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GLOBAL WARMING AND ITS IMPACTS: A STUDY OF HIMACHAL PRADESH (WESTERN HIMALAYAS)

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ABSTRACT

Climate change is a global phenomenon and their impacts are observed globally. But the two areas are highly vulnerable, coastal areas and mountainous areas of the world. Himalayas are the one of highest mountain range in the world and have fragile eco-system). The climate of Himalayas is highly effected by various factors like seasonal wind systems(monsoon), western disturbances, upper air wind circulation like Jet Stream, physiography, alpine glaciations, latitudinal extension, orographic impacts abnormal heating of land and water, formation of troughs and depressions, formation of El-Nino La-Nino Conditions in pacific regions etc. Western part of the Himalayas comprises Uttarakhand, Himachal Pradesh and Jammu & Kashmir have experiences multiple adverse impact of global warming and climate change. Observed impacts are abnormal precipitation, cloud bursting, glacial lake burst, flash flood, land sliding, forest fire, extinction and altitudinal shift forest zones, altitudinal shift of horticulture and agriculture and nomadic activities, shrinking of glacial area, extinction of small eco-systems and gradual altitudinal shift of tourist destinations. The Himalayan region evidently prove the shifting of horticultural plants to higher elevation with climate change. The Documentary "weeping apple tree" has elaborately explained the extinction of apple plans on the low heights due to global warming and climate change.

Key words: global warming, melting, flooding, droughts and Anthropogenic.

ITRODUCTION:

Climate change is a global phenomenon and their impacts are observed globally. But the two areas are highly vulnerable, coastal areas and mountainous areas of the world. Himalayas are the one of highest mountain range in the world and have fragile eco-system. The word "Himalaya" means "Adobe of Snow" is a spectacular range of mountains located in the subtropical high-pressure belt region of the planet earth and encompasses parts of eight South Asian territories of Afghanistan, Pakistan, China, India, Nepal, Bhutan, Bangladesh, and Myanmar. The Himalayas, with an average width of 300 km, stretches across a length of ~ 2500 km along the northern border of the Indian subcontinent, is a hotspot

of hundreds of sky-piercing mountains of height >7000 m (Karan, 1966; Gritzner, 2010). It stands as a great physical barrier for the chilled continental air masses of arid central Asia from entering the Indian subcontinent (Kennett, 2006; Sharma, 2007; Ramisch et al., 2016). Size of glaciated area of the Himalaya catchment is about 30,000 km^2, which makes it the most substantial body of ice outside the polar caps. Hence, it is also known as the 'Third Pole' and 'Water tower' of Asia. The glaciers present in the Himalayas feed water to the numerous rivers like the Indus, Ganga, Brahmaputra, Yellow, Mekong, and Yang-Tze flowing across its length and breadth (IPCC, 2007). The climate of Himalayas is strongly influenced by different types of wind systems like a mesoscale cyclonic storm, western disturbances, monsoon winds, snowstorm, and high-speed other winds along with cloudbursts resulting sudden floods, causing the climate of this region quite unpredictable (Nandargi and Dhar, 2011). Western part of the Himalayas comprises Uttarakhand, Himachal Pradesh and Jammu & Kashmir have experiences multiple adverse impact of global warming and climate change. Observed impacts are abnormal precipitation, cloud bursting, glacial lake burst, flash flood, land sliding, forest fire, extinction and altitudinal shift forest zones, altitudinal shift of horticulture and agriculture and nomadic activities, shrinking of glacial area, extinction of small eco-systems and gradual altitudinal shift of tourist destinations. The Himalayan region evidently prove the shifting of horticultural plants to higher elevation with climate change. The Documentary "weeping apple tree" has elaborately explained the extinction of apple plans on the low heights due to global warming and climate change.

LOCATION

Himachal Pradesh is a state of the Indian Union at the extreme north of the Indian sub-continent roughly between latitudes 30°22′N and 33°12′N and longitudes 75°45′E and 79°04′E, occupying a region of scenic splendour in the western Himalayas. Himachal means Snowy Mountain (hima, "Snow", achal, "Mountain"). The state (Pradesh) taking its name from Himalayas. The state has an area of 55,673 sq.km and consists of 12 districts. The state is bounded by Jammu and Kashmir on north, Nepal and Tibet on east, Uttaranchal on southeast, Haryana on south and Punjab on west and southwest. The climate of the state varies from place to place depending on the altitude. It varies from hot and sub-humid tropical (450-900 m) in the southern low tracts, warm and temperate (900-1800 m), cool and temperate (1900-2400 m) and cold alpine and glacial (2400-4800 m) in the northern and eastern high mountain ranges. The state may be broadly divided into 3 geographical regions, viz. outer Himalayas, the lesser Himalayas and the greater Himalayas or the Alpines. The outer Himalayas includes the districts of Bilaspur, Hamirpur, Kangra, Una and the lower parts of Mandi, Sirmaur and Solan. The lesser Himalayas includes the parts of Mandi, Sirmaur and parts of Chamba, Kangra and Shimla. The Alpine zone is at an altitude of 4500 m and beyond, includes Kinnaur and parts of Lahaul and Spiti, Chamba districts. Elevation of areas of the state increases as we move from west to east and from south to north. The hills in the outer Himalayas are about 600 m above sea level. The inner Himalayas are marked by gradual elevation towards the Dhauladhar and Pir Panjal ranges and abruptly rises in the Shimla hills, to the south of which is the high peak of Church-Chandni (3647 m) and the rise is gradual towards the north of river Sutlej.

