropical storms and heavy rains cause floods that contaminate drinking water supplies, threaten sanitation, and spread water-borne diseases such as cholera (UNICEF UK, 2008). Water-borne diseases attributable to climate change, including cholera, diarrhoea, salmonellosis, and giardiasis, as well as malnutrition conditions are prevalent in Bhutan, India, Myanmar, and Nepal. The risk of contracting such diseases or suffering from malnutrition in 2030 is expected to increase as a result of elevated temperatures and increased flooding (Patz et al., 2005). Climate change affects all aspects of life, making rainfall less predictable, changing the character of the seasons, and increasing the likelihood and severity of extreme events such as floods.

Dirty drinking water and poor sanitation are two of the major causes of child mortality. During floods, water sources are contaminated and water as well as sanitation facilities are destroyed, thereby putting children at an elevated risk of contracting water-borne diseases. Children from poor families are at great risk for the transmission of fecal-oral diseases as they do not have the means to take precautionary measures such as using safe water for drinking and discarding contaminated food. Children believe that frequent,

unexpected floods and additional water shortages linked to climate change are likely to increase the incidence of diarrhoea and other water-borne diseases in the future. In the opinion of locals, the discharge of water in rivers like the Tila and the Karnali in Kalikot and Tamor in Taplejung districts is decreasing because glaciers are shrinking.

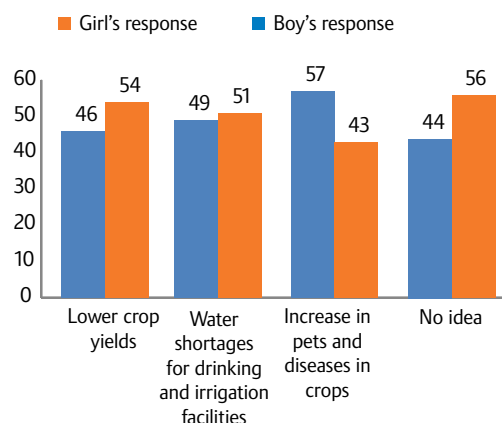
Climate change will have a wide range of health impacts, including increases in malnutrition due to the failure of food security; disease and injury due to extreme weather events (Epstein et al. 1995); the burden of diarrheal diseases from deteriorating water quality; and the incidence of infectious diseases. In addition, the incidence of cardio-respiratory diseases will climb due to the build-up of high concentrations of air pollutants such as nitrogen dioxide, lower tropospheric and ground-level ozone, and air-borne particles in large urban areas. A reduction in wintertime deaths is anticipated; however, human health is likely to suffer chronically from heat stress (Bouchama et al., 1991; Ando, 1998). In particular, the combined exposure to higher temperatures and air pollutants appears to be a critical risk factor for health during the summer months (Piver et al., 1999).

Figure 6a: Potential effects of the changing climate in the future



Source: Survey, 2012

Figure 6b: Potential effects of the changing climate in the future



Source: Survey, 2012

Air pollution, worsened by record-high temperatures and ozone levels, contributes to higher rates of asthma and other respiratory illnesses (UNICEF UK, 2008). People experience more anxiety and tension when they live near industrial air pollutants, which will be exacerbated by the warmer temperatures associated with climate change (Chattopadhyay et al., 1995).

Because water sources have been depleted, people are compelled to rely on rain. In fact, much land that was once irrigated is now rain-fed. In Hadikhola, Makwanpur, children expressed their fear that they would not be able to sow maize on time because of the lack of rain. They pointed out that at the same time in previous year (May 2011) maize plants had already reached the height of 6-9 cm. When they were asked what they thought would be the effects of the changing climate on the future, 56% said there would be a shortage of water for drinking and irrigation facilities, 21% that crop yields would decline, and 17% that crops would be more affected by pests and diseases (Figure 6a). More girls than boy have experienced an increase in the incidence of diseases, insects and pests, a disparity which is probably due to girls' involvement in harvesting grass from farmland to feed their family's livestock (Figure 6b).

During focus group discussions, most children complained that no effort was being made to cope with frequent floods and the resulting water pollution despite the fact that it posed a serious threat to children's health. In this context, 14-year-old Babita

Kafle from the village of Bhimesthan said, "During the monsoon, very dirty water comes from the tap. Every year children suffer from skin irritation and itching after bathing in such water."

Likewise, the children of Panchkanya, Sunsari, said that they often suffer from skin allergies and ear problems because they have to cross a muddy river to reach school. Similar views were expressed by many other children who live in flood-prone areas. In the dry season, as safe water sources dry up and people are forced to use contaminated water sources, health problems like dehydration, heat rash, and scabies are ubiquitous.

Girls do not use disposable sanitary pads when they menstruate; instead, they use strips of cloth that need to be washed out and dried. It is difficult to get clean water to do so. In addition, as girls of Palung explained, society forces girls to dry this cloth and their underpants in shady, hidden places and not in the sun. As a result of using such improperly dried cloth, girls, especially those from conservative families, develop various infections of their reproductive tracts. The girls also added that most girls are reluctant to share this problem with their guardians or to seek help in health posts. According to girls of Prakashpur and Panchkanya, their plight is worsened when toilets are unusable and they have to relieve themselves in contaminated places, thereby increasing their susceptibility to water-borne diseases. Boys are less unfortunate.

Peeing in peace

"My name is Sunita Kumari Urau. I am 15 years old and I study in class 8. I live in Neta Chowk, Morang, where there are only two public toilets for all the women and girls of the community. We are forced to wait in the rain to use the toilet as it is difficult to relieve ourselves outside the toilet when most of the land is inundated. Inundation problems are severe during the monsoon because of the increase in high-intensity rainfall due to climate change. Water stagnates for several days as there is no proper drainage system. Whenever the toilet is occupied and I am forced to relieve myself in a public place, I worry that one of my classmates might see me."



Sunita, grade 8, age 15
Morang

b. Expansion of vector-borne diseases

Children pointed out that climate change, combined with changes in land use, population growth and deforestation, has contributed to an increase in the incidence of vector-borne diseases such as malaria

and dengue fever. Tony and Lenton (1997) found that the percentage of the world's population exposed to malaria, one of the biggest killers of children under the age of five, is expected to increase 45-60% in the next 100 years due to climate change.

Every year when the monsoon starts, there is an outbreak of vector-borne diseases in the Tarai districts of Nepal. The children of Babiya, Sunsari, averred that the number of cases of vector-borne diseases like malaria and Japanese encephalitis is rising because of the rising temperatures. Children in Kerabari, Morang, stated that mosquitoes have become common only in the last two years and that people are now compelled to use mosquito nets. Children are more susceptible than adults to vector-borne diseases because of their poor immunity. Furthermore, rising temperatures are slowly increasing the geographical range of areas vulnerable to disease vectors and altering the seasonality of vector-borne diseases.

In the lowlands, hydrothermal stresses (warmer and wetter conditions) will result in an increase in the transmission of epidemic diseases and the higher incidence of heat-related infectious diseases (Martens et al., 1999). Malaria, schistosomiasis, and dengue are very sensitive to climate and, because of climate change, are likely to spread into new regions on the margins of the existing endemic areas. Vectors require specific ecosystems for survival and reproduction and epidemics of vector-borne diseases can occur when

their natural ecology is disturbed by environmental changes, including changes in climate (Martens et al., 1999; McMichael et al., 2001). With a rise in surface temperature and changes in rainfall patterns, the distribution of vector-mosquito species may change (Patz and Martens, 1996; Reiter, 1998). Temperature can directly influence the breeding of malaria protozoa and suitable climate conditions can intensify the invasiveness of mosquitoes (Tong et al., 2000). Another concern is that changes in climate may allow more virulent strains of disease or more efficient vectors to emerge or be introduced to new areas.

Many vector-borne and water-borne infectious diseases are known to be sensitive to changes in climatic conditions. The present analysis reveals that the potential impacts of climate change on health lies especially in the growing risk of outbreaks of three mosquito-borne diseases, malaria, kala-azar and Japanese encephalitis. Changes in temperature and precipitation could also result in the expansion of vector-borne diseases into previously uninfected high-altitude locations. The expansion of the geographic range of vectors and pathogens into new areas, the increase in suitable habitats and numbers of disease

I became the laughing stock of my friends

“I got malaria when I was in grade 4. I still feel dizzy and weak sometimes. I love swimming, so I used to go to the Bagmati River and nearby ponds all the time, say daily for two or three months. One day, I just couldn’t eat or walk. When my family took me to the hospital, I discovered that I had malaria. I became the laughing stock of my friend. I couldn’t study. Even though it is tempting to swim, I avoid the river. I don’t want to suffer from malaria again. Rivers and ponds are breeding grounds for mosquitoes that transmit malaria.”



Amit, grade 10, age 16
Rautahat

Resurgence of malaria

“I am currently studying in grade 10. I caught malaria during the final exams of grade 9. The medicines that they gave me caused side effects. I used to faint frequently and experience dizziness. I wanted to enjoy the marriage ceremony of my relative, so I stopped taking the medicine after 15 days even though I was supposed to take it for a month. After explaining my problem to the teachers, I got promoted to grade 10 without having had to take the exams. However, I am still not completely cured of malaria. I have no appetite and I get irritated when people talk in front of me. I go to school but I don’t feel like studying.”



Niranjana, grade 10, age 17
Rautahat

vectors in already endemic areas, and the extension of transmission seasons associated with climate change could potentially expose more people to vector-borne diseases. Studies show that, with rising temperatures, both Nepal's subtropical and warm temperate regions will become more vulnerable to malaria and kala-azar, and subtropical regions will become more vulnerable to Japanese encephalitis as well. The risk of contracting water-borne diseases or suffering from malnutrition in 2030 is also expected to increase as a result of elevated temperatures and increased flooding (Patz et al. 2005).

c. Perinatal health problems

The most common cause of death among children is neonatal death due to premature birth, infection and birth asphyxia. Antenatal care, safe delivery and postnatal care are essential to ensure neonatal health. Some estimates suggest that 85% of people who are dying from the impacts of climate change are children younger than five years. Indeed, the likely areas of climate change impact identified by the International Panel on Climate Change correspond closely with the current leading causes of death in children younger than five years (UNISDR, 2010).

Children said that infants could suffer from malnutrition when their mothers are unable to feed them due to food scarcity, poverty and other problems associated with climate change-induced disasters. Climate change will exacerbate one of the primary reasons for malnutrition, namely socioeconomic disadvantage (Bohle et al., 1994). Insufficient food, excessive workloads, and breastfeeding mean that malnutrition is more prevalent among mothers and young children. In the words of Kalpana of Jubitha, Kalikot: "It is very difficult to manage enough grain for the family to survive when the winter crops fail or when vegetable production is low during long droughts. In many instances, it is difficult to find something just to fill our empty stomachs, let alone to find something nutritious. In this situation, a good diet is simply beyond our imagination."

d. Effects on mental health and wellbeing

The mental health of children is often ignored or not emphasised enough while discussing the health and safety of children. Many child interviewees opined that psychological effects such as nightmares, depression, constant fear, and trauma are very common among those living with climate-induced

I am terrified whenever there is lightning

"My father was climbing the stairs when he fainted as a lightning bolt struck him. I ran to my neighbour to ask for help only to find out that he himself had been struck. I have never felt so helpless in my life. Later, other neighbours gathered and we took both my father and my neighbour to the hospital. My father recovered three hours after we arrived at the hospital. For many days afterwards, I could not sleep well or concentrate on my studies. Ever since, I am terrified whenever there is lightning. I imagine that the lightening will hit my house."



Janak, grade 9, age 15
Makwanpur

My old house haunts me

"The flood of 2003 took away one-third of our house, rendering us homeless. After struggling for some months, we built another house a little upstream of the first. When I see my old house on the way to school, the happy memories of the days we spent there overwhelm me. It breaks my heart to see it in such a sorry state. Even though we have built a new house, we are still affected by the river. Rill erosion on sloping land makes it impossible for us to grow enough food to feed our family of seven. We're still toiling to make ends meet."



Shishir, grade 9, age 14
Makwanpur

Tormenting tales

“I live in Palung-4, Angarey, Makwanpur. Fetching water is definitely a problem for me. In the dry season, I have to wait for hours in a queue, and I even quarrel with my own neighbours to get my share of water. Whenever I have to quarrel I keep thinking about it even in school and find myself unable to concentrate in class. Sometimes, I walk 15 minutes extra to fetch water from a faraway well to avoid conflict. Thunderstorms scare the hell out of me. I am so frightened that I can’t sleep at night. The area of our ‘bari’ (rain-fed sloping land) is reduced every year because of landslides triggered by heavy rain. I also fear that the fierce gales before the rain will blow away the roof of our house as it did when I was six years old.”



disaster. The psychosocial disruption and emotional turmoil experienced by children during a disaster can have long-term implications for health and wellbeing (Gautam and Katy, 2008). Indeed, disasters like floods have been found to increase the risk of mental health problems and significantly diminish the coping skills of children. Climate change will bring more droughts, fires, and other natural disasters to some regions, and these will more significantly harm the psychological wellbeing of citizens. Thus, there is a need for improving preparedness measures in order to ward off the worst outcomes (Morrissey and Reser 2007).

e. Early menstruation and the concomitant stress

There is a strong belief that young girls start menstruating earlier than they did in the past. Early menstruation is associated with warm climates though other factors like better nutrition also play a role. Children of Babiya, Sunsari, said that the average age of first menstruation had dropped from 15 to 12. Early-onset menstruation causes stress in some girls, especially Madhesi girls, who are forced to marry once they reach puberty. In fact, parents and relatives start discussing their daughter’s marriage as soon as her period starts. Cultural norms, values, and societal pressure to “preserve girls’ purity” account for this push for early marriage. However, such marriages deprive girls of their rights, and, naturally, girls who are not ready to give up a child’s life and accept the responsibilities that marriage entails suffer from distress and anxiety.

Families experiencing significant economic stress due to climate shocks tend to be most likely to uphold the culture of early marriage. Risks specific to adolescent girls from poor households, such as early marriage, trafficking, and pressure to provide sex for food

have been reported anecdotally in the context of depressed local economies, food crises and climate change-related household shocks (Nyumbu and Poulson, 2009).

f. Impact of urbanisation

Currently more than half of the world’s population lives in cities. The convergence of increasing unmanaged urbanisation and climate change will pose new threats to child survival. Many people live in overcrowded slums on low-lying and marginal lands. These areas are particularly vulnerable to disasters, fires and infectious disease epidemics as they are densely populated and people live in poorly constructed houses. The children of Balaju, Kathmandu said that they are surrounded by contaminated water, unsanitary grounds, and hazardous waste. Poor air quality increases the incidence of respiratory disease and affects children’s health severely. Since urbanisation is an inevitable phenomenon, a good town planning and management system is paramount if people are to be able to cope with the negative impacts of climate change.

