

Helpdesk Research Report

Seasonal vulnerability and risk calendar in Nepal

Brigitte Rohwerder

19.04.2016

Question

What is the information and evidence on the seasonal vulnerability and risk calendar in Nepal at a national and sub-national level?

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1. Overview

Nepal faces many seasonal disasters, including floods, landslides, fires, droughts and diseases. This rapid review presents the small amount of available information and evidence on the seasonal vulnerability and risk calendar in Nepal at a national and sub-national level. The majority of the literature includes grey literature from the Nepalese government, national, and international organisations working in Nepal, as well as a few journal articles and student dissertations carried out with the support of agencies in Nepal. Much of the evidence is scattered in the literature and there is little very recent information available. Available information about the sub-national level only covers a limited number of areas, although there are suggestions in the literature that more seasonal risk calendar exercises have been carried out across Nepal that have not been published publically. There is some consideration of the impact of seasonal migration on women.

The available information indicates that:

- Most **people are killed and injured** during July–September which is in the monsoon period (see Figure 1 below).
- **Preparedness** activities could take place in anticipation of seasonal disasters.

- The **monsoon season** (June-September) often experiences landslides, flooding, thunderstorms, disease (cholera, gastroenteritis, diarrhoea, encephalitis, meningitis, typhoid, jaundice, malaria, Japanese encephalitis) and drought (when the monsoon rains fail).
- The **dry season** (March-June) often experiences household and wildfires, drought, heatwaves, and windstorms.
- The **winter season** (November-February) often experiences avalanches, avian influenza, and crop damage.
- Nepal is very **vulnerable to climate change** which is expected to lead to more extreme weather and changing seasons.
- Summer **cropping season** (June-September) involves rice, maize and millet, while the winter cropping season (October-May) involves wheat, barley and potatoes.
- **Seasonal food shortages** are quite common in many parts of Nepal. July-August and January-March are traditionally agricultural lean seasons, leading to increased risks of food insecurity.
- **Water-borne diseases** are common between June-August. Water sources may be seasonal.
- **Seasonal migration** is related to the agricultural cycle, with young men leaving to find work, leaving those behind more vulnerable to disasters.

Other seasonal events which may increase vulnerability include:

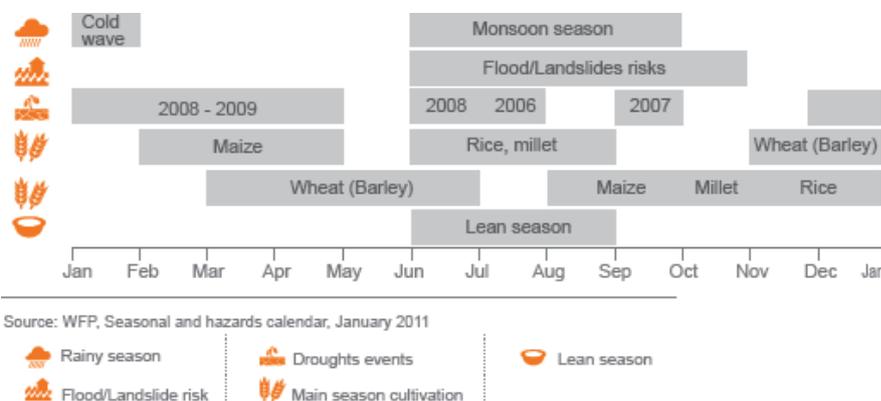
- The main **festival season**, which is in October/November. Festivals can see mass gatherings of people.
- Autumn and spring, which are the main **tourist trekking and hiking seasons** in Nepal.

Available information on the **seasonal risk calendars at the sub-national level** of Khumbu; Krishnapur VDC, Kanchanpur; Arghakhanchi and Kapilvastu; Bhalwad VDC, Kapilvastu; Jumla; and (Lumle) Middle Hills and (Meghauli) Tarai are also presented.