Figure 1 western Himalayan Region

Literature Review

Global warming is a climatic phenomenon that associated with rise in the temperature of atmosphere of earth. This associated with the abnormal increase in earth temperature. Changes in climate over short distances in mountains are reflected in large ecological gradients. AR5 reported new evidence that plant species of mid and low elevations were starting to colonise higher elevations in mountains, Since AR5, new studies have been published (e.g., Steinbauer et al., 2018; Payne et al., 2020), including in some previously less well studied areas such as the Andes (e.g., MoruetaHolme et al., 2015; Báez et al., 2016) and parts of Asia (e.g., Telwala et al., 2013; Artemov, 2018). There is now high confidence that many plant species' distributions have shifted to higher elevations in recent decades, consistent with climatic warming. In recent years publications have also started to show similar trends in some animal species, including birds (Freeman et al., 2018; Bani et al., 2019; Lehikoinen et al., 2019) and snails (Baur and Baur, 2013). Other climatic variables besides temperature can also affect elevational limits of species, and sometimes in ways that contrast with temperature, for example increasing precipitation can allow some species to occur at lower elevations in dry climates (Crimmins et al., 2011; Coals et al., 2018). Tsai et al. (2015) reported large changes in the montane bird community in Taiwan, which they link to changes in weather patterns, including more severe typhoons. Many studies available on the observed trends and variability of rainfall and also extreme rainfall events over India, but all the studies are based on past 100 years or more data and also the recent years are not included (Guhathakurta et al, 2015; Guhathakurta et al, 2011; Guhathakurta & Rajeevan, 2008 etc). Also, there are limited studies on district rainfall trends and variability of Uttar Pradesh state. In the present report all the analysis of observed rainfall patterns, trends and variability have been done based on recent past 30 years (1989-2018) that will help to have idea of the recent changes for climate change adaptation and management by the state authorities.

FACTORS AND THEIR EVALUTION

Change and rise in temperature, temperature (main controlling factors of water all weather phenomenon)

Rise of temperature has speedup the hydro-logical cycle-more evaporation→ more precipitation → more flowage (with increased runoff) →less recharge → less ground water and more damage to lives and property. The temperature of whole planet is rising (IPCC AR5 report shows an estimated warming of 0.85°C since 1880) Intergovernmental panel for climate change, AR4 estimated the average warming in the past century (1906-2005) was 0.74°C. Sharpest rise occurred between 1975-2010 (0.34°C). 1983-2013 was the warmest 30-year period for 1400yrs. By 2100 the temperature may exceed 1.5°C on earth surface. With the rise in the atmospheric temperature the solid form of water is highly affected (melting of huge ice block in high mountain reaches and polar areas). The Greenland, Antarctic ice sheets and Himalayan glaciers have losing mass in last decade. Resulted as rise in sea level. How precipitation and its extremes change as the climate changes are examined. There is a direct influence of global warming on changes in precipitation. Increased heating leads to greater evaporation and thus surface drying, thereby increasing intensity and duration of drought. However, the water holding capacity of air increases by about 7 % per 1ºC warming, which leads to increased water vapor in the atmosphere. Atmospheric temperature is an important factor that control the all phenomena on earth surface. As per IPCC AR 4 human influence has been dominant cause since 1950 for temperature rise. Recharge and input component is more important, Ozone depletion and increase in CFC Gases. Second increasement in the rate of evaporation and precipitation. High runoff erodes the upper permeable portion of the soil and affects the reserves of water resources.