Climate change will have a serious impact on urban populations and systems, exacerbating the existing 21st century challenges faced by city managers, leaders, and planners. It is estimated that 70% of the world’s population will live in urban areas by 2050 and that approximately 60% of the growth in urbanisation is expected to take place in Asia (UN-Habitat, 2008). Climate change will lead to warmer temperatures, greater variability in local conditions, and changes in the frequency, intensity, and location of precipitation and storms. The impact of these changes will potentially be worst in urban areas in Asia, where there are large vulnerable populations with little capacity and few resources to cope with such negative impacts.

Climate change also has implications for the urban poor and for rural-urban change. Most informal urban settlements are built illegally and without formal planning. Limited availability of water, high child and infant mortality rates, and a very high disease burden of diseases like malaria, tuberculosis, and diarrhoea are common characteristics of such informal settlements (Satterthwaite et al., 2007). Planning for climate change will be extremely difficult in such situations, where governments have limited authority and capacity to address the risks posed by existing hazards.

4.2.3 Child protection

Children are less developed than adults both physically and mentally and therefore have less capacity to cope with the deprivation and stress associated with changing climate. Changes brought about by climate change—desertification, reduced agricultural production, and changing weather patterns among them—will place additional burdens on children, which, in turn, will affect their chances of survival. Following any displacement associated with a climate-induced disaster, children are highly vulnerable to poverty, abuse and exploitation. During the consultation, children identified various issues related to child rights and protection. Climate change can affect children's rights, including their right to health, water, nutritious food, and even education.

a. Separation from one's family

In the majority of cases, children are separated from their families during climate-induced disasters. In addition to the physical impacts and the threat to safety such a separation entails, the associated emotional distress caused can have a long-term psychological impact on children. The ramifications of internal displacement brought about by climate-induced disasters include home sickness and a loss in the ability to concentrate in class due to the change in school, friends, teachers and overall environment.

Children are among those most vulnerable to future risks related to climate change; as a result, their rights to survival, protection, development and participation are increasingly under threat. Climate stresses are causing a drastic increase in the number of children who are displaced, suffer from malnutrition, find their schooling interrupted, or have to engage in harmful practices to help their families secure sufficient income. Boys and girls are impacted differently as a result of being separated from their families. Boys separated from their families are forced to give up education and engage in the worst forms of child labour, such as in

agricultural labour and factory work. In the absence of parental guidance, they may, as was seen in Hadikhola, Makwanpur, and Chisapani, Banke, be incited to indulge in criminal activities. Boys are less inclined to take care of their own health, a negligence which may result in the retardation of their physical, mental and emotional growth. On the other hand, girls separated from their families are less likely than boys to pursue resilient livelihood options and to realise their rights to protection and dignity. In the view of the girls of the villages of Hadikhola and Sarikhet of Makwanpur, they are at risk of sexual violence, unwanted pregnancy and trafficking. Children from Babiya, Sunsari, said, "During and immediately after disaster, we, along with our elders, are forced to engage in daily wage labour to earn some income within and outside the home. We also have to face the lascivious looks of the landowners and other men who employ us to do on- and off-farm labour work. The way they treat us is also a form of sexual abuse. We sometimes think that if our guardians were at home, we would never experience such inhuman behaviour."

b. Inadequate love, care and affection

Children deserve to be loved and taken care of. However, parents often don't get to spend quality time with their children when an unfavourable climate increases the increased workload in agricultural fields. Taking care of children becomes a secondary priority for parents when their livelihoods are threatened. In addition, children are becoming more frequently separated from their primary caregivers or beloved family members, who migrate in search of better income opportunities. According to the children interviewed, 75% of households have at least one family member who works abroad for a given period each year.

Children also shared that the stress experienced during disasters often incites domestic violence and family disputes. The children from Hadikhola, Makwanpur, highlighted that, along with their male counterparts, many married women have migrated to Middle Eastern countries to earn a livelihood, a migration trend associated with the slow onset of domestic disaster. Going aboard may be a chance to earn handsomely for some, but it also invites family disputes. Family relationships are disturbed and marital relationships are placed under stress. In a few cases, divorce has resulted (Gautam 2010). In such situations, children feel unloved and uncared for, an unhealthy feeling which may destroy their potential to bloom into emotionally healthy individuals.

c. Increased workload of children

Droughts induced by climate change also result in famine and starvation. Once a farming system is under stress, a farm-based economy turns into a labour-based economy. Children from urban areas of Kathmandu and Lalitpur reason that the threat of child labour and child trafficking is likely to increase because of climate-induced migration. It was observed that many children from poor migrant families are forced to work in brick factories or as domestic labourers.

Box 2: Daily task analysis of girls and boys

Key task (done on a daily basis)	Time spent (in min.)	
	Girl	Boy
Sweeping courtyard	10	5
Fetching water	80	30
Fetching firewood	60	40
Cleaning house	15	5
Worshipping	5	0
Milking	0	10
Cooking food	70	10
Child rearing	50	10
Feeding animals	20	60
Washing clothes	30	5
Clearing utensils	50	5
Tending livestock	15	50
	6.75 hrs	3.84 hrs

Source: Task analysis exercise with children, 2012

The quality of grazing land along riverbanks has degraded due to frequent flash floods. Thus, children who are responsible for grazing cattle and fetching firewood are forced to go ever deeper into the woods to perform these chores. Many severely-degraded government-owned forests are being handed over to the community forestry user groups of communities

to manage and conserve them. However, these groups do not get any incentives from the UN initiative Reducing Emissions from Deforestation and Forest Degradation. The daily collection of firewood and other forest products is prohibited in community forests; instead, they are open only a few days a year, as agreed by the community forest users' group committee. As a result, almost every day children have to walk long distances to reach national forests, where they can gather firewood, grass and litter but also where they are at a high risk of attack by animals, including deer, wild boars, and snakes, and sexual harassment.

The majority (83%) of children said that girls are most at risk from the impact of climate change because when local water and forest resources are depleted girls have to travel long distances in order to collect enough firewood, grass, and water. It is estimated that fetching firewood and grass takes 35-90 minutes in the hills and 20-60 minutes in the Tarai. When they were asked about changes in water availability and supply, 35% of children replied that traditional wells, stone spouts, springs, and streams are drying up. This depletion forces children to travel long distances to fetch water.

Children estimate that they spend of 4-5 hours per day working and that the total increases during peak agricultural periods. The tasks boys and girls perform are analysed in Box 2. Some chores, like fetching water and caring for other family members, are thought to be typically for girls, a finding confirmed by Brody et al. (2008). Climate change will increase the time rural-dwellers, primarily women and girls, take to collect



Girls are busy fetching water at Sarikheth (left) and Hadikhola (right), Makwanpur



Children engaged in livestock rearing

water as they will have to travel greater distances to find it. In urban areas, water collection is also an issue as women and girls may spend hours queuing for intermittent water supplies.

In addition to attending school for six hours daily, girls spend 6.75 hours, almost twice as much as boys' 3.84 hours, doing household chores. Climate shocks have increased the workloads of both girls and boys. The depletion of water sources adds to the already onerous workload of girls. In some places, like Chisapani, Banke, and Hadikhola, Makwanpur, the migration of women, some of whom are mothers, in search of employment is common because climate shocks have increased the pressure to earn income. The absence of female

household members has added to the responsibilities of girl children. As girls' work at home becomes more arduous, it becomes increasingly difficult for them to stay in school and enjoy their rights to development.

For affluent families, the use of biogas has decreased the kitchen-based workload. However, in poor families like those in Prakashpur, Sunsari, and Rangpur, Rautahat, children are forced to spend a lot of time collecting fuel wood. As children have to devote considerable time to various chores, the time they eat jalkhai (breakfast) and kalau (meals) also changes frequently. Some children blamed such irregular mealtimes for the gastritis and ulcers they suffer.

d. Threat to survival

During the consultations, children pointed out the possibility that morbidity rates would increase due to climate stresses and extreme events. Children were most fearful of the loss of life due to floods. Young boys are particularly at risk as they have to irrigate fields near flooded areas because, due to migration, there is often no older male family member to perform this essential task. In several instances, in Babiya, Sunsari, children have become the de facto guardians of their younger siblings.

According to children in Sarikhet, Makwanpur, and Pokhariya, Morang, girls are more at risk as they are less able to protect themselves from climate-induced

I wish

"There are 12 people in my family. The single 'bigha' of land that we own is insufficient to produce enough food for all. My father has been to Malaysia twice to earn additional income. He is now planning to go to Dubai. As my mother gets migraines and they are triggered by hot weather, I have to do a lot of household work like fetching water, tending our livestock, providing 'kuti katni' (equal amounts of chopped grass and straw for use as livestock feed), and collecting grass. I rank fourth in class. I know I could top the class if my workload were less. My family migrated to Prakashpur from Taplejung. Since we live on the bank of the Koshi River adjacent to Koshi Tappu Wildlife Reserve, we are troubled not only by floods but also by wildlife, mostly elephant raids. Wild elephants come to the Koshi as soon as the monsoon ends. Villagers, mostly us children, beat local drums, light firecrackers, burn tires, erect 'pultho' (scarecrows), and blow horns to get rid of the elephants. Despite our efforts, elephants still break 'deri' (earthen vessels used to store grain) and eat the grain. I wish I had less work at home."



Krishna, grade 8, age 13
Sunsari

disasters because of how they dress and their inability to swim.

4.2.4 Economic development and food security

Economic development in Nepal depends mostly on agriculture. Since about 28% of all crop production is rain-fed (and thereby) depends on predictable levels of precipitation, even slight swings in the amount and

timing of rainfall can result in lost harvests, reduced incomes, and increased food insecurity. Unpredictable rainfall brings with it new challenges that threaten to overwhelm people's coping capacity, reduce their resilience, and negatively affect child survival. Children of the study communities explained how the changes associated with changing climate have affected their families' livelihood over the past few years.

Rain has become unpredictable

“Last monsoon, two girls drowned in Kamala River while returning home from school. It doesn't rain often, but whenever it does rain, the intensity is so high that there is heavy flooding. The need to cross the river to go to school coupled with the inability of girls to swim puts our very survival at risk.”



Sabita, grade 10, age 15
Sindhuli

There are indications that the dry season is becoming drier and seasonal droughts and water stress more severe. The timing and length of the monsoon period also seems to be changing (Ramesh and Goswami, 2007). These early signs will have to be followed up and confirmed, but they are likely to have profound effects on agricultural and natural ecosystems alike, as well as on the availability of water for household use, industry, and energy, thereby impacting considerably on people's livelihoods and wellbeing. Among Nepal's different production systems, agriculture is likely to face the most significant adverse impacts of climate change due to the changes in the hydrological regime influenced by several factors, including temperature, monsoon rainfall, regional water flow, and extreme weather events. More water during the monsoon season will cause floods, and low water flow and the erratic behaviour of rainfall will result in intense and frequent drought.

Climate variability directly affects agricultural production, as agriculture is inherently sensitive to climate conditions and is one of the most vulnerable sectors to the risks and impacts of global climate change (Parry et al., 1999).

a. Low productivity due to little rain

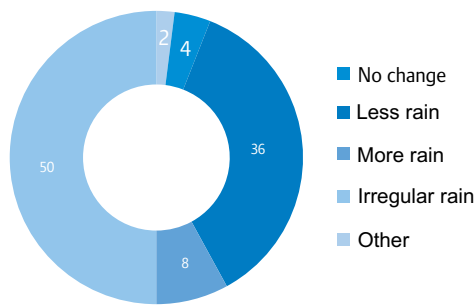
Climate changes may affect precipitation patterns and trigger extreme weather events. Half of the children (58% of girls and 42% of boys) have experienced irregular rainfall (Figure 7a and 7b) and 36% children (girls 23% and boys 49%) have experienced less rainfall than they used to. More boys than girls have a

clear understanding and experience of irregular rainfall, a phenomenon supported by the data published by the Department of Hydrology and Meteorology. Children believe the decline is the main reason for the low productivity of both winter and summer crops. Reduced soil fertility, the failure of irrigation facilities, and the emergence of new pests and diseases are other reasons they identified. Biophysical constraints to agriculture in arid areas include acute water scarcity, frequent drought, salinity, desertification and other forms of land degradation, as well as new climate-change challenges such as changes in the distributions of pests and diseases.

Children of the districts of Sindhuli, Rautahat, and Sunsari claimed that winter rains are either less or absent or that they do not fall at the appropriate time. Data from the Department of Hydrology and Meteorology supports their claim: between 1976 and 2005, winter rain was high in far-western region and low in southern parts of the central and eastern development regions. In Sindhuli District, most families have given up planting millet, barley, and buckwheat although some still broadcast seeds in the hope of getting a small harvest.

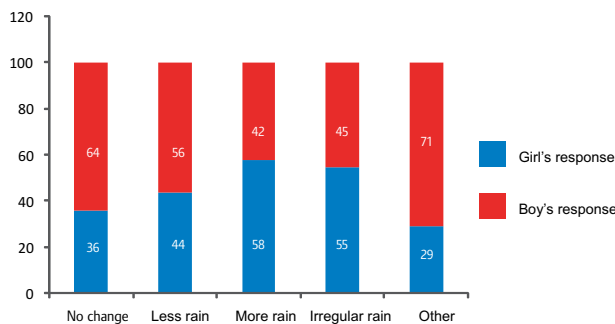
The unpredictability of rainfall is affecting crop choices as farmers are unable to plant and harvest crops on the traditionally calculated dates of the year. In Jubitha, Kalikot, people wait until the beginning of August for the rain they need to sow paddy and then cultivate maize and millet instead. There used to be

Figure 7a: Changes noticed in rainfall pattern



Source: Survey, 2012

Figure 7b: Changes noticed in rainfall pattern



Source: Survey, 2012

sufficient sources of water for rice cultivation, but most have disappeared. As a result, in Kalikot District, especially in upper elevations of the village of Jubitha, farmers have again started to grow buckwheat, barley and millet instead of paddy. In many places in the Tarai, people have stopped growing chickpeas, sweet potatoes, barley and millet due to their low productivity, which children ascribe mainly to low and unpredictable rainfall. In some villages, such as Samanpur, Rautahat, farmers have started cultivating

climate-smart crops like turmeric and ginger to lessen the impacts of these changes in precipitation.