2. Seasonal risks and vulnerability

Nepal is one of the most disaster prone countries in the world due to its topography and climatic condition. Earthquakes, landslides, floods, fire, and thunderbolts are the major causes of disaster events.¹ Many of these disasters are seasonal (see Figure 1). Some seasonal events may increase risk and vulnerability during future disasters, such as mass gatherings around festivals.

Figure 1: timeline of critical seasonal events

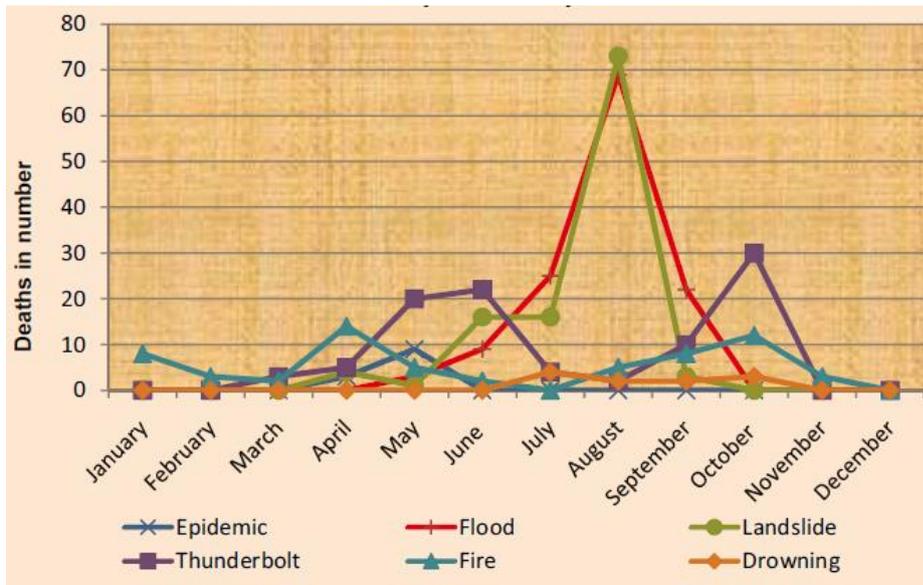


Source: OCHA, 2015, p. 2.

¹ <http://drrportal.gov.np/risk-profile-of-nepal> Accessed 18.4.16

In 2014, data gathered by the Ministry of Home Affairs indicated that most people were killed and injured during July–September, which is also the rainy season, when landslides and floods occur (see Figure 2) (MoHA & DPNet-Nepal, 2015, p. 48). The breakdown of the distribution of these disasters by district found that 17,376 families were affected by various types of disasters in Bardia in 2014, followed by Banke (10,763 families), Dang (4,028 families), Surkhet (3,871 families) and Mugu (2,608 families) (MoHA & DPNet-Nepal, 2015, p. 55). The year 2013 shows a similar higher incidence of death between June and September (see Figure 3) (MoHA & DPNet-Nepal, 2015, p. 57).

Figure 2: human deaths by disasters in 2014



Source: MoHA & DPNet-Nepal, 2015, p. 49

Figure 3: comparison of human deaths by disasters in 2013 and 2014



Source: MoHA & DPNet-Nepal, 2015, p. 57

Practical Action (2010b, p. 39), an international NGO that has worked on disaster management in Nepal, suggests that seasonal calendars indicate that preparedness activities to cope with floods should be

completed before the middle of June each year (prior to the monsoon season), while awareness activities on fire prevention should start in February (prior to the dry season).

Seasonal weather cycles

Monsoon period (June-September): landslides, flooding, storms, disease and drought

Landslides and floods are the most destructive types of disasters in Nepal and are most common during the monsoon season, between June and September, when 80 per cent of the annual precipitation falls, coinciding with snowmelt in the mountains (MoHA & DPNet-Nepal, 2015, p. 7; Nepal Risk Reduction Consortium, 2013, p. 26). The steep topography of the land, combined with very high intensity of rainfall during monsoon season, results in floods and landslides (MoHA & DPNet-Nepal, 2015, p. 7). Landslides and floods result in huge loss of lives and livelihoods, destroying crops and houses, causing economic losses and increasing vulnerability to food insecurity and diseases (MoHA & DPNet-Nepal, 2015, p. 7).