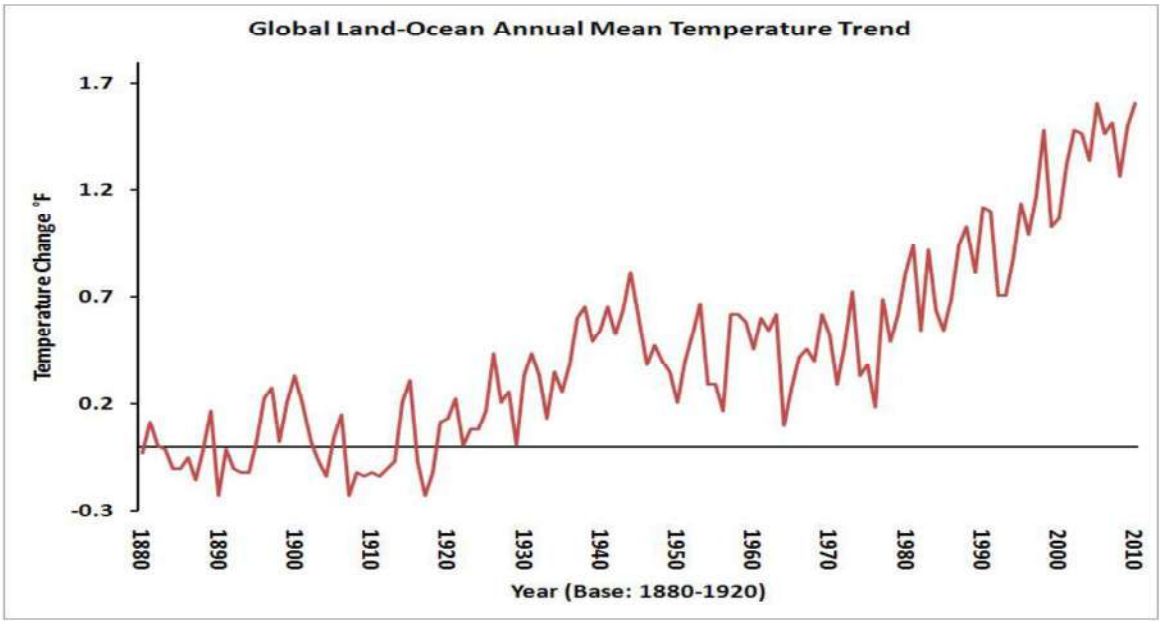

Figure 2

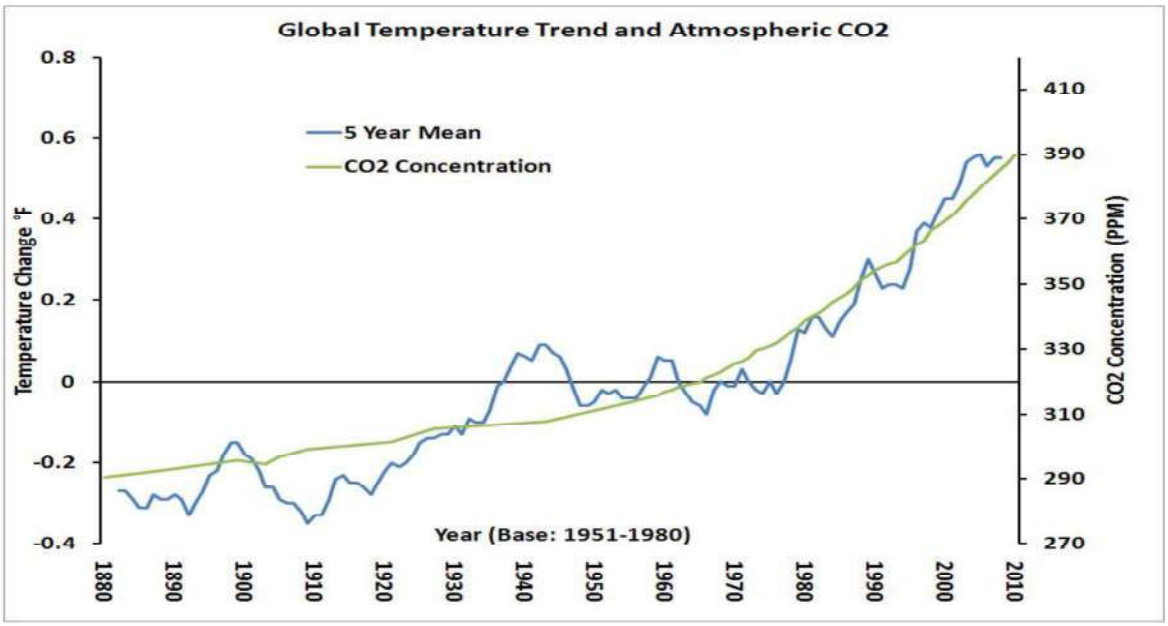

Figure 3

Impact and their Evaluation

Vegetation

Altitudinal shift of forest zones and mixing of different forest zones causes huge lose to mountain eco-systems. The Net effects of ongoing climate change with treeline advance and vegetation change on ecosystem carbon exchange, or possible effects on mountain hydrology, remain unresolved in the literature. Uncertainties remain regarding the effects of ecosystem-level carbon storage, given that above-ground biomass is higher in forests than in alpine vegetation and (new) trees may change soil carbon fluxes, for instance by introducing new soil organisms, thereby increasing soil carbon flux (e.g., Tonjer et al., 2021). The short- and long-term effects of combined warming and changed species cover on mountain soils are complex and insufficiently quantified (Hagedorn et al., 2019).

water

Sources of freshwater from mountains, such as rainfall, snow and glacier melt, and groundwater are strongly affected by climate change, leading to important changes in water supply in terms of quantity and, partly, quality and timing (e.g., shifts and changes in seasonality). In many cases, the effects on ecosystems and people are negative, e.g., creating or exacerbating ecosystem degradation, water scarcity or competition or conflict over water mainly in the foot hill areas. Many natural and gravitational kulh systems are badly affected. In middle and upper Himalayan region these gravitational irrigation channels dried due to climatic and human interferences in mountainous ecology.

Landslides and floods

People and Infrastructures are at Risks from Landslides and Flood. The amount of people and infrastructure at risk of landslides will increase in regions where the frequency and intensity of rainfall events is projected to rise (Gariano and Guzzetti, 2016; Haque et al., 2019). Extreme precipitation in major mountain regions is projected to increase, leading to consequences such as floods and landslide. Rain-on-snow events, which can accelerate all flood stages and result in widespread consequence for societies, are projected to increase between 2°C and 4°C GWL (but decrease afterwards) (SROCC Chapter 2 (Hock et al., 2019), AR6 WGI Chapter 12 (Ranasinghe et al., 2021)). There is high confidence that glacial retreat, slope instabilities and heavy precipitation will affect landslides and flood activities, although for landslides there are considerable uncertainties in the direction of change (Patton et al., 2019, AR6 WGI Chapter 12 (Ranasinghe et al., 2021) in case of Himalayas orographic impact also strengthen with the rise in temperature. Second with occasional formation of depression in the region may affect the intensity of precipitation in the area. The frequency of cloud bursts also increased.