The productivity of many crops and vegetables has decreased due to changes in temperature and precipitation. In the view of the children of Basantapatti, Rautahat, the irregularity and scarcity of winter rain has seen the grain size of winter crops getting smaller and the husks more profuse. Children in Samanpur, Rautahat, said that they were disappointed that trees like mangoes are initially covered with flowers but that they bear few and small fruits. For instance, in Sarikhet, Makwanpur, children reported "Maize, black lentils, and cucumbers don't grow as copiously as they used to." In the opinion of 14-year-old Antim, a ninth grader from Basantapatti, Rautahat, "People depend upon monsoon rain for irrigation. But lately rainfall is proving elusive to the extreme. While productivity is very high in some years, it is so low in other years that people have nothing to eat."

b. Trends in climate-induced migration

Migration is attributed to the loss in agricultural productivity, the scarcity of irrigation water caused by changes in rainfall patterns, poverty, and the lack of markets. About 80% of the households in the villages studied report that at least one member works in India for a given period each year. Among the children interviewed, this figure was slightly lower, 75%. For food sufficiency, many of their families rely less on agriculture and more on remittances from family members working both within and outside Nepal. The trend of migration to India has increased since 2002



Children enjoy swimming in Sarikhet (left) and Pokhariya (right)

partly because of the conversion of Nepal's farm-based economy into a labour-based economy due to frequent climate-induced disasters and partly because of political instability.

Those who migrate to India work there for a few months, mostly during the agricultural slack season. They return to plant rice, when labour (traditionally male) is required for ploughing. Because it is becoming increasingly hard to predict when the first rainfall propitious for planting will occur, it is hard for them to time their return. When their limited leave is over, especially if it occurs before the required rains, they leave behind a huge burden of farm work for women and children.

Extreme weather events and gradual environmental change will increase the number of migrants, both temporary and permanent. A large number of the families interviewed had migrated from the hills to the Tarai in the last 12-15 years for a variety of reasons,

including climate-induced disasters. Since many families cannot afford basic supplies, including food, migration and the borrowing of money are commonplace. Among such destitute families, the primary role of children is to earn a livelihood rather than to study. They have to assume a considerable workload and are rendered vulnerable to child labour and trafficking.

c. Emergence of diseases and pests in crops and livestock

Children reported that local people have increased their use of synthetic fertilisers to raise productivity and of insecticides and pesticides to get rid of new pests and diseases. Some of the particular diseases they described were the decaying of roots and fungal infections in the majority of crops in Babiya, Sunsari; the wilting of maize in Kerabari, Morang; the surge in the number of "khumra," an insect that feeds on plants, in Chisapani, Banke; and club root disease in cabbage, cauliflower, and mustard in Palung, Makwanpur. After the flood of 1993, the people

School is my second priority

"My family migrated from Bhojpur District. We are a family of eight and the food we produce on the 11 'katha' of land that we own is insufficient. Thus, the members of my family are sharecroppers. Since my father is always sick, my elder brother, who is 21 years old, has gone to Delhi to find work. I have to fetch water, cook food, and do other household chores. Although I love to study, I often have to miss classes due to the workload at home. School is my second priority."



Arjun, grade 9, age 14
Sunsari

of Palung shifted from cultivating cereal crops to farming vegetables, a shift that demands heavy use of pesticides and synthetic fertilisers. Children observed that the incidence of livestock diseases was alarmingly high and guessed that rising temperatures and the overuse of chemical fertilisers might be responsible. Chemical fertilisers may also affect children's health as they contaminate water sources and can be inadvertently consumed in various foods.

d. Local extinction of a few crop varieties

Many traditional crop varieties that used to grow well without much attention some years ago now have minimal yields even though farmers use all sorts of synthetic fertilisers. Children observed that some local varieties have disappeared, lowering biodiversity in

the area, and believe that climate change played a role in their loss. The children of Sarikhet, Makwanpur, claim that while mustard, millet and pumpkin used to grow abundantly a few years ago, people have stopped planting these species altogether due to the decline in their productivity, which affects both prices and market demand. The villagers of Chisapani and Holiya of Banke District have stopped cultivating lentils as production plummeted so low that it is no longer economically viable for them to do so. In Jubitha, Kalikot, the decrease in snowfall has reduced soil moisture, driving down the productivity of barley and wheat and forcing farmers to abandon the cultivation of buckwheat. The disappearance of local indigenous crops may weigh heavily on the already existing problem of food insecurity.

⁷ 20 katha = 1 bigha = 0.67 ha

The impact of climate change on children with different characteristics is summarised in Table 8 below.

Table 8: Impacts of climate change on children with different characteristics

Theme	Sex		Geographical setting		Educational status	
	Male	Female	Rural	Urban	School-going	Out-of-school
Education	<ul style="list-style-type: none"> • Poor aptitude and limited skills • High dropout rate • Poor attendance 	<ul style="list-style-type: none"> • High dropout rate • Increase workload • Poor attendance • Poor learning and skills 	<ul style="list-style-type: none"> • Poor educational performance • High dropout rate • Poor attendance 	<ul style="list-style-type: none"> • Poor educational performance • Poor attendance 	<ul style="list-style-type: none"> • Poor attendance • Poor educational performance • High dropout rate 	<ul style="list-style-type: none"> • Poor attendance • Poor educational performance • High dropout rate
Health and Nutrition	<ul style="list-style-type: none"> • Malnutrition • Dehydration • Low immunity 	<ul style="list-style-type: none"> • Malnutrition • Fainting and heat exhaustion • Urinary tract infections • Dehydration 	<ul style="list-style-type: none"> • Under-nutrition • Weak immunity • Skin and eye infections • Water- and vector-borne diseases 	<ul style="list-style-type: none"> • Water- and vector-borne diseases • Respiratory diseases • Eye infections • Allergies 	<ul style="list-style-type: none"> • Malnutrition • Low immunity 	<ul style="list-style-type: none"> • Malnutrition • Low immunity • Psychological effects (owing to neglect by guardians)
Protection	<ul style="list-style-type: none"> • Involvement in risky work • Increase in bad habits • Threat of child labour • Juvenile delinquency • Neglect by caregivers who have to migrate 	<ul style="list-style-type: none"> • Sexual violence, Trafficking (in families rendered penurious by disaster) • Early marriage (due to early menstruation) • Increased workload 	<ul style="list-style-type: none"> • Increased workload • Child labour • Bad habits • Violent behaviour • Exploitation 	<ul style="list-style-type: none"> • Exposure to domestic and communal violence 	<ul style="list-style-type: none"> • Exposure to disaster 	<ul style="list-style-type: none"> • Sexual harassment • Decreased access to juvenile justice (due to transportation problems caused by disasters)

Source: Focus groups discussions with children, 2012

4.3 Adaptation practices at the local level

This section briefly describes the adaptation practices that communities and social institutions have adopted to reduce the impacts of climate change on children. They are categorised into four areas: education, health and nutrition, child protection, and food security and livelihood.

Though adaptation is a complex subject with many dimensions, children were asked to focus on the practical aspect and to identify what they understood about adaptation practices. Those interviewed do

understand the concept: about 55% children (37% of girls and 73% of boys) opined that adaptation means 'doing something new or different from what the community has been doing in order to reduce the negative impacts of climate change,' 27% (21% of girls and 33% of boys) that adaptation is 'any pragmatic practice that reduces the impact of climate change,' and only 18% (11% of girls and 25% of boys) that they had no idea. The majority (87%) of children (82% of girls and 96% of boys) believe that they can play a major role in climate change adaptation, but 13% children (23% of girls and 3% of boys) said that

it was their guardians, not they themselves, who would play this key role. The data suggests that girls are not well informed about adaptation. The dissemination of information about climate change is very limited: of the 315 respondents, only 16% children (9% of girls and 23% of boys) said that they share what they know with their families and friends.

Children are sure that climate change will impact their lives and overall wellbeing in the future. They predict that there will be hotter temperatures (32%), outbreaks of diseases and pests which affect people, livestock, crops, and fruits (21%), and a decrease in the amount of rain (19%) (Table 9). Their view, which is substantiated by global modelling, suggests that there is an urgent need to upscale adaptation practices in order to reduce the likely impacts of climate change. The fact that about two-thirds of girls have no idea at all about the possible future effects of climate

change points to the need for capacity-building and information dissemination, especially among girls.

About 77% of children (97% of girls and 57% of boys) said that they had not heard about disaster management or climate adaptation plans in their community, 18% (9% of girls and 27% of boys) said that they thought such plans existed, and only 5% (girls 3% and boys 7%) that not only had their communities made such plans but that they, too, had participated in their formulation. More so than boys, girls do not have sufficient information about these plans and they did not participate in their formulation. The children of Prakashpur and Babiya, Sunsari, children were eager to find out what kind of plans they could adopt.

Some preventive measures have been implemented with support from non-governmental organisations.

Table 9: Possible future effects of climate change

SN	Future effects of climate change	No. of responses	Percent	Response/(Percent)	
				Girl	Boy
1	Increased erosion	45	14	23/ (51)	22/ (49)
2	More storms	12	4	7/ (58)	5/ (42)
3	More rain	6	2	2/ (33)	4/ (67)
4	Less rain	58	19	27/ (47)	31/ (53)
5	Hotter temperatures	102	32	56/ (55)	46/ (45)
6	More disease and pests	67	21	34/ (51)	33/ (49)
7	Don't know	21	7	14/ (67)	7/ (33)
8	Other*	4	1	1/ (25)	3/ (75)
Total		315	100	157/ (50)	158/ (50)

Source: Survey, 2012

*"Other statements" refer to children's perceptions of climate change that are not directly relevant to the question.



Children in Bioengineering work for flood mitigation

Holiya, Banke, for example, now has safe shelters, an early warning system for floods which includes rain gauges and a cell phone relay, and raised tube wells. Sarikhet, Makwanpur, set up an emergency fund and Hadikhola, Makwanpur, community seed banks. Many communities have implemented bioengineering techniques to protect riverbanks. This is a start, but much more is left to be done.

4.3.1 Education

Some community-level practices have been initiated to reduce the impacts of climate change on education. They are summarised below.

a. Mainstreaming of climate change issues in school curricula

Climate-change related issues have been incorporated in school curricula, adding value to formal education. However, these issues are relegated to the last chapters of textbooks, which are often not covered, and children are not tested on this material on their final examinations. As a result, students remain ignorant about climate change. In any case, 78% (60% of girls and 96% of boys) feel that the information about climate change that is incorporated in their textbooks is inadequate. Just 12% (9% of girls and 15% of boys) say that coverage is sufficient and 10% (17% of girls and 3% of boys) were undecided. This data suggests that girls are both less likely to feel that they learn enough and less likely to feel that they are competent to judge, a fact again highlighting the need for a gender-sensitive approach to improving curricula. Many children, including those of Ranibas, Sindhuli, observed that the existing curricula focus on problems, not solutions, and, as a result, generates fear. They feel that textbooks should indeed present the causes and consequences of climate change but that they should focus more on adaptation and mitigation strategies. The teachers consulted added that schools are in dire need of well-designed teaching materials and special training in the contemporary issues of climate change:

The view of Mr. Ram Narayan Yadav, a teacher of Rangpur, Rautahat, is typical: “Schools in the villages need to be funded so that they can afford better teaching materials. Similarly, teachers like us need to be provided with special trainings focussing on climate change issues.”

b. Rearrangement of school calendars to suit the changing climate

Responding to children’s claim that summers are getting hotter and winters colder, many schools have made their own school calendars to better suit the climate. Daily routines and the scheduling of summer and winter holidays vary across different geographic locations. For example, the introduction of “the morning shift” from the beginning of April to July is an adaptation in response to the extreme heat of afternoons. A teacher from Basantapatti, Rautahat, noted that this practice was not in existence 18 years ago. Children recommended that, in addition, school assembly be cancelled during extreme weather conditions. Ninth-grader Shanti of Bhimesthan, Sindhuli, said that it really saddened her when school was closed to due to floods. She believes that the holiday schedule needs to be rearranged so that there is a longer holiday during the monsoon season and fewer days off after the end of each term. The majority of teachers expressed the following opinion: “In terms of planning for school vacations, the existing school calendar is no longer applicable because rain is always unpredictable. Generally, our vacation starts from the beginning of July and lasts till the beginning of August. When school reopens, it is approximately the middle of the monsoon season. In light of the difficulties faced by students, the monsoon vacation should be moved to the middle of August. Otherwise, there is no meaning to the term ‘monsoon vacation’.”

A comparison of the number of days that students are not in school, whether due to a scheduled holiday or unscheduled emergency, shows that, since 1991,

Table 10: Comparison of non-school days per year before and after 1991

Period	Summer vacation	Winter vacation	Schools as shelters	Emergency leave due to extreme weather and/or disaster	Total
Before 1991	20	20	2-4	14-19 (hills); 18-26 (Tarai)	56-63 (hills); 60-70 (Tarai)
1991-present	25	25	4-12	27-42 (hills) 22-34 (Tarai)	81-104 (hills); 76-96 (Tarai)

Source: Consultations with teachers and district education offices in 2012
 Note: These are averages. They do not include public holidays for festivals and other occasions.



Organic farming in Palung, Makwanpur

the number of days off has increased by up to 65% in both the hills and the Tarai, though slightly more in the former. While some of that increase is due to lengthier vacation times, much can be attributed to extreme weather and natural disasters and to the use of schools as shelters in the aftermath of such occurrences (Table 10). The number of days off is so great that it threatens to reduce school attendance to below the required 220 days.

c. Improvement of physical infrastructures

Temporary bamboo bridges have been built across streams to make it easier for children to get to school, and roads are often improved after the monsoon season. The children of Kerabari, Morang, and Bhimsthan, Sindhuli, claimed that making such improvements is a recent practice. These bridges and roads, however, are often damaged by flash floods at unexpected times. The risk to children is great as bridges get washed out when they are needed the most—during monsoon. In some places, community-managed boats are operated whenever a bridge is destroyed.