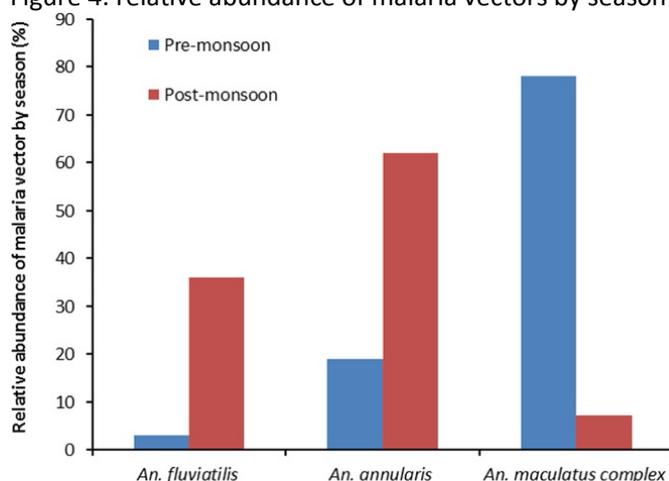
Snow-fed rivers in Nepal, such as the Koshi, Narayani, Karnali, and Mahakali, present flood-risks during the monsoon period (June-September).²

Increased glacial melt in Nepal during the monsoon period (June-September) could contribute to outbreaks from glacial lakes resulting in catastrophic floods. 14 glacial lake outburst floods were recorded to have occurred between 1935 and 1991 in Nepal. 15 glacial lakes are found substantially dangerous in Nepal.³

Thunderstorms usually occur during the monsoon season; and hailstorms at the beginning and end of the monsoon season, causing potential damage to property and crops and increasing vulnerability to food insecurity, for instance (MoHA & DPNet-Nepal, 2015, p. 8).

Droughts are a frequent occurrence in Nepal and generally caused by uneven and irregular low monsoon rainfall in the summer (MoAC, 2011, p.1). Some parts of Terai, mid-land and Trans-Himalayan belts of Nepal are prone to drought.⁴ Droughts cause considerable damage to crops and also increase vulnerability to food insecurity.

Figure 4: relative abundance of malaria vectors by season in eastern Nepal



Source: Dhimal et al, 2014, p. 6.

² <http://drrportal.gov.np/risk-profile-of-nepal> Accessed 18.4.16

³ <http://drrportal.gov.np/risk-profile-of-nepal> Accessed 18.4.16

⁴ <http://drrportal.gov.np/risk-profile-of-nepal> Accessed 18.4.16

Cholera, gastroenteritis, diarrhoea, encephalitis, meningitis, typhoid, jaundice, and malaria epidemics commonly occur during the summer and rainy seasons (MoHA & DPNet-Nepal, 2015, p. 8) (see Figure 4 for example). The seasonality of epidemics is strongly correlated with floods and other hazards that take place in the monsoon months, with epidemics usually occurring with the worst floods (MoHA & DPNet-Nepal, 2015, p. 8). Japanese Encephalitis is seasonal, mainly visible in the months between June to October with maximum levels in July and August, and occurs mainly in the Tarai region, although a few cases have been found in the hilly regions too (Mishra et al, 2013, p. 48, 54). Epidemics have been found to be the leading cause of human casualties from disasters (MoHA & DPNet-Nepal, 2015, p. 8).

Dry season (March-June): fires, drought, heatwaves, and storms

Household and wildfire risks increase in the dry season (March to June), especially in Tarai in Nepal's southern plains where the closely built wooden houses with thatched roofs are extremely vulnerable to incendiary lighting strikes caused by storms during this season (Gautam, 2011, p. 12, 14; MoHA & DPNet-Nepal, 2015, p. 7). Fires also commonly occur in the Middle Hills region (MoHA & DPNet-Nepal, 2015, p. 7).