Figure 4.Kedarnath cloud burst Uttarakhand

Following events are also the result of direct or indirect impact of global warming and climate change.

Cloud Burst: A **cloudburst** is an extreme amount of precipitation in a short period of time, sometimes accompanied by hail and thunder, which is capable of creating flood conditions. Cloudbursts can quickly dump large amounts of water, e.g., 25 mm of precipitation corresponds to 25,000 metric tons per square kilometre (1 inch corresponds to 72,300 short tons over one square mile). However, cloudbursts are infrequent as they occur only via orographic lift or occasionally when a warm air parcel mixes with cooler air, resulting in sudden condensation. At times, a large amount of runoff from higher elevations is mistakenly conflated with a cloudburst. The term "cloudburst" arose from the notion that clouds were akin to water balloons and could burst, resulting in rapid precipitation. Almost all areas of middle Himalayas are highly sensitive to cloud burst. Occasional incidents of cloud burst may be observed in other parts of Himachal Pradesh.

Figure 5 Collapse of Chakki bridge 2022, Figure 6. flash flood after cloud Burst in Dharamshala 2021

- Glacial lake outburst.
- Torrential rain falls
- Land slide and Blockade in river channel.

Increase in run off of river water.

70% rise in concretised surfaces increased flooding in Mumbai: Report Mumbai News
Updated on Sep 25, 2019 05:49 AM IST

Researchers said over the past 45 years, concretisation and filling up of wetlands that worked as flood absorbers has led to a 40% increase in the amount of rainwater entering stormwater drains that have not been rebuilt to handle the increased flow. Same effect In Himachal Pradesh the urbanization trend is follows:

Table-1

Himachal Pradesh

Census year	*Urban Growth (%)*
1971	6.99%
1981	7.91%
1991	8.69%

2001	9.8%
2011	10.03%

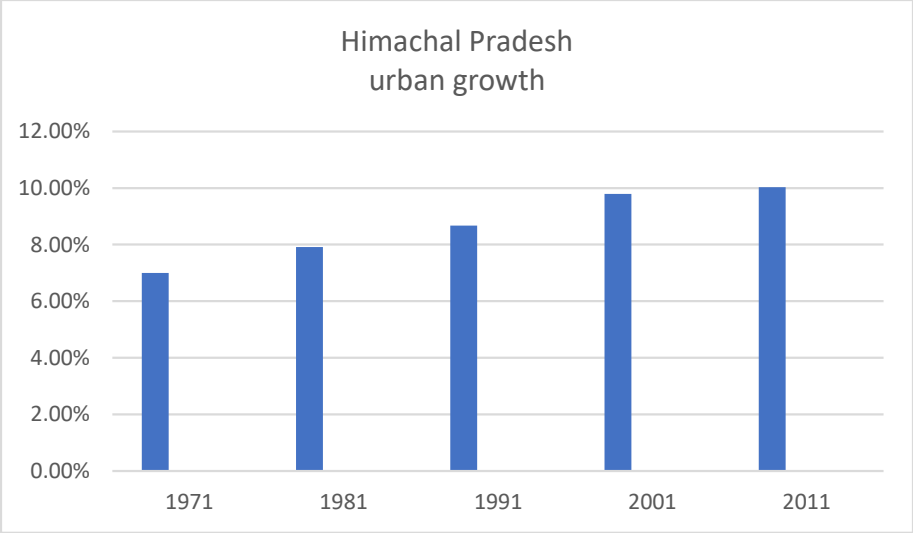

Figure 6

With rapid urbanization and concretization flowage and runoff gradually increased, and time water percolation process is also decreased. Over all in result……

- Rain-on-snow events (Leh and Kashmir flood, 6 August 2010 across a large part of Ladakh, Amarnath July 08, 2022 21:57:31 IST).
- Mixing of western disturbance with monsoon trough (Kedarnath cloud burst In June 2013).
- Altitudinal shift of snow line with rise in temperature, "The Weeping Apple Tree | Promote Documentary Film".
- Intrusion of riverine land scape in glacial land cape, when there is onset of rain in glacial areas with altitudinal shift of thermal zones in mountain areas with due effect of global warming. Outwash plain and morainal (recessional moraines) landscape converts in fluvial landscape. The huge debris flows with water causes blockade in river channels. This blockade and debris fill the river channel becomes cause of huge lose to property, lives, and landscape.