4.3.2 Health and nutrition

The practices that people in the research areas have adopted to improve health and nutrition are summarised below.

a. Healthful practices

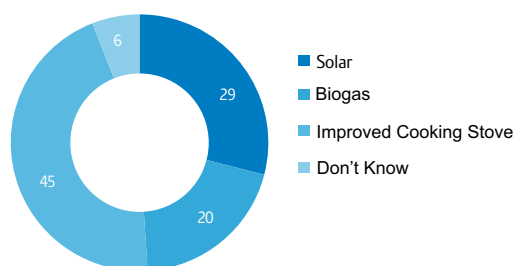
In recent years, local health institutions have initiated awareness campaigns to improve the health of local people. Children are aware of the facilities available and are conscientious about using them. Since the incidence of vector-borne diseases is on the rise, a few local hospitals have distributed black nets

(“kala jhul”), insecticide-treated nets that prevent the outbreak of kala-azar. Health institutions also provide oral rehydration therapy to treat diarrhoea and vaccinate against common childhood diseases such as measles. Locals have also been provided with drinking water filters.

b. Community cleanliness campaigns

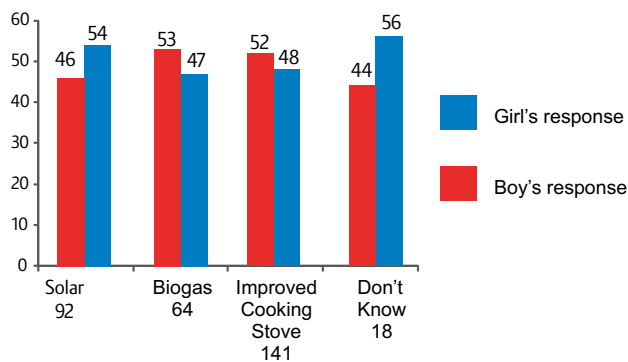
Child and youth clubs have initiated various community cleanliness campaigns. More specifically, the youth clubs of Basantapatti, Rautahat, and Palung, Makwanpur, have started to manage solid waste. Many villages in Plan working districts have declared themselves open defecation-free and neighbouring villages have emulated them. Community- and school-led total sanitation programmes are in place to encourage toilet construction. The children of Palung, Makwanpur, emphasised that door-to-door campaigns are very important in facilitating toilet construction. To create pressure indirectly, they decided not to admit to child clubs those children who do not have toilets in their homes, a harsh measure unfair to children from poor families who cannot afford to build toilets.

Figure 8a: Energy-efficient alternative technologies at the local level



Source: Survey, 2012

Figure 8b: Energy-efficient alternative technologies at the local level



Source: Survey, 2012

4.3.3 Child protection and rights

The following initiatives have been taken to ensure children are protected and their rights upheld.

a. Formation and strengthening of child and youth clubs

Schools and local organisations have formed various child and youth clubs. These clubs educate children about their rights, often by organising a series of consultations, providing counselling, and staging street theatre performances. In the opinion of the children of Holiya, Banke, more children are now aware of their rights. Training and orientation are instrumental in increasing awareness about children's rights to survival, protection, development and participation. If children are made more aware, they will be more likely to convince their parents to take local action to develop good CCA measures that can ensure them of their rights even during climate-induced disasters.

b. Reduction of workload through promotion of energy-efficient alternative technologies

Many community forest users' groups and farmers' organisations in the study villages promote energy efficiency technologies like biogas plants, solar lighting systems, and improved cooking stoves. These initiatives have made children's lives easier because they have reduced the total time they spend collecting firewood by an average of 3-4 hours per day (3-5 hours in the hills and 3-4 hours in the Tarai). About 45%, 29% and 20% of children said that their families used improved cooking stoves, solar lighting systems and biogas plants respectively (Figure 8a). It is interesting to see that even though girls are the main users of energy-efficient alternative technologies, they know less about them than boys do because they are less exposed to and have fewer interactions with the outside world. Apparently, people have not realised how important it is to share information about these technologies with girls (Figure 8b). The use of such

technologies is on the rise at the local level. While the motivation behind their adoption is to reduce the consumption of firewood, the use of these alternatives also reduces carbon emissions.

4.3.4 Food security and livelihood

To ensure that they have enough to eat and that they earn enough to meet their other needs, the people of the study villages have adopted several adaptive strategies, as described below.

a. Kitchen gardening and bagar kheti

Many families farm in their own backyard to increase their supply of fresh vegetables and fruits. The practice of using fewer hazardous pesticides and promoting organic farming through integrated pest management is slowly increasing. People practice bagar kheti (seasonal cultivation along riverbanks) to obtain green leafy vegetables, watermelons, cucumbers,



Woman in her riverbank plot

pumpkins, and gourds. The children of Samanpur, Rautahat, explained that the practice of bagar kheti is very recent as 7-10 years ago the land was planted by Indian merchants. Many locals took up bagar kheti after seeing its benefits. They also feel it uses the slack agricultural season well.



Energy efficient technologies

b. Trials of different varieties of crops to suit local climatic conditions

People have been changing the crop varieties they grow to suit the local climate. Children said that their families now plant paddy varieties that ripen in three rather than five months so that they will at least have some yield even if rainfall is erratic. Families with poor irrigation facilities now plant some of their paddy fields with maize and those whose land is likely to be inundated either for long periods or with a lot of water have switched to flood-resistant species crop. In places irrigated with water from canals or artesian wells, farmers have begun growing vegetables in the winter and paddy in the summer.

Children believe that the production of fruits has gone down, an assertion which flies in the face of the data of national horticulture stations and the fact that rising temperatures support the production of many fruits.

People in Samanpur, Rautahat, started growing maize and wheat after traditional crops like millet, chickpeas and other grams, and sweet potatoes started yielding less. In order to ward off wild animals from their fields, the people of Chisapani, Banke, grow repellent plants like chamomile and turmeric and the people of Holiya grow peppermint. All three of these species are new ones.

A new trend in farming

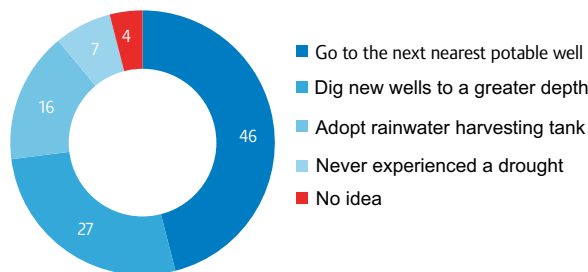
“Mangoes, papayas, and jackfruits don’t grow as abundantly as they used to, so people have switched to pomegranate, lichee, and banana farming. Similarly, people have stopped planting soybeans, millet, sweet potatoes, barley, and gram due to their low productivity. Now people grow maize, sugarcane, yellow lentils, and off-season vegetables. Today maize cultivation is carried out on a massive scale; five years ago, however, it was very limited.”



c. Water management during long droughts

When asked how people manage to get enough water during droughts, 46% of children opined that people go to the next nearest well or water source and 27% that they dig their wells deeper (Figure 9a). Girls are more likely to claim that people dig new wells to a greater depth (69%), while boys said that they go to the next nearest potable wells (55%) and adopt rainwater harvesting (59%) (Figure 9b). Villagers have also improved farmer-managed irrigation systems, introduced rainwater harvesting technologies, conserved watershed areas, and protected water sources.

Figure 9a: Water management during long droughts

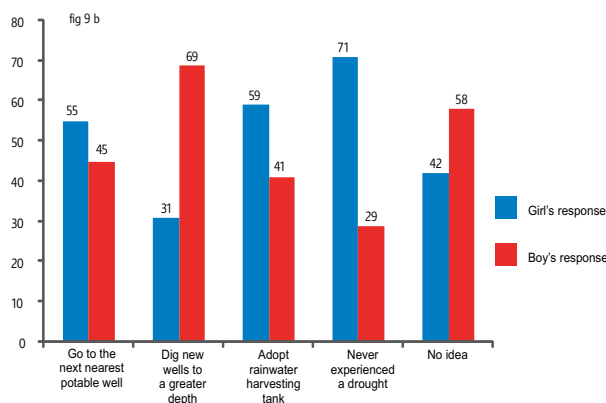


Source: Survey, 2012

d. Plantation programmes

Faced with the loss of forest products, medicinal herbs, and the environmental services provided by forests, people are slowly being drawn towards the concept of community plantation. Committees were recently formed to facilitate plantation programmes and control grazing in erosion-prone areas. The people of Rangpur, Rautahat, seemed particularly serious about promoting community plantation and agro-forestry. Plan Morang Programme Unit has been encouraging people to plant at least two trees in the name of any child whose birth they register.

Figure 9b: Water management during long droughts



Source: Survey, 2012

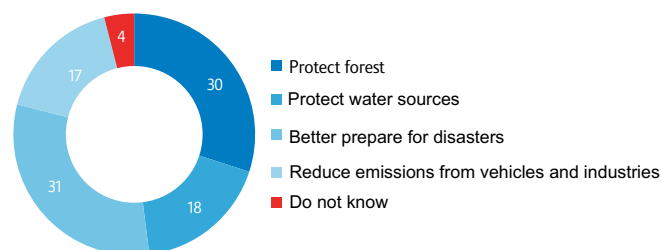
When asked about the actions needed to reduce the impacts of climate change, growing trees and increasing greenery got the highest score, with 34% of children (27% of girls and 41% of boys) recommending it, followed by conserving water (30% overall, 46% of girls and 14% of boys) and using climate-resilient seed varieties (15% overall, 7% of girls and 23% of boys). The data shows that girls favoured the conservation of water for reducing the impacts of climate change, whereas boys argued for plantation and the adoption of climate-resilient crops. These responses demonstrate that children have a clear understanding of protection measures. In their view, addressing disasters through better preparedness (31%) and protection of forests (30%) are the best two strategies to reduce the impact of climate change. Another 18% and 17% respectively identified the protection of water resources and the reduction of the emissions from fuels and industries (Figure 10a).

In terms of measures protecting people from climate change, girls favour the protection of forests (53%) and the reduction of emissions from vehicles and industries (57%), while the preponderance of boys chose to protect water sources (54%). Far more boys (83%) than girls (17%) do not know anything about measures which can protect people against climate change (Figure 10b). Children who live in the hills are more aware of the impacts of climate change than those who live in the Tarai.

Child rights: Analysis of child rights, specifically, the rights to survival, protection, development and participation, can help reorient policies so that they treat children as rights holders and identify the best approaches to safeguarding those rights. Many child rights enshrined in the United Nations Convention on the Rights of the Child, Convention on the Elimination of All Forms of Discrimination against Women, and

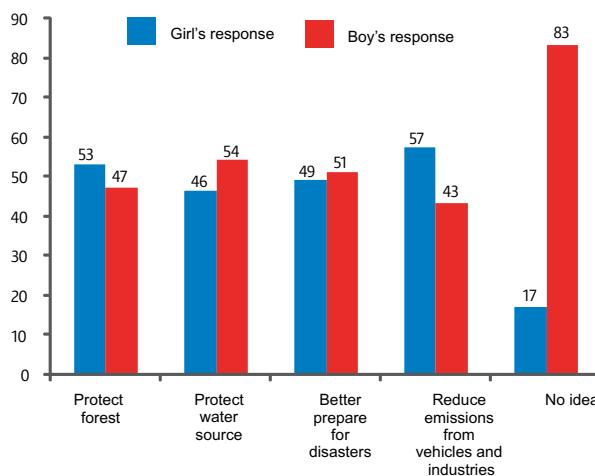
Convention on People with Disabilities as well as other human rights instruments. Some of the child rights seriously impacted by climate change include (i) the right of a child to have his or her best interests be a primary consideration in all actions concerning him or her (Article 3), (ii) the right to live (governments should ensure that children survive and develop healthily) (Article 6), (iii) the right to the enjoyment of the highest attainable standard of health (Article 24), and (iv) the right to education (Article 27).

Figure 10a: Protection of communities from climate change



Source: Survey, 2012

Figure 10b: Protection of communities from climate change



Source: Survey, 2012



Community plantation in the degraded land and in the vicinity of school

Many children from the research districts confirmed that their fundamental rights are violated because of the impacts of climate change. The key issues raised by the children are summarised in Table 11.

Table 11: Impacts of climate change on child rights

Element exposed to climate change	Survival	Protection	Development	Participation
Increase in temperature	<ul style="list-style-type: none"> • Vector-borne diseases • Heat exhaustion and fainting • Scarcity of drinking water 	<ul style="list-style-type: none"> • Aggressive behaviour • Domestic violence • Violence among peer groups • Exposure to risks 	<ul style="list-style-type: none"> • Disruption of education • No extracurricular activities • Poor attendance 	<ul style="list-style-type: none"> • Low mobility • Poor participation in social and cultural activities
Changes in precipitation	<ul style="list-style-type: none"> • Food insecurity • Loss of means of livelihood • Reduction in access to medical services 	<ul style="list-style-type: none"> • Poor attendance • Increased workload • Drowning because of unexpected flash floods 	<ul style="list-style-type: none"> • Changes in plans and programmes • Reduced access to basic facilities • Decrease in outdoor activities 	<ul style="list-style-type: none"> • Obligation to do farm work • Migration as a necessity, not a choice
Extreme weather	<ul style="list-style-type: none"> • Allergies, pneumonia, diarrhoea, dehydration, and dysentery • Vector-borne disease • Skin and eye infections 	<ul style="list-style-type: none"> • Possibility of disease outbreaks • Inadequate love, care and protection from parents 	<ul style="list-style-type: none"> • High dropout rate • Schools used as shelters • Damage of physical infrastructures 	<ul style="list-style-type: none"> • Poor mobility and participation • Migration as a necessity, not a choice
Extreme weather events (disaster)	<ul style="list-style-type: none"> • Food insecurity • Disruption of local enterprises • Compulsion to sale assets and jewellery • Water-borne diseases 	<ul style="list-style-type: none"> • Internal displacement • Chances of injury and death • Child labour • Sexual exploitation • Juvenile delinquency • Early marriage 	<ul style="list-style-type: none"> • Food insecurity • Loss of means of livelihood • Reduction in access to medical services 	<ul style="list-style-type: none"> • Food insecurity • Loss of means of livelihood • Reduction in access to medical services

Source: Focus groups discussion with children in each of the research districts, 2012

Children's needs and capacities: Children's self-identified needs in the context of climate change and their capacities to address the immediate- and long-term consequences of climate changes are summarised below.