Windstorms generally occur during the dry season between March and May, resulting in crop damage and loss of life (MoHA & DPNet-Nepal, 2015, p. 8).

Parts of Nepal (particularly the Tarai area) may experience heat waves (temperatures soaring above 44°C) during May and June, which results in people suffering from dehydration and other heat related health concerns (MoHA & DPNet-Nepal, 2015, p. 12).

Dry spells usually also occur between November and May, and droughts have become more frequent, longer, intense and severe (Practical Action, 2010, p. 1). Droughts have an adverse effect on crop production and increase vulnerability to food insecurity (MoHA & DPNet-Nepal, 2015, p. 13).

Winter season (November-February): avalanches, avian influenza, and crop damage

Avalanches tend to occur during the winter season in the northern mountainous part of Nepal (MoHA & DPNet-Nepal, 2015, p. 12). Powerful avalanches can sweep away entire villages and wash away highways (MoHA & DPNet-Nepal, 2015, p. 12).

Outbreaks of avian influenza have a highly seasonal pattern, with nearly all outbreaks occurring in January and February (World Bank, 2013, p. 12).

In mid-winter, parts of Nepal, especially the Tarai areas, can experience cold waves which often cause crop damage that may lead to famine (MoHA & DPNet-Nepal, 2015, p. 13).

Climate change

Nepal is considered to be one of the countries in the world that is most vulnerable to climate change, being ranked as the fourth most climate vulnerable country in the world by the World Bank in 2011 (MoHA & DPNet-Nepal, 2015, p. 9). Nepal is expected to experience an increase in temperature, more frequent heat waves and shorter frost durations in the future (MoHA & DPNet-Nepal, 2015, p. 9). Winters are expected to be drier and monsoon summers wetter which could result in more frequent and intense summer floods and winter droughts (MoHA & DPNet-Nepal, 2015, p. 9). The rapid decline in glacial cover due to global warming will increase floods, Glacial Lake Outburst Floods (GLOFs) and landslides (MoHA & DPNet-Nepal, 2015, p. 9).

Changes in seasonal patterns can result in new disasters for those that rely on the natural conditions for their livelihoods (Practical Action, 2010b, p. 67). Altered seasonal dates – either too early or delayed – or a variance in seasonal precipitation make it difficult to plan for farming and create a greater risk of food insecurity (Practical Action, 2010b, p. 67). In one study carried out in Mid-West Nepal for example, farmers reported that ‘they can no longer tell seasons apart or count on the monsoon rain coming at the right time, making it difficult to know when to plant crops’ (Schilling et al, 2013, p. 38).

Crop cycles

Different crops are planted and harvested during the different seasons of the year (Nepal Food Security Cluster, 2015, p. 7). Maize and rice are the main crop staples in most districts (Nepal Earthquake Response, 2015, p. 40).

The summer cropping season (June-September) involves rice, maize and millet, while the winter cropping season (October-May) involves wheat, barley and potatoes (Nepal Food Security Cluster, 2015, p. 27)⁵. Summer crops are harvested in November/December (Nepal Earthquake Response, 2015, p. 3). Winter crops are more prone to viruses, with new diseases and pests identified which attack crops during different seasons (Practical Action, 2010, p. 1).

Seasonal food shortages are quite common in many parts of Nepal as a result of monsoonal influences in production, poor post-harvest storage and handling, and weak transport infrastructure and market integration (Shively et al, 2011, p. 15). July-August and January-March are traditionally agricultural lean seasons and a resultant seasonal deterioration in the food security situation is expected (Nepal Food Security Monitoring System, 2013a, p. 1; Nepal Food Security Monitoring System, 2013b, p. 3). Mountainous areas especially experience seasonal deterioration in the food security situation between November and March (Nepal Food Security Monitoring System, 2013a, p. 5). Household food stocks are depleted during this period and some households are unable to afford some essential non-food expenditures without engaging in irreversible coping strategies (Nepal Food Security Monitoring System, 2013b, p. 4, 8).