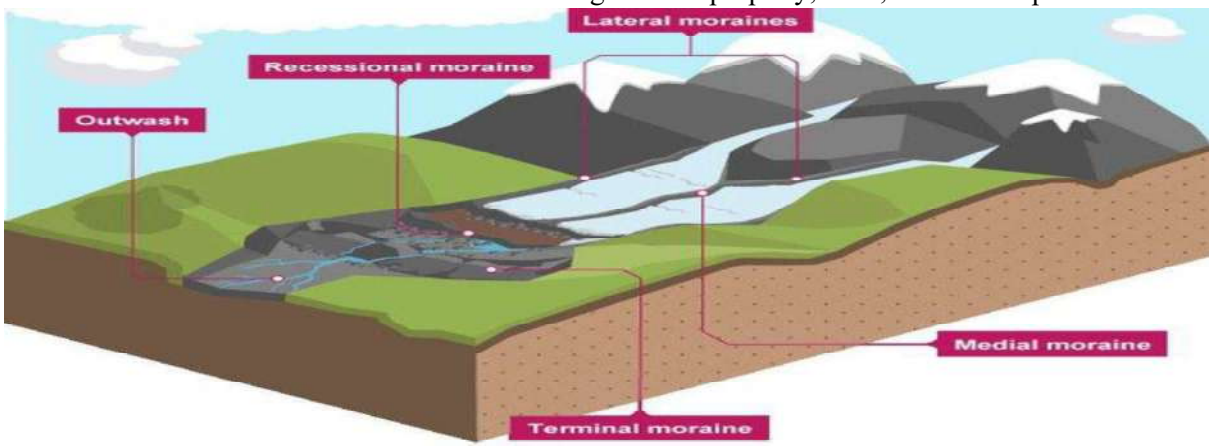

Figure 5. glaciated land scape

Shifting of agricultural/ horticultural zones

In Himachal Pradesh mainly Kullu valley evidently seen the impact of climate change, 30 years ago apple zone starts from Bajoura 1100mts and extended 80 kms towards Manali upto height of 1926mts and now this zone shifted 50 kms upward and starts from 1250mts Seubag and extends toward Manali

lahual-spiti upto 3000mts. Farmer have started farming of palm, vegetables, peaches, cauliflower and tomatoes, this transition is very painful for farmer but the temperature is still rising. This is very harmful for the agricultural ecology. The Hurla village of kullu valley still remembering the whispering sound of apple trees. Now that event becomes horticultural history for the farmer as "A weeping apple tree"

– Changes in temperature and seasonal precipitation patterns are reported to affect nutrient depletion of soils and increased incidence of pest attacks in crops (e.g., in cases in the HKH and in Peru); however, there is generally limited evidence on directs links specifically to climate-related changes in mountain regions. This also observed in Himalayan off seasonal vegetable cultivation zones of Himachal Pradesh, e.g., Kullu-Manali and lahaul-Spiti etc.

– Climate-induced hazards, such as erratic precipitation (rain, snow and hail), floods, droughts and landslides, have negatively affected the stable supply and transport of agricultural products and horticultural products in and out of remote mountain areas, such as Kullu-Manali and lahaul-Spiti etc.

– Warming temperatures and changes in the timing of seasons and frost conditions needed for seeding certain tree crops (Apple) impact lower-elevation mountain areas, such as in lower belts of middle Himalayas in western Himalayan region.

– Drought conditions negatively affect mountain grasslands (medium confidence), as reported in cases in western Himalayan region.

– In some cases, climate-related hazards lead to outmigration in mountain areas, with indirect negative impacts on labour deficits to support agricultural practices and productivity in mountain areas (medium confidence) (e.g., Uttarakhand, Himachal Pradesh and Jammu & Kashmir)

– Positive impacts (favourable growing conditions) are reported for the production of some fruits and vegetables in Higher reaches of the middle and greater Himalayan regions due to rise in Temperature new areas of cultivation emerges on high altitudinal zones. Same as in Gilgit-Baltistan province of Pakistan and for the production of traditional crops (e.g., local beans) in the Karnali region of Nepal.

– Impacts on pastoralism include changes in growing conditions associated with warming temperatures and declining precipitation, which in turn lead to negative impacts on livestock productivity, food security and livelihoods of pastoralist communities, including drought-induced degradation of rangelands (medium confidence) in huge part of western Himalayas including Himachal Pradesh, which exacerbate impoverished conditions in pastoral communities

Forest Fire

The long-term implications of a warmer global climate, coupled with more frequent and/or severe fires in mountain ecosystems, are expected to be transformative for mountain biota. Fire-sensitive montane forests, such as Australia's alpine ash (Eucalyptus delegatensis), are expected to become highly susceptible to population collapse and local extinction as intervals between fire events contract and become too short for species to reach reproductive maturity (Bowman et al., 2014; Enright et al., 2015)—an impact that will likely be further exacerbated by recruitment failure caused by post-fire drought and moisture deficiencies (Davies et al., 2019; Halofsky et al., 2020; Rodman et al., 2020). Fire and climate change are also likely to act synergistically in mountainous ecosystems, via positive feedbacks that increase fire frequency by changing vegetation composition to more flammable fuel types, thereby increasing landscape susceptibility to future fire (Camac et al., 2017; Tepley et al., 2018; Zylstra, 2018; Lucas and Harris, 2021). More frequent fires in these ecosystems will also exacerbate native and exotic species invasions (Catford et al., 2009; McDougall et al., 2011; Gottfried et al., 2012; Kueffer et al., 2013), faunal population declines (Ward et al., 2020), poor air quality (de la Barrera et al., 2018; Burke et al., 2021) and soil erosion and landslide risk (de la Barrera et al., 2018) and reduce freshwater catchment volumes and quality (Rust et al., 2018; Niemeyer et al., 2020), all of which will impact negatively on human health and well-being (Ebi et al., 2021). Himalayan areas are also most vulnerable to forest fire mainly in Autumn and summer season, coniferous forests are very much prone to forest fire. With the rise in temperature, unprecedented droughts in the area and less precipitation days fire incidents becomes more frequent in the region.