- Listening to children's voices: As discussed earlier, children observe things differently than adults do, perceive things from different angles, and identify solutions on their own. If children's issues are listened to carefully, they are capable of producing as many, if not more, innovative ideas as adults are. As stipulated in Article 6 of the United Nations Framework Convention on Climate Change, it is important to ensure that children have access to information and education so that they can contribute to decision-making.
- Forming and institutionalising child forums: To consolidate and amplify children's voices, establishing children's forums would be advantageous. It is through such forums that issues and concerns pertinent to children could be advocated with duty bearers. Forums would help children to meet their needs with the help of relevant stakeholders.
- Organising periodic debates and discussions: Periodic debates and regular discourse on climate change issues, including likely impacts and possible adaptation measures are necessary among children as well as adult and duty bearers. Interactions would help to increase the resilience of children and their families to climate shocks and provide a firm base for child-focused adaptation.
- Building the capacity of children: Training, coaching, facilitation, and study visits would help children build their capacity to understand and address the current issues of climate change. Knowledge management is important for elucidating unclear issues. Capacity-building

initiatives should be based on the understanding that children are change agents not passive victims. Initiatives should be taken to increase access to education through extracurricular activities and formal and informal media and communications. It is equally important to transfer indigenous knowledge to children for use in CCA.

Using their own skills and innovative ideas, children can adapt to environmental changes, thereby enhancing the adaptive capacity of their own families and even of entire communities. However, in many instances, children’s ideas and innovations are not fully acknowledged and the Nepali socio-cultural setting does not favour letting children assume leading roles. It is wise to build the capacity of both children and their guardians by organising training on climate change issues and by supporting children in articulating their needs in policy spaces. Using participatory vulnerability analyses, children are able to identify, explore, analyse and prioritise actions in order to reduce the different forms of their vulnerabilities.

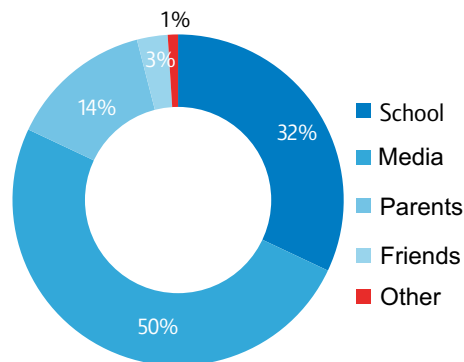
4.4 Adult’s perspectives towards children’s role in climate change adaptation

Children, if given a chance, are capable of playing a critical role in CCA. In fact, the overlooked opinion of a single child could be the one small thing leading to a solution. Providing children with avenues to explore their potentials and take part in development work will help build a society resilient to climate change. Children can play a major role in raising awareness and taking localised action for CCA and environmental protection. Engaging children in participatory vulnerability analysis, basic disaster preparedness drills, and extracurricular activities along with community leaders can be effective in planning and implementing disaster risk reduction and adaptation programmes. However, even though children are effective communicators of risk and drivers of change in their communities, their roles are too often overlooked. About this tendency, many teachers and guardians in the research villages said, “Even though children always come up with alternative solutions to local problems, we teachers and guardians are reluctant to buy their ideas in the fullest sense because of our socio-cultural structure. We fear that if we wholeheartedly support children’s ideas, we may not be respected in the school or community.” To address such attitudinal obstacles, external agencies like non-governmental organisations should work with children as well as parents and community leaders to

improve their understanding of children’s issues and roles in a changing climate.

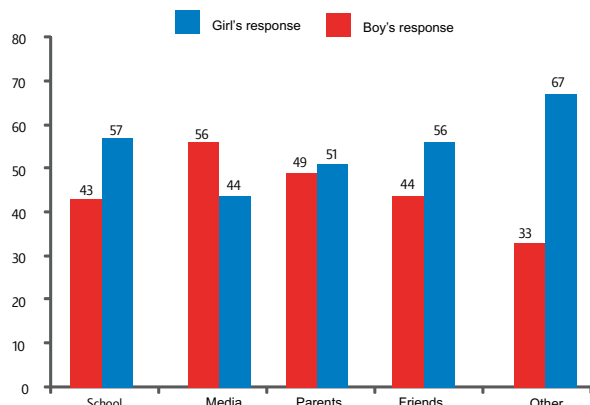
The research team observed that if children are given a good orientation to and coaching in these processes, they can mobilise the media and local governments and influence their decision-making processes so that officials and other adults will protect local environments and enforce climate change adaptation plans and programmes. The chairperson of a community forest users’ group in Sarikhet, Makwanpur, spoke of the persuasiveness of children: “Children can generate ideas and influence others instantly because they are proactive and straightforward. Because of their lack of bias and pure spirit, they can convince others with their logic. As a result of their convincing ideas, we were compelled to allocate some timber for building a school and for making temporary bridges across small streams even though there was no provision in support of such an action.” Learning from the past, children can assess the current situation, prioritise their issues, and design and implement disaster risk reduction and adaptation plans and programmes successfully.

Figure 11a: Sources of knowledge about climate change



Source: Survey, 2012

Figure 11b: Sources of knowledge about climate change



Source: Survey, 2012

4.5 Children’s access to information about climate change adaptation

Children’s access to information related to climate change, whether from the media or formal or informal education or other source, was explored. The array of climate change education resources developed and widely disseminated by different non-governmental organisations is growing vaster. Children acknowledged the role of media in educating them about climate change: about half said that the media was their main source of knowledge (Figure 11a). In girls’ views, school and friends are the main sources of knowledge about climate change whereas boys depend on media. As discussed earlier, girls have poor access to the media because of heavy workloads at home (Figure 11b). While almost one-third (32%) said that their schools were their main source of information about climate change, clearly informal education plays a greater role than does formal education.

programmes. Most children extolled the role of the radio in disseminating information about the issues of climate change to a wider public. The radio also broadcasts local disaster warnings and makes duty bearers responsible for providing immediate relief. Though Nepali television programmes do telecast climate change-related news and programmes, most children prefer Indian television channels because of the variety of entertainment they provide. In fact, only 7% children (3% of girls and 11% of boys) accessed climate change related-information and messages from Nepali television stations. About 6% (4% of girls and 8% of boys) got information from newspapers and 14% (22% of girls and 6% of boys) said that they knew nothing. These data indicate that girls have extremely limited access to climate change-related information and messages from electronic and print media. Albeit slowly, children’s access to print media like newspapers and magazines is growing. However, there is a pressing need to present such information

Table 12: Proposed awareness tools

SN	Proposed tool	No. of responses	Percent	Response/(Percent)	
				Girl	Boy
1	FM radio	55	17	26/ (47)	29/ (53)
2	Participatory video	16	5	10/ (63)	6/ (38)
3	Street theatre	39	12	16/ (41)	23/ (59)
4	Extracurricular	76	24	40/ (53)	36/ (47)
5	Posters and pamphlets	12	4	7/ (58)	5/ (42)
6	Storytelling	5	2	2/ (40)	3/ (60)
7	Training and consultation	18	6	7/ (39)	11/ (61)
8	TV programmes	34	11	14/ (41)	20/ (59)
9	Newspapers	11	3	7/ (64)	4/ (36)
10	Community meetings	49	16	28/ (57)	21/ (43)
Total		315	100	157/ (50)	158/ (50)

Source: Survey, 2012

FM radio programmes designed to increase awareness about the issues of climate change are broadcast, much to the delight of the children of Chisapani, Banke, and Palung, Makwanpur. Radio programmes are particularly effective as they are accessible to people of all walks of life. Climate-change related information is also covered in “bal samachar” (children’s news) programmes through local FM stations.

In terms of children’s access to different media, 73% (53% of girls and 93% of boys) have access to FM radio, most of which broadcast information on climate change and its impacts both in the news and in special

in a way that children find appealing and to ensure its dissemination in local languages.

Children proposed different ways to spread awareness about climate change (Table 12). About 24% of all children (14% of girls and 34% of boys) recommend school-based extracurricular activities, 17% (7% of girls and 27% of boys) the mobilisation of local FM radio stations, and 16% (19% of girls and 13% of boys) community meetings. Both girls and boys favour extracurricular activities and FM radio. Though extracurricular activities have great potential to increase awareness about climate change, many school-based extracurricular programmes overlook this fact.

Table 13: Proposed local-level early warning systems

SN	Proposed early warning system	No. of responses	Percent	Response/(Percent)	
				Girl	Boy
1	Weather broadcasting from FM radio	92	29	43/ (47)	49/ (53)
2	Installation of rain gauges	38	12	22 / (58)	16/ (42)
3	Use of manual sirens	27	9	18 / (67)	9/ (33)
4	Mobilising katuwale (local messengers)	129	41	60/ (47)	69/ (53)
5	Other*	29	9	15 / (52)	14/ (48)
Total		315	100	158/ (50)	157/ (50)

Source: Survey, 2012

*Other statement refers to children's perceptions of climate change that are not directly relevant to the question.

Children's access to early warning messages is limited. Only 6% of all children (5% of girls and 7% of boys) saw, heard, or read weather forecasts or bulletins on FM radio or television stations or in newspapers. The great preponderance, therefore, are unaware when a disaster is likely to strike. When asked how they recommended that early warning messages be delivered, 41% of children (37% of girls and 45% of boys) were in favour of mobilizing katuwale followed by weather broadcasting by FM radio (overall 29%, 23% of girls and 35% of boys). In terms of local-level early warning systems, both girls and boys have similar responses, except about using manual sirens (Table 13). Learning from experience, if children are given enough space in disaster management committees and children's parliaments, both forums where CCA can be addressed, then they can be good communicators of risks.

4.6 Mainstreaming child rights in national climate adaptation policy and practices

This research critically reviewed the existing climate change adaptation policies, particularly with a view toward assessing how they address child rights, as well as children's participation in national-level climate adaptation policy and practices.

Children are effective agents for adaptation and mitigation. However, while many stakeholders say they believe that children can play a role in policy and planning, children rarely participate in practice and children's issues are rarely addressed in policies and planning. The Climate Change Policy approved in March 2011 has clear goals and objectives, but they are generic and, because there is no associated act or regulations, its provisions have not been implemented. Nowhere in the policy are children mentioned and not one child consulted had ever heard of the policy. Even though children are considered change agents

and risk communicators, they are ignored during the formulation of plans and policies. Children must be prioritised in climate change policies in order to secure their rights.

Nepal's experience in child rights-based, child-led and child-sensitive approaches to development could greatly contribute to national responses to climate change. Though Nepal prepared its National Adaptation Plan for Action in September 2010 and a number of local adaptation plan for action were prepared afterward, many stakeholders know nothing about these plans and those that have heard about them are not well-informed. The district-level stakeholders consulted said they had very limited information about the National Adaptation Program of Action—they could not explain exactly what it is or how it works—and knew nothing about local adaptation plans of action. More positively, some networks have been formed at the national and district levels for increasing awareness on climate change agenda and some district development committees have started to allocate some funds for climate change adaptation programmes. While developing the National Adaptation Plan of Action and most of the existing local adaptation plans of actions, children were rarely consulted and their issues were not taken into consideration. In fact, these plans could be labelled 'child-blind'.

The government of Nepal has started some initiatives for climate change-based plans and programmes. Clean Energy Development Bank and Winrock International have been providing technical advice about renewable energy technologies since 2006; USAID-Nepal contributed to an environment and energy programme specialising in small and medium-sized hydropower plants; World Wildlife Fund carried out an impact study of the Himalayan glaciers of Nepal, India and

¹ Local messengers recruited by communities under certain terms and conditions.

Box 3: National climate change initiatives

- Developed and submitted the first initial national communication report to United Nations Framework Convention on Climate Change in 2004
- Established designated national authority to execute Clean Development Mechanism projects
- Developed National Climate Change Policy for Nepal
- Developed National Adaptation Programme of Action
- Formed networks such as Climate Change Network and Climate Change Network Nepal
- Established Climate Change Council in July 2009
- Initiated capacity-building activities through Asian Pacific Network and Department of Hydrology and Meteorology
- Formed mountainous countries alliance and started initiatives 2010
- National Planning Commission initiated the climate resilience planning process
- Research and development on climate change initiated within MOE in collaboration with universities 2010

China; and the Ministry of Environment prepared a national strategy regarding the clean development mechanism and supports the promotion of renewable energy, energy efficiency, and greenhouse gas abatement. These projects, however, leave much to be desired when it comes to addressing children's issues and concerns.

In terms of policy-level debate and discourse at the district and national levels, children's participation is very low. Currently, children's views, rights and capacities are totally overlooked in policies, plans, and programmes. In order to address their issues and shape policies and programme frameworks in favour of children, dialogue between duty bearers and children is needed.

It is good to see that the Women, Children and Social Welfare Ministry addresses the issues of children and gets a sizable budget (3.38% of the total budget in 2010); however, stakeholders need to participate in orientations to and facilitations of child rights analysis through a climate-change lens before they will be truly capable of addressing children's issues in national adaptation policies and planning. The National Adaptation Plan of Action and existing local adaptation plans of action need to be modified so that they incorporate the issues of children and an act and regulations to implement Nepal's Climate Change Policy need to be developed.

Nepal has slowly started to address climate change issues in the policy arena. Its Eighth Plan incorporates alternative energy promotion, while the Ninth Plan emphasises environment policy. The recent Interim Plan (2011-13) focuses on the promotion of clean development mechanism projects, alternative energy systems in rural communities, and Euro1-standard vehicles. It also suggests that two-stroke vehicles be banned. These are only a few initiatives among many.

Children should be more involved in different forums and they should attend international events such as meetings held under the United Framework Convention on Climate Change. Their influence can also be increased through greater media engagement. If children feel that their voices are being heard, they will be motivated to share their learning with friends and family members and to get involved in actions too. To inspire children will require providing for their continuous involvement in initial and follow-up actions rather than their participation in one-off, stand-alone events. They should participate in a number of different training sessions and orientation for communities as well as in district- and national-level advocacy activities. To start with, children can pressure education stakeholders to mainstream DRR and CCA education in school and college curricula.

5. Conclusion

The findings of this research confirm that climate change may put children at considerable risk of violence, abuse, and multiple forms of poverty, particularly through displacement, migration, and the erosion of assets and livelihood alternatives. The general increase in temperature and changes in precipitation patterns have resulted in a decline in the discharge of rivers, which, in turn, has made managing irrigation and drinking water during the winter difficult, lowered groundwater tables, and increased outbreaks of pests and diseases among crops and livestock.