Water and sanitation cycles

Oxfam organised a training programme for national and international organisations working in the water, sanitation and hygiene (WASH) sectors in emergencies (Shrestha, 2014). The participants created a seasonal calendar relevant to the WASH sectors which looks at how seasonality affects disease outbreaks and capacity of affected people for WASH services, for example (see Figure 5) (Shrestha, 2014, p. 13).

The seasonal calendar they created indicates that water borne diseases are a seasonal risk between June-August. The calendar also indicates when and what water sources are likely to be available to humanitarian actors and affected people in the case of a disaster such as an earthquake. For example, springs may be seasonal and operational only during the monsoon (Shrestha, 2014, p. 22).

⁵ Specific crop calendars for Dhading, Dolokha, Gorkha, Rasuwa and Sindhupalchok can be found in Nepal Food Security Cluster, 2015.

Figure 5: WASH seasonal calendar

Host Community	February		March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan
	M	F											
Drinking WATER consumption	*	*	***	***	***	***	***	***	**	**	**	**	**
Expenditure for water	*	*	**	**	*	*	*	*	*	*	*	*	*
Discharge of water at source			*	*	*	***	***	***	*	**	**	**	**
Treatment pipe quality of water	*	*	*	*	*	**	**	**	*	*	*	*	*
Water treatment (ppl)			*	*	*	*	*	*	*	*	*	*	*
Water borne disease	*	*				*	*	*					
Pipe water supply			**	**	**	*	*	**	**	**	**	**	**
Water tanker			***	***	*	*	*	*	*	*	*	*	*
Spring water					*	**	**	**	*	*	*	*	*
Stone spout			**	**	**	**	**	**	**	**	**	**	**
Jar/Bottle water			*	*	*	*	*	*	*	*	*	*	*

Source: Shrestha, 2014, p. 21

Seasonal migration

Seasonal migration is related to the agricultural cycle. In Mid-West Nepal for instance, there is a trend of increased frequency and duration of seasonal migration, in part as a result of environmental risks (Schilling et al, 2013, p. 38). Hill farmers would traditionally migrate to cities during the fallow period between planting and harvesting, but would return periodically to tend crops and remove weeds before harvest; however, now they tend to stay away longer without tending crops between planting and harvest because crop yields are becoming more variable (Schilling et al, 2013, p. 38).

This seasonal migration by men to seek work in nearby towns or abroad (India, Malaysia, Qatar, Saudi Arabia, South Korea and Bahrain for instance), often leaves women and children vulnerable to the impacts of climate change, especially food shortages (MoAC, 2011, p. 3; Hagen-Zanker et al, 2014, p. 8; National Planning Commission, 2015, p. 63). The decrease in labour force reduces agricultural output and hence food availability, but several women in a study in Mid-West Nepal noted that the remittances they received from their migrating men mitigated any negative impacts (Schilling et al, 2013, p. 38). A study in Rolpa found no statistically significant differences between migrant and non-migrant households in terms of food insecurity (Hagen-Zanker et al, 2014, p. 36).

In the aftermath of disasters, agricultural households, which are mainly female headed, are likely to resort to negative coping mechanisms to cope with damage to grains, seeds and livestock (National Planning Commission, 2015, p. 63). These strategies, for example, the liquidation of key assets such as livestock, hinder the medium and long term coping capacities of households (National Planning Commission, 2015, p. 63).

Seasonal mass gatherings

Certain seasonal events such as mass gatherings during festivals can increase risks and vulnerability if a disaster occurs during this time; or may themselves be vulnerable to disasters such as stampedes (MoHA & DPNet-Nepal, 2015, p. 70). The main festival season in Nepal is in October/November (Nepal Earthquake Response, 2015, p. 3). Local systems, including healthcare systems are under stress at this time (MoHA & DPNet-Nepal, 2015, p. 70). Recently, mass gatherings in Nepal have only seen a small number of casualties, injuries and illness (MoHA & DPNet-Nepal, 2015, p. 74). The dates of festivals in Nepal tend to correspond to the Nepali calendar, which means they shift slightly each year.