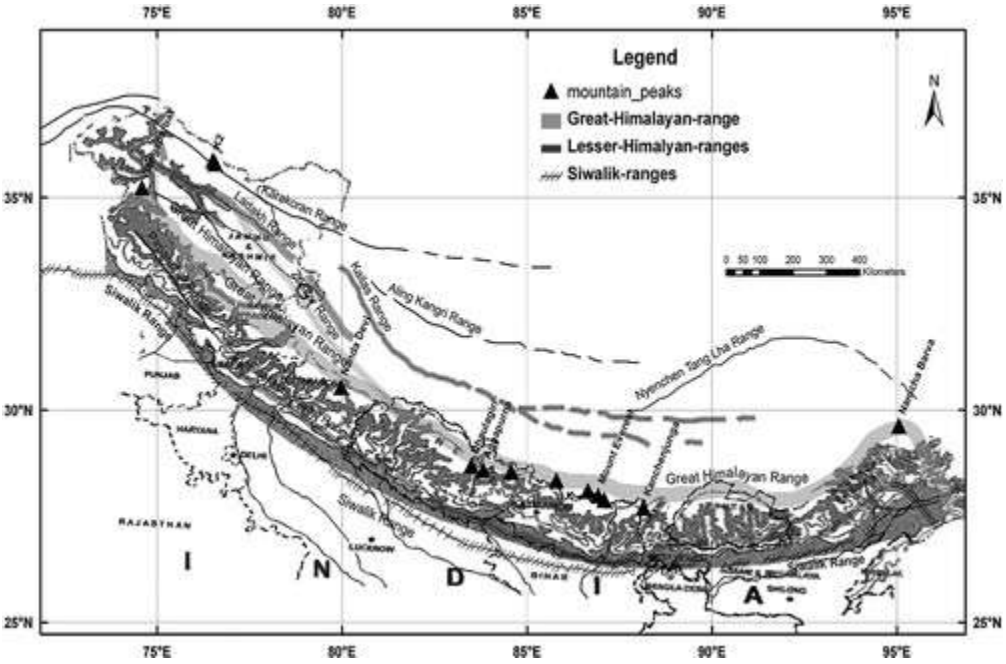

Figure 7

Precautions

– Recharging groundwater and adopting rainwater harvesting (including appropriate tillage methods to improve soil moisture),

restoration and rehabilitation of land,

diversification of agricultural crops (including introduction of stress resistant crop varieties), promotion of in situ (protected areas, conservation areas) and

ex situ (nurseries, gene banks, home gardens) conservation strategies,

afforestation and agroforestry.

Local knowledge is used to help maintain the productive and cultural value of mountain agriculture and pastoralism, such as in the French and Italian Alps, Western Himalaya in India and the mountains of northern Morocco. Fassio et al. (2014), Kmoch et al. (2018), Das (2021) Ecosystem- and community-based adaptations contribute to supporting the diversity and complementarily of management options, permaculture, and local capacities to adapt and support ecosystem functions vital for agrobiodiversity (medium confidence).

Since SROCC, the literature on climate change impacts on winter skiing tourism has remained dominated by studies focused on future climate change impacts and projected risks due to decreasing seasonal snow reliability (CCP5.3.1), most relevant when considering snow management and snow-making. Hock et al. (2019), Sauri and Llurdés (2020), AR6 WG1 Sections 9.5.3 and 12.4.10.4 – Climate-induced hazards in mountains, such as rockfalls, negatively affect access to some climbing, mountaineering, and hiking routes in summer (medium confidence), with cases mainly reported in the European Alps. Same as in Himalayan areas, Hock et al. (2019), Mourey et al. (2019, 2020)

Higher temperatures and extreme heat conditions at lower elevations have made some mountain destinations more appealing for human comfort, increasing the potential summer visitation demand and opportunities for tourism and recreation in mountains, such as in the European Alps and the Catalan Pyrenees (medium confidence) Himalayan regions. However, there is limited evidence on similar trends in mountain regions outside of Europe. Serquet and Rebetez (2011), March et al. (2014), Pröbstl-Haider et al. (2015), Steiger et al. (2016), Juschten et al. (2019a, b) CCP5 2288 Mountains The characteristics of natural hazards in mountain areas have been widely explored, and evidence suggests that conditions favouring cascading impacts are a common feature (high confidence) (Section 8.2.1.1) (Zimmermann and Keiler, 2015; Huggel et al., 2019; Kirschbaum et al., 2019; Schauwecker et al., 2019; Terzi et al., 2019; Motschmann et al., 2020a; Shugar et al., 2021).