While it is true that climate change does impact children differently depending on their social status, gender, settlement (rural or urban), schooling status (school-going or out-of-school), this research can still serve as a foundation for the adoption of forward-looking plans and promote the practice of listening to children. When there is enough data, it is easy to explore the needs and potentials of children and to address their issues in plans and policies. Children have much potential and many ideas; thus, their ideas, issues and concerns are of particular importance if adaptation approaches are to work.

Children from different socio-cultural settings will have different perceptions of risk, so risk-reduction actions need to be analysed through a CCA lens. Adaptation plans should be formulated following the prioritised needs and aspirations of children and consider ways to mitigate the impact of climate change on children's future livelihoods options. As not all children are equally vocal or articulate, there is a need for a special effort to make sure that those who are reserved also be included and their issues and concerns addressed.

This study revealed that children should be mobilised to carry out simple initiatives (small is beautiful), starting with what they can do well and have an interest in doing. Involving them in a series of climate change-based activities like thematic drawing, singing, dancing and drama will provide invaluable insights into their minds. Diary writing and mobility

mapping also support children in identifying the climate changes they have observed over time. Enabling children to participate in small adaptation or risk reduction activities carried out through youth clubs or as part of extra-curricular school activities will increase children's understanding by letting them test and practice solutions themselves. Such exercises will open up many avenues for them to enjoy themselves, express their ideas, exercise their imaginations, and interpret their natural and manmade surroundings on their own terms and drawing on their own ideas.



Children and youth performing street drama

Children clearly articulate the causes and consequences of climate change, but, in many instances, it is difficult for them to correlate those consequences with climate science. In addition, it is difficult to clearly demarcate those consequences which result from climate change and those associated with socio-economic and natural phenomena. However, it is essential to recognise that child-centred CCA can provide a holistic approach to addressing various climate change-induced problems associated with children's health, education, protection and overall development. More empirical research and education and awareness programmes for children on the linkages between sustainable development, climate change and disaster are needed.

6. Recommendations

Based on a thorough analysis with a view toward upholding children’s rights in the context of climate change, the study team offers the following recommendations for reducing the likely impacts of climate change. They are broadly categorised into those for the government and those for non-governmental organisations.

6.1 Recommendations for non-governmental organisations

- For DRR and CCA programmes to be effective, children, along with community leaders, should be mobilised to take part in participatory vulnerability analysis, basic disaster preparedness drills, and extracurricular activities. Non-governmental organisations should work with children as well as parents and community leaders to improve their understanding of children’s issues and roles in a changing climate.
- Climate change-related advocacy and campaigns should be organised for school teachers and students and for community forestry and water user groups. The documentation of knowledge about the impact of climate change and community-based adaptation practices should also be emphasised.
- Considering the role of radio in disseminating information about the issues of climate change to a wider public, radio programmes on local disaster warnings should be developed and broadcast to make duty bearers responsible for DRR and CCA and to increase awareness among children.
- Children should be mobilised to carry out simple initiatives, starting with what they can do well and have an interest in doing. They should be involved in a series of climate change-based extracurricular activities like thematic drawing, singing, dancing and drama. Local-level adaptation plans should be formulated following the prioritised needs and aspirations of children in order to mitigate the impact of climate change on their future livelihood options and their overall lives and wellbeing.
- Different trainings should be provided to improve the life saving skills (swimming, tree climbing) of children, separating boys and girls and the differently-abled according to their specialised needs.
- Climate change is set to have different impacts on girls and boys, both directly and indirectly. Thus, plans and programme should be designed keeping gender and age in mind. The capacity of

non-governmental organisations and government actors to implement gender- and age-responsive climate change policies and programmes should be improved.

- Initiatives like making a video documentary of community adaptation practices should be undertaken in order to create safe and resilient communities in which children and young people contribute to managing and reducing the risks associated with changes in the climate.
- Children and their communities should work



together with local governments to design small but effective interventions under local adaptation plans of action and village development committee grants which take into account present and future scenarios and which integrating climate risks and adaptation into development plans and activities.

- Local non-governmental organisations should collaborate with national and international organisations to facilitate children’s participation in climate change conferences that address children’s issues.
- Rainwater harvesting systems should be installed to store water for use in the dry season so that the time and energy children spend fetching water are reduced. Local communities should be mobilised to protect watersheds in order to conserve water resources. Vegetative cover should be increased across entire catchment areas.
- Additional skills should be taught and off-farm income-generating schemes should be initiated at the local level to increase family income and to encourage families to continue to educate their children, especially girls.

- Improved cooking stoves and bio-briquettes should be promoted at a large scale to reduce the time children spend collecting firewood. Renewable energy technologies like biogas and solar energy should be installed to reduce pressure on forest resources and to lighten kitchen-based workloads.
- Agro-forestry should be scaled up on private land to meet the demand for firewood, fodder, and litter and to reduce the time children spend fetching these products. Campaigns should to promote community forests and to plant fast-growing trees like bamboo that have enough soil-holding capacity to prevent soil erosion should be organised.
- Non-governmental organisations should encourage the installation of hydro-meteorological stations at schools to make children aware about meteorological phenomena like temperature, wind, and rainfall as well as tools like thermometers, barometers, and rain gauges. The data should be used during consultations about climate change.
- To make crossing rivers easier and to obviate the need for children to travel long distances to reach school, community-managed boats should be provisioned in strategic areas. Ditches, canals and culverts should be constructed in strategic locations to improve drainage.
- Considering the negative health impacts of synthetic fertilisers and pesticides, people should be encouraged to apply green manure and bio-pesticides and to control disease, insects and pests through integrated pest management.
- Group farming of cash crops like sugarcane, sweet potatoes, taro, groundnuts, watermelons, and yams should be promoted along riverbanks by reclaiming degraded land. As rainfall is unpredictable, farmers should be encouraged to adopt drought-, windstorm-, and flood-resistant new crops in coordination with the Nepal Agriculture Research Council. If they exploit these new species they will be able to grow more and thereby ensure a securer livelihood for themselves and their children.
- School buildings should be constructed in safe places following the conduction of a multi-hazard risk assessment. To reduce the impact of tin roofs (excessive heat in summer and excessive noise during rainstorms), galvanised tin should be replaced with other materials. Glass windows should be provisioned to prevent the entry of rain during the monsoon and the cold in the winter. The Ministry of Education should draft a policy regarding when schools convene during extreme weather conditions and when the monsoon vacation is scheduled in order to reduce the likelihood of accidents during climate- and water-induced disasters.
- The existing curriculum should be modified so that it is solution-centric rather than problem-centric. Textbooks should present the causes and consequences of climate change but focus more on adaptation and mitigation strategies. Curricula on DRM and CCA should be developed in local dialects and in terms tailored to the specific needs of girls and boys of different groups, including the disabled, ethnic minorities, adolescents, and very young children.
- Since irrigation is the backbone of farm productivity, irrigation facilities should be improved through the installation of treadle pumps and artesian boring and the multiple use of water should be promoted. Traditional irrigation systems should be restored to curtail the time children spend irrigating fields and to increase farm productivity.
- For community-based adaptation to climate change, social protection and resilient livelihoods are key. Social protection can have a crucial impact on the survival of children whose families struggle to provide food and healthcare as well as to pay school fees and invest in livelihoods assets. The government should prepare a social protection policy to strengthen climate resilience of the communities that are now vulnerable.

6.2 Recommendations for the government

- To address the issues of children and to shape policies and programme frameworks in favour of children, dialogue between duty bearers and children should be periodically arranged. The government should take a lead role in mobilising the relevant stakeholders for policy-level debate and discourse which places children's issues in the front. If children feel that their voices are being heard, they will be motivated to share their learning with friends and family members and get involved in action, too.
- The government should facilitate the revision of the National Adaptation Plan of Action so that it addresses children's issues and concerns, formulate appropriate plans and programmes taking account of the impacts of climate change on girls and boys, and allocate adequate funding to translate those plans and programmes into on-the-ground action that directly addressing their needs.
- Government representatives who participate in national and international climate change conferences should raise the issues of children and try to incorporate measures to address their issues in national and international policies.

References

- Ando, M. (1998). Risk assessment of global warming on human health. *Global Environmental Research*, 2, 69-78.
- APN. (2007). Enhancement of national capacities in the application of simulation models for the assessment of climate change and its impacts on water resources and food, and agricultural production.
- Back, E. & Cameron, C. (2008). Our climate, our children, our responsibility: The implications of climate change for the world's children. United Nations Children's Fund United Kingdom.
- Baidya, S.K., Shrestha, M.L. Sheikh, M.M. (2008). Trends in daily climatic extremes of temperature and precipitation in Nepal. *Journal of Hydrology and Meteorology*, 5(1).
- Bartlett, S. (2008). Climate change and urban children: Impacts and implications in low- and middle-income countries (Human Settlements Discussion Paper Series: Vol. 2). London, U.K.: International Institute of Environment and Development.
- Bohle, H. G., Downing, T. E., & Watts, M. J. (1994). Climate change and social vulnerability: Toward a sociology and geography of food insecurity. *Global Environmental Change*, 4, 37-48.
- Brody, A., Demetriades, J., & Esplen, E. (2008). Gender and climate change: Mapping the linkages: A scoping study on knowledge and gaps. Brighton, U.K.: University of Sussex.
- Bouchama, A., Parhar, R.S. El-Yazigi, A., Sheth, K., Al-Sedairy, A. (1991). Endotoxemia and release of tumor necrosis factor and interleukin 1 alpha in acute heatstroke. *Journal of Applied Physiology* 70(6): 2640-2644
- Chattopadhyay, P., Som, B., & Mukhopadhyay, P. (1995). Air pollution and health hazards in human subjects: Physiological and self-report indices. *Journal of Environmental Psychology*, 15, 327-331.
- Chase, T.N., Pielke, R.A. Sr., Kittel, T.G.F., Nemani, R.R., & Running, S.W. (1999). Simulated impacts of historical land cover changes on global climate in northern winter. *Climate Dynamics*, 16, 93-105.
- Department of Hydrology and Meteorology, Government of Nepal, Ministry of Environment, Science and Technology. (2008). Stream flow summary. Kathmandu, Nepal: Author.
- Epstein, Y., Sohar, E., Shapiro, Y. (1995) Exceptional heatstroke: A preventable condition. *Israel Journal of Medical Science*, 31, 454-462.
- Gautam, D. (2010). Child-led disaster risk reduction and climate change adaptation [Toolkit developed by Save the Children Nepal for field practitioners].
- Gautam, D., & Dhakal, S. (2008). Study of Community Based Flood Disaster Management, Banke. Nepal Development Research Institute.
- Gautam, D., Kathayat, R. & Yadav, R. (2008). Impact of climate change on students, schools and neighbourhoods: A sociological study from Matehiya and Bageshwori VDCs of Banke, Mid-Western Nepal. Kathmandu, Nepal: ActionAid Nepal.
- Gautam, D., & Oswald, K. (2008). Child voices: Children of Nepal speak out on climate change adaptation [Report]. Brighton, U.K.: Institute of Development Studies.
- Gautam, D., Gautam, K., & Poudel, D. (2007). Climate change impacts and adaptation strategies by poor and excluded communities in western Nepal: A comprehensive study of Banganga River Basin, Nepal. Kathmandu, Nepal: ActionAid Nepal & National Disaster Risk Reduction Centre Nepal.
- Goswami, B.N., Venugopal, V., Sengupta, D., Madhusoodanan, M.S., Xavier, P.K. (2006) Increasing trend of extreme rain events over India in a warming environment. *Science*, 314, 1442-1444.
- Government of Nepal, National Planning Commission, Central Bureau of Statistics. (2004). *Statistical pocket book*. Kathmandu, Nepal:
- International Centre for Integrated Mountain Development. (2007). The melting Himalayas: Regional challenges and local impacts of climate change on mountain ecosystems and livelihoods.

- International Panel on Climate Change. (2007). Climate change 2007: Climate change impacts, adaptation and vulnerability: Summary for policy makers (4th assessment report of the Working Group II of the Intergovernmental Panel on Climate Change).
- International Panel on Climate Change. (2007) Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change: Impacts, adaptation and vulnerability: Summary for policymakers. Available at www.ipcc.ch/ipccreports/ar4-wg2.htm
- Manandhar, K. B. (2006). The fog episode in southern Tarai plains of Nepal: Some observations and concepts. *Journal of Hydrology and Meteorology*, 3(1).
- McMichael, A., Githeko, A., Akhtar, R., Carcavallo, R., Gubler, D., Haines, A.,... Sasaki, A. (2001). Human health. In McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J., & White, K.S. (Eds.) *Climate change 2001: Impacts, adaptation, and vulnerability* (pp. 451-485). Cambridge, United Kingdom: Cambridge University Press.
- Martens, P., Kovats, R.S., Nijhof, S., de Vries, P.; Livermore, M.T.J., Bradley, D.J., Cox, J; McMichael, A.J. (1999) Climate change and future populations at risk of malaria. *Global Environmental Change*, 9, S89-S107.
- McMichael, A., Githeko, A., Akhtar, R., Carcavallo, R., Gubler, D., Haines, A.,... Sasaki, A. (2001). Human health. In McCarthy, J.J., Canziani, O.F., Leary, N.A., Dokken, D.J., & White, K.S. (Eds.) *Climate change 2001: Impacts, adaptation, and vulnerability* (pp. 451-485). Cambridge, U.K.: Cambridge University Press.
- Morrissey, S. A. & J. P. Reser. (2007). Natural disasters, climate change and mental health considerations for rural Australia. *Australian Journal of Rural Health*, 15(2), 120-125.
- Nyumbu, S. & Poulsen, B. (2009). The global crisis and rising child labour in Zambia's mining communities: Are we facing a downward decent work spiral? Retrieved from http://www.ilo.org/public/english/support/lib/financialcrisis/download/story26_childlabourzambia.pdf
- Parry, M. C., Rosenzweig, A., Iglesias, G., Fisher, & Livermore, M. (1999). Climate change and world food security: A new assessment. *Global Environmental Change*, 9: S51–S67.
- Patz, J. & Martens, W.J.M. (1996). Climate impacts on vector-borne disease transmission: Global and site-specific. *Journal of Epidemiology*, 6: S145-S148.
- Patz, J.A.; Cambell-Lendrum, D., Holloway, T., Foley, J.A. (2005). Impact of regional climate on human health. *Nature*, 438, 310-317.
- Piver, W.T., Ando, M., Ye, F., Portier, C.T. (1999) Temperature and air pollution as risk factors for heat stroke in Tokyo, July-August, 1980-1995. *Environmental Health Perspective*, 107(11), 911-916.
- Society of Hydrologists and Meteorologists of Nepal. (2009). Temporal and spatial variability of climate change over Nepal. Kathmandu, Nepal: Practical Action Nepal.
- Ramesh, K. V., Goswami, P. (2007) Reduction in temporal and spatial extent of the Indian summer monsoon. *Geophysics Research Letters*, 34 (23): L23704.
- Reiter, P. (1998). Global warming and vector-borne disease in temperate regions and at high altitude. *Lancet*, 351: 839-840.
- Tong, S.L. & Ying, L.V. (2000). Global climate change and epidemic disease. *Journal of Disease Control*, 4(1), 17-19.
- Shrestha, A.B., Wake, C.P., Dibb, J.E., & Mayewski, P.A. (2000). Precipitation fluctuation in the Nepal Himalaya and its vicinity and relationship with some large scale climatological parameters. *International Journal of Climatology*, 20, 317-327.
- Shrestha, A.B., Wake, C.P., Mayewski, P.A., & Dibb, J.E. (1999). Maximum temperature trends in the Himalaya and its vicinity: An analysis based on temperature records from Nepal for the period 1971-94. *Journal of Climate*, 12, 2775-2787.
- United Nations Children's Fund & Plan Nepal (2010). The benefits of a child-centred approach to climate change adaptation.
- United Nations International Strategy for Disaster Reduction & United Nations Children's Fund. (2010). Assessing world-wide progress on school safety: A scoping study. Geneva, Switzerland: United Nations Children's Fund
- Watterston, T. & Lenton, S. (1997). Sustainable development, human induced global climate change, and the health of children. *British Medical Journal*, 87, 95-97.