Mass gatherings that occur in Nepal, mentioned by Ministry of Home Affairs, include (MoHA & DPNet-Nepal, 2015, p. 74):

- Maha Shiva Ratri: a gathering of huge masses in the month of February each year in the temple of Pashupatinath located in Kathmandu to pay homage to Lord Pashupatinath (also called Mahadev or Shiva) on the occasion of Lord Shiva's birthday.
 - Gai Jatra: the festival of cows celebrated mainly in Kathmandu valley by the Newar and Tharu community and generally celebrated in the Nepalese month of Bhadra (August–September).
 - Ghode Jatra: horse festival, celebrated in Tundikhel, Kathmandu, which takes place around March.
 - Indra Jatra: celebrates the founding of Kathmandu, and is held in September.
 - Bisket Jatra: a nine-day festival held in Bhaktapur celebrating the Nepali New Year.
 - Godavari Mela: a month-long festival which takes place every 12 years around September.
- Maghe Sakranti: the beginning of the holy month of Magh (Nepali calendar), usually in the middle of January.

Other large festivals celebrated in Nepal include:

- Dasain: a 15 day celebration, falling in September or October.
- Tihar: a five day festival of lights that falls between October/November.

Seasonal tourism

September to November are the busiest trekking and hiking seasons in Nepal as a result of the good clear weather conditions (MoHA & DPNet-Nepal, 2015, p. 95). There is another trekking season in spring. Any disruptions to the tourist season, for example as a result of earthquakes or weather related disasters, have livelihood impacts for people living in these areas, especially Dalits, who are overrepresented in porter work (National Planning Commission, 2015, p. 63).

3. Sub-national seasonal risk calendars

A number of studies looked at sub-national seasonal risk calendars, at district or Village Development Committee (VDCs) level. They include the seasonal risks in Khumbu; Krishnapur VDC, Kanchanpur; Arghakhanchi and Kapilvastu; Bhalwad VDC, Kapilvastu; Jumla; and (Lumle) Middle Hills and (Meghauli) Tarai.

Khumbu

The USAID funded Climate Change Resilient Development project helped develop Khumbu's Local Adaptation Plan of Action, which included looking at seasonal risk in the area (See Figure 6) (Byers and Thakali, 2014).

September is the beginning of the autumn tourism season in Khumbu, although the best time for autumn trekking and flights now appears to be November-December as opposed to October-November in the past, as a result of overcast or prolonged cloud cover from May to October (Byers and Thakali, 2014, p. 37, 53).

Local analysis indicated that the seasonal calendar in Khumbu is changing (Byers and Thakali, 2014, p. 55-56):

- The monsoon is starting about two weeks later than it used to, usually around the second week of June, but lasts longer, ending in late September.
- Winter is starting a month earlier (October) and ending in February, and is getting milder. However, the region has been experiencing heavier snowfall for more extended periods of time. Snowfall used to start in December and last until March, but now, it starts as early as September and may last until May. Cumulatively, however, Khumbu is receiving less total snowfall during the winter season than in previous decades.
- Summer is starting earlier, lasting longer and becoming warmer. Summer now starts in February and lasts five or six months until August or September.
- Overnight frost occurs for longer periods. There is a slight variation in frost conditions across the three Village Development Committee (VDCs). Chaurikharka VDC, for example, used to get frost between November and mid-February, but now frost can occur until mid-March. Khumjung VDC used to get frost from mid-November to December; it now lasts until mid-February. Namche VDC has experienced no observed change in frost patterns.
- Dry periods are getting longer, although droughts are mainly experienced in Chaurikharka VDC, which now has a dry or drought period extending from February to June.
- Khumjung and Namche VDCs are experiencing avalanches earlier than in the past, beginning as early as March now as compared to May/June in the past.
- Forest fires are now occurring more frequently, whereas a decade ago they were rare.
- Mosquitos are now quite common in Chaurikharka VDC, when a decade ago they were non-existent. Other insects, diseases, and pests harmful to vegetables and crops are appearing.
- The impacts of heavy snowfall are more severe in Khumjung and Namche VDCs than in Chaurikharka VDC, whereas windstorm impacts are growing in all three VDCs. Chaurikharka is more sensitive to forest fires than the other two VDCs (Byers and Thakali, 2014, p. 3).