Compound and cascading impacts have affected people, ecosystems and infrastructure and generate significant spill overs across numerous sectors, resulting in destructive impacts (Nones and Pescaroli, 2016; Kirschbaum et al., 2019; Schauwecker et al., 2019). Most adaptation responses to natural hazards in mountain regions are reactive to specific climate stimuli or post-disaster recovery (robust evidence, medium agreement) (McDowell et al., 2019; Rasul et al., 2020). Hard structural measures such as dikes, dam reservoirs and embankments have been widely employed to contain hazards, along with early warning systems, zonation, and land management (Box 4.1, 10.4.4.5, 12.5.3 and 13.2.2). Awareness raising, preparedness and disaster response plans are increasingly used in the context of more unpredictable hazard trends (see Cross-Chapter Box DEEP in Chapter 17) (Allen et al., 2016, 2018; Hovelsrud et al., 2018). Ecosystem-based adaptations (EBAs) are widely implemented to mitigate risks from shallow landslides (e.g., afforestation and reforestation and improved forest management), floods (e.g., river restoration and renaturation) (Renaud et al., 2016; Klein et al., 2019b) and droughts (e.g., adapting watershed) (Renaud et al., 2016; Klein et al., 2019b; Palomo et al., 2021). Evidence from different mountain regions shows that adaptation and risk reduction efforts are less successful if they focus on hazards or risks without considering diverse risk and value perceptions of the affected people (medium confidence) (French et al., 2015; Allen et al., 2018; Hovelsrud et al., 2018; Kadetz and Mock, 2018; Klein et al., 2019 b).

Previous experience and local social contexts of exposure to climate-related disasters affect people's perceptions and influence the patterns associated with disaster risk management and associated coping strategies (high confidence) (SROCC Chapter 2 (Hock et al., 2019)), (Kaul and Thornton, 2014; Shijin and Dahe, 2015; LanderosMugica et al., 2016; Wirz et al., 2016; Carey et al., 2017; Adler et al., 2019). Important synergies exist between disaster risk reduction, climate change adaptation and sustainable development in mountain regions (medium confidence) (Zimmermann and Keiler, 2015), where the multiple and diverse perceptions of risk and risk tolerance for natural hazards are relevant considerations (Schneider bauer et al., 2021).

Global agreements for integrated disaster risk management and climate change adaptation (Alcántara-Ayala et al., 2017), including the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR, 2015), the SDGs (UN, 2015), the Paris Agreement (UNFCCC, 2015) and the New Urban Agenda-Habitat III (UN, 2016), create opportunities for synergies to address disaster risks (see also Section 6.3). Although these agreements are well established in international agendas, there is limited evidence of their implementation to address disaster risk reduction and adaptation in mountains (Alcántara-Ayala et al., 2017). CCP5.2.7 Synthesis of Observed Impacts and Attribution and Observed Adaptations CCP5.2.7.1 Observed Impacts and Attribution to Anthropogenic Climate Change The assessment of observed impacts identified a large number of impacts across all major mountain regions of the world and for a large variety of systems, based on more than 300 references (SMCCP5.2). Overview of key observed impacts and adaptation on select livelihood activities and economic sectors References and relevant AR6 WGII sections Responses and adaptation

Diversification of tourism activities to non-snow activities has been reported as an adaptation approach to maintaining economic viability in some winter ski areas, partly due to the high cost of running snow-making infrastructure in winter, for example in the Pyrenees (Europe) and Australian Alps. Morrison and Pickering (2013), Sauri and Llurdés (2020) – In some cases, managing water resource availability and demand for snow-making is reported, with destination and large-scale governance highlighted as critical aspects for managing trade-offs, including overcoming conflicts arising from competing demands for environmental resources and land use (e.g., in French Alps and in Scandinavia). Demiroglu et al. (2019), Gerbaux et al. (2020) – For snow management, examples exist of dedicated climate services designed to enable better-informed decision- making on appropriate long-term adaptation (e.g., through a dedicated Copernicus Climate Change Service or real-time early was Climate change and mountain social-ecological systems

CLMIATE CHANGE DIRECT IMPACT INDIRECT IMPACT ADAPTATION OPTIONS IN MOUNTAIN REGIONS:

- People in and around mountain regions depend on these services for livelihood, income generation, food, health, and well-being Mountain ecosystems provide vital services, including water, forest, carbon storage and cultural values
- Precipitation changes (e.g., drying up springs, erratic rainfall, cloud burst)
- Decreasing regeneration potential
- Threatening native and endemic species Shortage of fodder
- Declining livestock populations Climate induced hazards (e.g., landslides)
- Altering habitat conditions Increasing wildfire weather
- Decreasing quality and quantity of ecosystem products
- Decreasing pollinator diversity
- Promote conservation of native flora and fauna and their habitat restoration
- Promote water harvesting (roof top, rain water) and multi-purpose projects for disaster risk management
- Promote mountain products (wild edibles, medicinal plants, cash crops, ecotourism)
- Restoration of degraded land/wasteland
- Promote agroforestry practices Crop diversification/ crop change
- Education and awareness building
- Poverty Food, nutrition, and health insecurity
- Outmigration Increase in area of fallow land Help species to adapt and protect refugia.
- Impact of climate change on mountain social-ecological systems, including ecosystem services and products, livelihoods of mountain

333 MM
IN 24 HOURS
HIGHEST-EVER RAINFALL IN DHARAMSALA

316 MM
ON AUGUST 6, 1958
THE LAST HIGHEST RECORDED

COLONIAL-ERA BRIDGE COLLAPSES

A portion of the Britishera railway bridge over the Chakki river in Kangra collapsed after flash floods in Kangra on Saturday.

Landslips, flash floods kill 20 in HP

TRIBUNE NEWS SERVICE

MONSOON MAYHEM 8 OF FAMILY AMONG 11 DIE IN MANDI | 743 ROADS BLOCKED

Vehicles hit by flash flood near Bagi nullah in Mandi.