Annex-1: Research design

Children and Climate Change Research and Programme Development Project on Impact of Climate Change on Children in South Asia, Plan Nepal, Nepal Country Office

1. THE CONTEXT

Nepal is experiencing high climate variability in terms of climate change compared to the global average. As different scenarios and predictions reveal, situation is likely to worsen in future by aggravated consequence due to the increased impacts of climate change combined with natural and socioeconomic driving factors. Precipitation is likely to vary in intensity, seasonality and duration so likely to experience more erratic pattern of precipitation and rise in temperature affecting natural resources, agriculture and livelihoods in the region. Already there are unusual rainfall patterns leading to floods and drought situations. Without concerted action, millions of boys and girls will be at increased risk from infectious disease, malnutrition, water scarcity, disasters, and the collapse of public services and infrastructure.

Nepal is among the most vulnerable countries to climate change globally primarily because of high exposure, high sensitivity and poor adaptive capacity. Plan Nepal also believes boys and girls are the most vulnerable to climate change consequences. Plan Nepal adopted child-centred DRM measures designed for child protection and their education during disaster and protect means of livelihood and the assets of their families and communities from the possible adverse impacts of hazards before disasters strike. It is therefore Plan works with the communities to reduce vulnerability to disasters and increase the resilience of men/women and boys/girls in the face of disasters through child centred climate smart disaster risk management incorporating CCA and DRM practices into all of its other ongoing and upcoming programmes.

The climate sensitive agrarian economies of all the countries in the region including Nepal clubbed with vulnerabilities associated with poverty, malnutrition,

illiteracy and social inequities are aggravating the risks from stress on water, agriculture, and environment and creating recipes of more disasters. Meanwhile, high rates of urbanization in the region bring new risks associated both with exposure to hazards associated with climate change, such as flooding, and new dynamics of vulnerability. Boys and girls in cities are particularly vulnerable as in rural areas. Considering above context, Plan Nepal wishes to carry out a research with the following objectives:

- To assess the perception of girls/boys and key stakeholders on impact of climate in children's lives specifically in relation to its impact on access to education, health, nutrition and protection in Nepal,
- To use IPCC International Panel on Climate Change findings and assess and explain the impact of climate change on girls/boys in Nepal,
- To capture both positive and negative coping mechanisms that households are undertaking to cope and adapt to the changing climate and the implication of these on child rights (to health, education, protection, etc),
- To assess the level and quality of information about CCA amongst girls/boys, and document their access to information on DRM/CCA – e.g.: where they are getting the information from (school, media, peer groups, children clubs, ICTs, other),
- To identify good practices while working with girls/boys on implementing child centred CCA that can be replicated elsewhere,
- To make specific recommendations under each 'thematic area' clearly identifying relevant audience, and

- To develop programme framework to inform Plan's work on climate change in Nepal and the region.

In light of above context and the research objectives, this research will seek to answer the following key questions:

- What are the perceptions of girls/boys and key stakeholders about the effect climate change on children's lives specifically access to education, health, nutrition and protection?
- What are the positive and negative coping and adaptation mechanisms that households are undertaking to slim down the impact of climate change on child rights (health, education, protection, etc)?
- Do girls/boys have access to information about DRM/CCA – e.g. where are they getting information from (school, media, peer groups, children clubs, ICTs, other)?
- What are the good practices while working with children on implementing child centred CCA that can be replicated?

The research will attempt to answer above questions by using girls/boys friendly participatory tools and techniques (refer section 3)

2. RESEARCH DESIGN

Research design is a plan of proposed work, a planned sequence of the processes involved in carrying out a research. It provides guidelines to researchers for finding the answers to research questions. The overarching or central 'units of analysis' are girls/boys from different age groups (infants and adolescents). The secondary units are the parents and other duty bearers (teachers, local government, community and religious leaders, etc) of the research communities.

The design of this research is based on a 'qualitative and interpretative approach', because 'thick or deep description' of the phenomenon under research can provide insight on the impacts of climate change on girls/boys.

Hypothesis is a formally stated guess as to the outcome of the experiment, which data collected during the course of the experiment can be used to

support or reject. Hypothesis testing is the basis for the statistical analysis of an experiment. There are two types of hypothesis: null and alternative. Null Hypothesis, H_0 – states that there are no real cause-and-effect relationships in the experiment, i.e.

$$H_0: \mu_1 = \mu_2$$

Alternative Hypothesis, H_1 – states the alternative is that the Null Hypothesis is rejected, that a cause-and-effect relationship may exist, i.e. $H_1: \mu_1 < \mu_2$ or $H_1: \mu_1 > \mu_2$

The general hypothesis of the research is disasters have an impact on children's rights to survival, development, protection and participation. Girls are disproportionately affected. Children once granted the skills, knowledge and resources can effectively contribute to community resilience and CCA. CCA and DRM policies do not adequately address the rights of girls and boys (neither at national or local level)

3. DATA SOURCES: TOOLS AND TECHNIQUES FOR DATA COLLECTION

Based on the ToR, this research will use mix of both qualitative and quantitative methods. Qualitative information would be collected from literature review; key informant interviews (KIIs), focus group discussions (FGDs), and case studies whereas quantitative information would be acquired from questionnaire survey

The research will be guided by the following process steps so that objectives of the research are met and findings can be more logical and systematic:

QUALITATIVE INFORMATION

STEP 1: Literature review

Key areas focused during literature review:

- Review of CCA and DRM policies and how these address child rights to survival, protection, development and participation (identifying gaps and specific interventions)
- Review of research findings from Plan International and Oxfam climate change works
- Review of national and local policies and identify the gaps to protect child rights from disaster risks
- Review of children and climate change (review of

CRC reporting, HFA reporting. UNFCCC, National Adaptation Plan of Action, WB, EC and DFID country documents, etc)

- Assemble appropriate literature with all the latest research on children and climate change induced disasters

STEP 2: National level consultation

National level consultation will be made with relevant institutions as specified in the box 1. In the initial stage, one to one interview will be taken with these institutions while national level workshop will be organized at the later stage to share the key findings of the research.

Issues for discussion:

- Presence of girls/boys and climate change related program and priority specified within the program framework
- Key programs intervention and activities to lessen the impacts of climate change on girls/boys
- Key progress achieved in this area

- Major findings of the research on children in climate change (gender, urban vs. rural, school going vs. out-of-school children)
- Stakeholders' perceptions on problems, challenges, constraints faced by girls/boys as a result of changing climatic hazards
- Level of girls/boys participation, internalization of the issues, program innovation, etc
- Perception of stakeholders about child rights on the impact climate change particularly access to education, health and nutrition, protection, economic development/food security (how the things are changing, what are the problems/constraints, how they cope or adapt, etc.)
- Key gaps: program interventions, policy and practices

STEP 3: Design product framework

NDRC Nepal has proposed the product framework (end product of this research) based on ToR.

Box 1: Institutions to be consulted:

- Government agencies: Ministry of Women, Children and Social Welfare, Ministry of Environment Science and Technology, Tribhuvan University, Institute of Engineering - Green School Project, Ministry of Education., Ministry of Health and Populations, etc
- Regional Agencies: SAARC, ICIMOD
- UN agencies: UNICEF, IUCN, UNEP
- International agencies: WWF, World Vision, Save the Children, Practical Action, Oxfam GB, Mercy Corps, CARE and ActionAid
- Local NGO: CWIN, LUMANTI, NSET
- Networks: Child Rights networks Climate Change and Energy)/Clean Energy Nepal (CEN), Climate Change Network Nepal (CCNN), Nepalese Youth For Climate Action (NYCA), Clean Air Network Nepal (CANN), Climate Change Adaptation Network South Asia (CANSAs)

STEP 4: PU level meeting with Senior Plan officials (6 meetings, one in each PU)

In the presence of PU level senior staff, PU wise meeting will be held before carrying out the intensive fieldwork. It will help to internalise the research issues and own the research work. Steps to be adopted during PU level meeting are as follows:

- Share general scenario, trends of climate change, and its impacts on girls/boys at the Global, South Asia and Nepal's context
- Educate the rationale of this research in the Plan Nepal's context (this research is in alignment with Plan Nepal Country Strategy Programme in general and PU Long Term Plan in particular)
- Share the key findings achieved from the literature review
- Select 18 Village Development Committees, from each of the PU (based on the occurrence of different hazards, caste and ethnic setting, geographical settings, well-being status, etc)
- Lead the discussion on the issues as specified in the box-2

Box 2: Issues for PU level meeting

- Issues of girl/boy in education, health and nutrition, protection, economic development/ food security in general and climate change in particular
- Impact of climate change on child rights
- Local coping and adaptation practices to reduce the impact of climate change on girl/ boy
- Good practices while working with girl/boy on implementing child centred CCA
- Advocacy strategy and programme framework to be foreseen for children and climate change

STEP 5: VDC level consultation meeting (18 meetings, one in each VDC)

A total of 18 meetings will be carried out at the VDC level. VDC Secretary, social elites, women groups, youth groups, community forest and irrigation/ drinking water committees, alternative energy promotion committee, and people with disability (PwD) will participate in VDC level meeting. Key issues during such meeting are given below:

- Share the rationale of research and its role in VDC level plan and programme
- Impacts of climate change on girl/boy, women, and PwD
- Cause and effects of climate change
- Use of community based coping and adaptation practices to slim down the adverse effects
- Girls/boy's role on climate change adaptation

STEP 6: Use of participatory tools and techniques

a. Key informant interviews

These interviews would be carried out to capture the perceptions and beliefs and likely impacts of climate change on girl/boy.

- **Basis of key informant's selection:** Specific knowledge on research variables, willingness to cooperate, have thorough understanding of climate change issues and their impacts on girl/ boy. VDC level consultation meeting will choose key informants at local level
- **Key informants at local and national level:** Parents, school teachers, VDC secretary, community and religions leaders, women groups, child and youth groups; users groups (community forestry, irrigation, drinking water, small farmers, livestock, dairy cooperatives), journalists; staff of non-governmental organizations and government officials, public and private sector (at local level), and UNICEF, Save the Children, Institutions in Education Clusters, MoE, MoHP, Ministry of Women and Children (at national level).

- **Number of key informants at each PU:** Nine key informant (women/men-4, and VDC level stakeholder-5) would be the key informants (gender balance will be maintained during key informants selection)
- **Process of KII:** Following guide questions will be used during interview. Interesting and relevant views expressed during interviews will be presented as ‘quotations’.

Guide questions/checklist for key informant interview

- Perceived cause and effects of climate change
- Perceived impact of climate change on girl/boy; any difference in Impact of girls and boys
- Community based coping and adaptation practices to slim down the impact
- Adult’s perspectives towards children’s role in climate change adaptation
- Status of child rights, needs and capacity of girl/ boy in a changing climatic conditions
- Girl/boy involvement in climate change debates and discourse
- Perception of mainstreaming child rights in national climate adaptation policy and practices

b. Focus group discussion (18 FGDs, 3 FGDs from each PU)

FGDs will be carried out to accumulate the the perceptions and beliefs and likely impacts of climate change on girls/boys. It helps to crosscheck the information provided by different sources.

- **Basis of child clubs selection:** The local Plan Nepal staff would select the child/youth clubs in consultation with VDC level stakeholders. Out-of-

school-children and children with disability would also be included in each FGD.

- **Number of girls/boys in each FGD:** 6-8 girls/boys. Out of three FGDs, one with girls, another with boys while third would accommodate both girls and boys to capture their feeling, perceptions, and experiences.
 - o **Age:** Between 12 to 16 years, randomly selected
 - o **Caste/ethnic settings:** Girls/boys from different ethnic/caste groups
 - o **Rural/urban setting:** To capture the different experiences and perceptions, child clubs from extreme rural and semi-urban areas would be selected
- **Process of FGD:** Following guide questions/ checklist will be used during interview. Female facilitator will facilitate FGD with girls as some of their issues are sensitive. To prepare girl/boy for interview, few additional activities will be carried out (see box-3). Interesting and relevant views expressed during interviews will be presented as ‘quotations’. Both verbatim quotes and blind voting (see in box 3) would be used to make interview fun.
- In addition to these. we will
 - o Ensure girls feel safe (no female/male adults listening)
 - o Begin with an ice breaker
 - o Ensure consent is obtained to make use of quotes/ photos taken (from parents if under 18)
 - o Share the purpose of the research and relation to Plan’s work
 - o Not pressure them if they do not wish to disclose sensitive information

Box-3: Blind Voting Process

Blind voting will be used to capture quantitative data. It provides individual girl/boy an opportunity to share their views in privacy, and to triangulate the messaging shared by girls/boys through the FGDs. This method include the pocket chart methodology where girls/boys are given stones or sticks and asked to select their answers by putting the stone/stick into a particular pocket. These pockets are placed in an easily accessible area which provides privacy. One by one, girls/boys are requested to mark their answers and the facilitator will document the tallied up responses by sex.