Erratic climate conditions have also impacted on seasonal trade with Tibet and neighbouring villages, which has resulted in food and other commodities becoming more expensive as a result (Byers and Thakali, 2014, p. 75).

Figure 6: Khumbu seasonal calendar

		Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
Monsoon	Before												
	Now												
Winter Season	Before												
	Now												
Summer Season	Before												
	Now												
Frost: Chaunri Kharka	Before												
	Now												
Frost (Namche)	Before												
	Now												
Frost (Khumjung)	Before												
	Now												
Snowfall	Before												
	Now												
Hailstone (Chaunrikharka)	Before												
	Now												
Cloud	Before												
	Now												
Drought (Chaunrikharka)	Before												
	Now												
Avalanche	Before												
	Now												

Source: Byers and Thakali, 2014, p. 57.

Krishnapur VDC, Kanchanpur

A master’s dissertation looking at climate change impacts in Krishnapur VDC created a seasonal calendar (See Figure 7) (Bhatta, 2011, p. 49). It was found that the seasonal calendar for farmers has shifted by 15 to 20 days earlier than it was 20 to 25 years ago (Bhatta, 2011, p. 61). The four monsoon months (June to September) are highly sensitive to weather related disasters, including diseases which affect humans and animals (Bhatta, 2011, p. 30).

Figure 7: seasonal calendar for Krishnapur VDC

Calendar	Activities	Disaster
May 15 to June 15	Maize weeding, seed sowing of rice, ploughing bare land for rice cultivation	Drought, storm, forest fire
June 15 to September 15	Maize collection and storage, rice cultivation and rice weeding	Flood
September 15 to November 15	Rice harvesting	Flood and hailstorms
November 15 to December 15	Wheat and vegetable cultivation	Dew
December 15 to February 15	Forest management	Drought
February 15 to May 15	Wheat harvesting, maize cultivation	Forest fire, drought, storm

Source: Bhatta, 2011, p. 49.

Arghakhanchi and Kapilvastu

An Actionaid project in the Banganga River basin of Arghakhanchi and Kapilvastu districts of the Western Development Region of Nepal created a seasonal calendar for the area (See Figure 8) (Gautam et al, 2007, p. 29). Seasonal migration in search of labour, involving mostly young men, leaves behind women, children and elderly people, who are vulnerable to disasters as a result of their poor coping strategies (Gautam et al, 2007, p. 21). Seasonal migration normally peaks during November to January, after harvesting of the paddy fields and the sowing of the winter crops mostly wheat, mustard and maize (Gautam et al, 2007, p. 21). The income earned by the household member who has migrated helps provide a certain level of food security (Gautam et al, 2007, p. 21). However, the women left behind may have to take out loans to survive or sell their livestock to feed their families (Gautam et al, 2007, p. 49). The impact of disasters contributed to increased seasonal migration as a result of crop failures (Gautam et al, 2007, p. 22).

Figure 8: seasonal calendar of Banganga River basin downstream VDCs

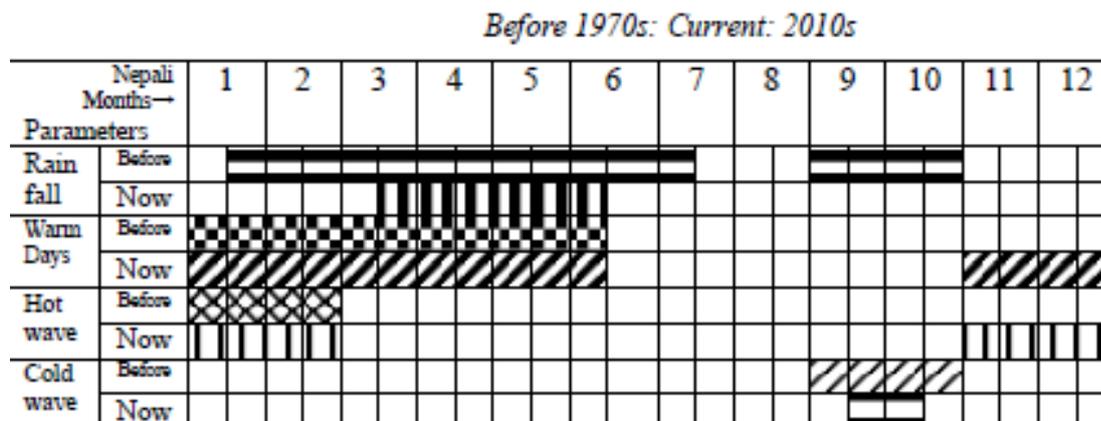
Major Incident	Months											
	1	2	3	4	5	6	7	8	9	10	11	12
Flood												
River Cutting												
Fire												
Starvation												
Loan												
Diseases												
Fetching firewood												
Thunderbolt												
Inundation												
Freed animal												
Snake bite												
Cold wave												
Encephalitis, Malaria												
Eye disease, dysentery												

Source: Gautam et al, 2007, p. 29

Bhalwad VDC, Kapilvastu

A multi-stakeholder process in Bhalwad VDC, Kapilvastu, involved creating a seasonal calendar looking at the differences before the 1970s and in the 2010s (See Figure 9). They found that though rainy days decreased, more intense and erratic rainfall has been experienced (Jamarkattel et al, 2011, p. 1). Drought, fire and water scarcity is increasing (Jamarkattel et al, 2011, p. 1).

Figure 9: participatory changed seasonal calendar for Bhalwad VDC, Kapilvastu



Source: Jamarkattel et al, 2011, p. 1.

Jumla

Jumla residents experience three months of food scarcity in April, May and June, when many households run out of their previous stocks and await the next harvest (Gaire et al, 2015, p. 1671). A study in Jumla found that the risk landscape in Jumla is changing as a result of climatic changes as well as more local social changes (Gaire et al, 2015, p. 1671). Jumla is experiencing less and more erratic (heavy) rainfall (Gaire et al, 2015, p. 1670). Rising temperatures are contributing to drying spring water sources, increasing disease and pest infestations of crops, crops' early maturation, and early flowering and budburst (Gaire et al, 2015, p. 1671). Those from poorer families and lower castes experience greater seasonal food insecurity than other socio-economic groups (Gaire et al, 2015, p. 1676). Seasonal migration usually starts in July when the planting of the summer crop is complete and migrants return after winter (Gaire et al, 2015, p. 1673).

(Lumle) Middle Hills and (Meghauli) Tarai

A study carried out in the villages of Lumle and Meghauli found that increasing irregularities in seasonal and annual rainfall were perceived in both places (Pandey and Bardsley, 2013, p. 6). Monsoon rain has become increasingly erratic and has decreased in length by about two weeks: there are more dry weeks within the season and reduced winter and pre-monsoon rainfall; and the stress of drought is increasing (Pandey and Bardsley, 2013, p. 6). Hailstorms in Lumle have increased and occur out of the usual spring and autumn seasons (Pandey and Bardsley, 2013, p. 6). Floods and drought in Meghauli, and landslides, seasonal drought, heavy rain and hailstorm in Lumle are reported as major drivers of vulnerability (Pandey and Bardsley, 2013, p. 6).

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Key websites

- Government of Nepal – Nepal Disaster Risk Reduction Portal: <http://drrportal.gov.np/risk-profile-of-nepal>

Expert contributors

Ram Chandra Khanal, Climate and Development Knowledge Network

Suggested citation

Rohwerder, B. (2016). *Seasonal vulnerability and risk calendar in Nepal* (GSDRC Helpdesk Research Report 1358). Birmingham, UK: GSDRC, University of Birmingham.

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