Box 4: Additional tools and techniques will be employed during FGDs with child groups for listening to younger voices

- Show climate change impacts on children related video for setting the environment
- Role play among children on how different impacts could be (what was the situation for girls/boys 'before' 'during' and 'after' climate induced disaster)
- Drawing in the card board paper to show the past context, current situation and potential future situation of their village and children in relation to disaster and climate change, positive and negative consequences of disaster and climate change
- Mobilization of children to produce poems, songs and cartoon on climate change
- Depiction of girls task analysis (in daily basis): in last 5-7 years vs. now, changes in children's task at home and at community
- Vox pop: short interview/reflection of each of the key informant

Things to ponder during FGD

- To ensure children's active engagement in FGDs, different types of engagement tools will be used for making the most of children's input. Drawings, role play, games, flash cards could be some of the tools.
- Every effort will be made to conduct gender disaggregated (separate boys and girls) FGDs. This will ensure that girls' and boys' views are heard equally, and that both girls and boys have the confidence to give their opinions and ideas in full. Where mixed FGDs are necessary the ratio of boys to girls should be as even as possible and each group will be supported and encouraged to say what they truly think, and given sufficient chance to speak and be heard.
- Apart from the separate FGDs, FGD in mixed group must take place. It is crucial that girls' and boys' views and voices are heard to the same extent. This is especially important in cases where there are less girls in the mixed groups than boys, or where boys are less outspoken than girls/ or engaged in at risk behaviour.
- Greater focus will be given on inclusion of marginalised children (out of school, disabled, from different ethnic groups, deprived, etc) will ensure that their views and voices are included.
- While carrying out FGDs, following issues would be taken into consideration:
 - o Children's participation requires sufficient time, funding and planning if it is to be meaningful and good quality
 - o 'Child friendly' information is essential in order to give children the same access to information as adults
 - o The selection of children needs to be sensitive to issues of representation and inclusion, in order to both maximise the experience/views brought into FGDs and to inform appropriate responses.
 - o Language is a major barrier to children's participation. Proper attention needs to be given to the translation of materials and the ready availability of interpreters, as well as child friendly language.

(Extract from Child Centred DRR Toolkit, Plan International, 2010)

Guide questions/checklist for FGDs

- Perception of girl/boy about impact climate change on their lives
 - o Education (access to education, school attendance, disturbance in homework due to power cut-off, rains flooding school during exams, excessive rain on school rooftop disrupting study, girls don't want to go to school during flood with wet clothes, poor educational performance at school, drop out, etc)

- o Health and nutrition (occurrence of seasonal diseases, water contamination during floods, shortage of drinking water at school due to drought, recovery period, medication, girl's problem during menstruation period, fluctuation in menstruation, early pregnancy, etc)
- o Protection (early and force marriage, sexual violence, not able to express their emotions, increase in children workload at home (water fetching, firewood collection, tending livestock, collecting grass and fodders), sense of security, etc)
- o Economic development/food security (crop failure, change in food habits, force seasonal and permanent migration of family members, increase in workload in agriculture and domestic affairs, have to participate in daily wage labour, etc)
- Positive and negative coping mechanisms that households are undertaking to cope and adapt to the changing climate and the implication of these on rights of girl/boy
- Impact of climate change in general and on girl/boy in particular
- Girl/boy's access to information on DRM/CCA
- Rights, needs and capacities of girls/boys in a changing climate conditions
- Girl/boy's involvement in climate change debates and discourse
- Use of innovative risk communication tools: murals, theatre and participatory video/radio/other and the impact of these communications modes
- Mainstreaming child rights in local and national level climate adaptation policy spaces
- Priorities to be covered in Plan Nepal advocacy strategy/framework on climate change

STEP 7: Documentation of case studies, 18, three from each PU)

Appropriate case studies that can be useful in explaining the linkage of climate change impacts

with the life of girl/boy will be collected. In doing so, research team will explore at least three case studies in different themes with different climatic hazards with girls/boys and children with disability. Case will be prepared on awareness campaign on indigenous early warning system, and community information system. Cases will be elaborated and validated through discussions with the child groups. In addition to these, information would be gathered from district line agencies (education and health centres) and their interesting observations are reflected in quotation. The information derived from all the case studies would be syntheses and few very interesting cases would be put in the box to strengthen the research findings.

QUANTITATIVE INFORMATION

For the quantitative information, questionnaire survey will be taken with girls/boys. Survey will explore the perceptions what boys and girls think about the climate change and its impacts on their lives and overall well-being. The sample size for the survey will be determined using a formula devised by Arkin and Colten (1963), whose confidence and error levels are 95% and p% respectively

$$n = \frac{NZ^2 P(1-P)}{Nd^2 + Z^2 P(1-P)}$$

Where,

n = sample size

N = total number of households study VDCs

Z = level of confidence (95%)

P = estimated proportion of beneficiary population

d = level of error (5%)

Using the above formula, the sample size is calculated as 315 or 21 randomly selected respondents i.e. boys and girls in each research district for questionnaire survey. The distribution of 21 girls/boys to be selected for questionnaire survey is as follows

- Out-of-school children: 8 girls/boys
- School children: 10 girls/boys
- Children with disability: 3 girls/boys

Checklist for questionnaire survey

KNOWLEDGE

1. Have you ever heard of climate change?

- a. Yes, I have heard
- b. Yes, but I could not say what it actually meant
- c. No, I have not heard about it

2. Where did you learn about climate change?

- a. School
- b. Media
- c. Parents
- d. Friends
- e. Other

3. By now, in your opinion, do you think our climate is changing?

- a. Yes
- b. No
- c. I cannot tell

4. For you, what is the most crucial factor that reflects climate change?

- a. Adverse weather patterns
- b. Temperature changes
- c. Seasonal changes
- d. No idea

5. Have you noticed any changes in your village or surrounding (weather, temperature)?

- a. Yes
- b. No
- c. Not sure

6. What changes have you noticed in the rainfall pattern?

- a. No change
- b. Less rain
- c. More rain
- d. Irregular rain
- e. Other (.....)

7. What changes have you noticed in the temperature?

- a. No change
- b. Hotter
- c. Cooler
- d. Other (.....)

8. Have you and your family ever been exposed to natural hazards (landslides, flood, etc)?

- a. Yes
- b. No
- c. No idea

9. In your knowledge, what are the trends of those hazards?

- a. Increasing
- b. Decreasing
- c. No idea

10. Do you feel that there is a correlation between hazards and climate change?

- a. Yes
- b. No
- c. Can't say

11. Are there similar changes in the wind pattern?

- a. No change
- b. Stronger winds
- c. Weaker winds
- d. Winds from different direction
- e. Other (.....)

12. What are the changes in water availability and supply in the recent years?

- a. Wells/stone spouts dry up
- b. Piped water became defunct because of shortage of water
- c. Water sources dried up
- d. No change
- e. Don't know

13. What have you already heard about the possible future effects of climate change?

- a. Increase erosion
- b. More storms
- c. More rain
- d. Less rain
- e. Hotter temperatures
- f. More disease in human being and pest in crops
- g. Don't know
- h. Other (.....)

14. What can be the main reason of all these changes?

- a. Population growth
- b. Environmental degradation
- c. Urbanization
- d. Extreme weather events such as flood and drought are more frequent and intense
- e. Increased carbon dioxide gas which is a pollutant
- f. No idea at all

15. What are some potential effects of the changing weather in your community?

- a. Lower crop yields
- b. Water shortages for drinking and irrigation
- c. Increase in pests and diseases in crops
- d. All of above
- e. No idea

16. Do you know what sources of renewable energy are available at local level?

- a. Solar
- b. Biogas
- c. Wind power
- d. Don't know

17. What do you understand by adaptation to climate change?

- a. Doing something new or different than what community did in the past in order to reduce the negative impacts of climate change
- b. Possible solution to the impact of climate change
- c. No idea

ATTITUDE

1. Do you think, you have a role in climate change adaptation?

- a. Yes (because).....
- b. No (because).....

2. What would you do to protect your community from CC?

- a. Protect forest
- b. Protect water sources
- c. Better prepare for disasters
- d. Reduce emissions from vehicles and industries
- e. Do not know

3. Who, in your opinion, is at most risk from impact of climate change? Why?

- a. Girls ((because...))
- b. Boys ((because...))
- c. Elderly (because...)
- d. Children with disability (because...)
- e. Youths (because...)

4. How would you cope with changing climate?

- a. Be prepared with equipment and tools
- b. Design agriculture and other livelihood activities to cope with drought/floods
- c. Other.....
- d. Do not know

5. What worries you the most when you think of CC?

- a. Loss of life
- b. Loss of property/assets
- c. Impact on health
- d. Impact on education
- e. Reduction of assets for future generation
- f. Other (.....)
- g. Do not know

6. In your opinion, who has a major role in addressing impact of climate change especially for children?

- a. Individuals
- b. The wider community
- c. The government
- d. Everyone
- e. Don't know

7. How important is climate change in life of girls/boys?

- a. Educational importance
- b. Poverty reduction significance

- c. Future employment value
- d. Health significance
- e. Child protection
- f. Others
- g. Don't know

8. What could be practised at local level to reduce the negative effects of climate change?

- a. Conserving electricity
- b. Using rechargeable batteries
- c. Conserving water
- d. Growing trees/greenery
- e. Climate resilient seed varieties
- f. Influencing others to change their behaviour
- g. Not at all

9. Have you shared some of what you learned about CC with family or friends?

- a. Yes
- b. No
- c. No idea

10. What would be the best option to increase awareness about climate change?

- a. FM Radio
- b. Participatory video
- c. Street theatre
- d. School based extracurricular activities: art, debate and essay competitions
- e. Poster and pamphlets
- f. Story telling
- g. Training and consultation
- h. TV program
- i. Newspaper
- j. Community/religious meetings
- k. All of above
- l. No idea

PRACTICES

1. In your opinion what is happening in your community that is contributing to the changing climate?

- a. Deforestation
- b. Burning conventional and fossil fuels e.g. coal, oil, gas, petrol, etc
- c. High population pressure
- d. Changing weather patterns
- e. Industrial pollution
- f. Building of roads, buildings, other
- g. Release green house gases into the atmosphere
- h. All of above
- i. Others (.....)

2. Have you heard anything about CC in the media? What?

- a. Yes
- b. No

3. If yes, through which media or means have you heard about CC?

- a. Video/TV
- b. FM Radio
- c. Street theatre
- d. Newspaper
- e. Internet
- f. No idea

4. Do you think that the current school curricula cover about climate change? Why?

- a. Yes (because.....)
- b. No (because.....)
- c. No idea

5. How did you get a warning or climate change information (through which media)?

- a. Radio
- b. TV
- c. Close friends
- d. School teachers
- e. Other (.....)

6. What did you do when there was a huge floods, droughts and epidemics of recent years years?

- a. Stayed in the house
- b. Went to a safe location
- c. Other (.....)

7. How did your community respond after the extreme climatic event?

- a. Built mitigation activities
- b. Dismantled house and moved to a safer location
- c. Planted trees/grass
- d. Other (.....)

8. What do you do if there is a lack of water/longer drought?

- a. Go to the next nearest potable well
- b. Dig new wells to a greater depth
- c. Adopt rainwater harvesting tank
- d. Never experienced a drought
- e. No idea

9. Is there a “disaster management or climate adaptation plan” in place in your village?

- a. Yes (have you participated...)
- b. No
- c. Don't know

10. If there are such plans, what disaster initiatives are taking place in your community at local level?

- a. Prepare safer house (shelter)
- b. Improve the road conditions
- c. Establish seed bank/emergency fund
- d. Improve early warning system
- e. River bank protection and bio engineering in highly vulnerable areas
- f. Heightening water scheme, house and toilets

- g. School and ECD are constructed with quality to withstand storms
- h. No idea

11. Are you benefitting from such disaster risk reduction initiatives?

- a. Yes (because...)
- b. No (because...)
- c. Don't know

12. What activities are taking place to increase resilience of people?

- a. Disaster preparedness through drills and simulation exercise
- b. Increase participation and use of indigenous knowledge and skills
- c. Protect forests, water sources, other ecosystems
- d. Livelihood diversification
- e. No idea

13. What are the early warning systems at local level?

- a. Community Radio program for national weather broadcast information
- b. Community rain gauge
- c. Use of manual siren
- d. Mobilize Chaukidar (watch person)
- e. None at all
- f. other (.....)

14. How has flood/drought impacted your family?

- a. Loss of members of the family /kin
- b. Loss of livelihood
- c. Force seasonal migration/displacement
- d. Permanent migration
- e. Others (.....)

15. What alternative coping mechanisms are families turning to which negatively affect girls/boys?

- a. Stop the education of girl/boy
- b. Early forced marriage
- c. Child labour
- d. Other

4. Data analysis and interpretation

The qualitative data derived from the various tools and techniques will be analysed by the following methods:

- Putting information into different arrays,
- Making a matrix of categories and placing the evidence within such categories,
- Creating data displays--flow charts and other devices--for examining the data,
- Tabulating the frequency of different events,
- Examining the complexity of such tabulations and their relationships by calculating second-order numbers such as means and variances, and
- Putting information in chronological order

The quantitative data received from the semi structured interview will be summarised in tabular form using means and percentages through SPSS 10.0 software for Windows. All the quantitative data would be disaggregated by sex (girls and boys).

Our identity

Plan is an international humanitarian, child-centred development organisation without religious, political or governmental affiliation. Child sponsorship is the basic foundation of the organisation.

Our vision

Our vision is of a world in which all children realise their full potential in societies that respect people's rights and dignities.

Our mission

Plan strives to achieve lasting improvements in the quality of life of deprived children in developing countries through a process that unites people across cultures and adds meaning and value to their lives by:

- ▶ enabling deprived children, their families and their communities to meet their basic needs and to increase their ability to participate in and benefit from their societies;
- ▶ building relationships to increase understanding and unity among people of different cultures and countries; and
- ▶ promoting the rights and interests of the world's children.



Plan Nepal

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