मुल्थान, मणिकर्ण में फटे बादल, ब्यास में बाढ़ से मनाली में 30 मकान खाली कराए

कुल्लू के गोशान में पुल बहा, वशिष्ठ में हेलिपैड क्षतिग्रस्त, ब्यास में फंसे तीन लोग बचाए, मंडी के टाढ़ा में भूस्खलन टनल से आवाजाही

4 अगस्त तक भारी बारिश का येलो अलर्ट जारी

The Sunday Tribune
JALANDHAR | SUNDAY | 24 JULY 2022
HIMACHAL

Lease area not defined, illegal mining thrives in Paonta Sahib

DEEP NEXUS

Undefined leased area on the Yamuna riverbed often leads to dispute between HP and Uttarakhand.

EXPLOITING HIMACHAL

TAKE UP ISSUE WITH U'KHAND

Rainfall 3 pc deficient, but losses highest in five years

TRIBUNE NEWS SERVICE

SHIMLA, AUGUST 28

A house that collapsed in Chudana village of Chamba district.

MONSOON DATA FOR PAST 5 YEARS

Year	2018	2019	2020	2021	2022*
Rainfall (in %)	+17	-10	-26	-13	-3
Human loss	343	218	240	476	270
House damage	5,160	3031	1346	1,976	902
Loss (in ₹ crore)	1,520.36	1,202.69	872.32	1,151.72	1,721.35

*FROM JUNE 29 TO AUGUST 26

Heavy to Very Heavy Rainfall Events >= 204.5 mm in year 2021 Month-wise Rainfall during Monsoon Season-2021

Table-2

Serial no	Station name	Date	Rainfall Amount(mm)	Month	District
01	Shahpur	13-07-2021	264.0	July	Kangra
02	Dharamshala	13-07-2021	2296	July	Kangra
03	Palampur	13-07-21	210.2	July	Kangra
04	Palampur	19-07-21	230.0	July	Kangra

The average annual snowfall recorded in the state for all IMD stations for the year 2021 was 68.3 cm with the highest snowfall recorded as 460 cm in Gondhla in district Lahul Spiti.

SIGNIFICANT WEATHER EVENTS

Extreme weather events such as Extremely heavy Rainfall, Very Heavy Snowfall, lightning, thunderstorm, Hailstorm, Cold Wave occurred in HP during 2021.

Impacted Extreme Weather Events:

1. Heavy rainfall and flood-related incidents claimed over 55 lives in Himachal Pradesh ϖ There was loss of 55 lives in total due to floods, Heavy Rains and Landslides on account of Heavy Rainfall on 12,25,27 July and 11 August. Some other events led to the loss of 4 lives. There was no loss of Life on account of Lightning and Thunderstorm.
2. There were total of 11 Landslides as reported with the maximum occurrence in High hills with a annual frequency of 8. The number of occurrences has been maximum in Monsoon Season. A Total of 5 Cloud Bursts occurred during 2021 with the maximum occurrence observed in Kinnaur. The number of occurrences has been maximum in Monsoon Season.
3. Frequency of Occurrence of Landslides 2021 Frequency of Occurrence of Cloudbursts 2021 Low Hills Mid Hills High Hills Major Impact of Heavy Precipitation during Monsoon Season in HP District Place Damage Source Kangra Mcleodganj (Dharamshala) Car, bikes washed away. Shop destroyed Hindustan times/Outlook Magazine
4. Lahul Spiti Brahma Ganga NH-5 Block News/Media Lahul Spiti Mooring, Kwang and Kamring nullah SH-26(Tandi, Udaipur, Kadhu nullah) got blocked SDMA
5. Kinnaur Charang Khad near Rishpa village Two bridges got damaged SDMA

Annual District-wise Occurrence of Majors Extreme Weather Events Districts

Name of District	No Land slide	Lightning incidents	Cloud Brust	Flash flood
Bilaspur	2	1		
Chamba	4	1	3	2
Lahul-spitil	13	1	2	3
Kinnaur	9			
Mandi	14			
Kullu	6	1	2	
Shimla	25			
Simuar	3	1		
Kangra	5	1		
Solan	4			

6. Lahul Spiti Shakoli nallah (udaipur) Road Block SDMA
7. There were a total of 70 Western Disturbances (WDs) that impacted HP, with the maximum occurrence of 26 in the Pre monsoon season, followed by Monsoon season (20), Post monsoon (17), Winter season (10) ϖ The maximum number of WDs has been observed in the Pre Monsoon season. ϖ The thunderstorm activity was most frequent in Monsoon Season.

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WATER AND RESERVOIRS SYMBOLIZING HUMAN SACRIFICE, EXODUS AND DISENFRANCHISEMENT IN THE LITERATURE OF HILLS

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ABSTRACT

This paper attempts to bring forth the theme of water which is a sanctified symbol of the form of human sacrifice, submergence, and exodus as a dire consequence of building dams in the hills. The elixir called water sustains life but has deeper implications when we look into its multifaceted manifestations acquiring myriad cultural and civilizational connotations, especially in the hills of North India. It will explore the concept of human sacrifice for water that is practiced in the hills and also delve into the environmental hazards caused due to the building of dams that result in the exodus of the families residing in the towns and villages, that face submergence due to the backlogging of the river water, and their rehabilitation. The drowning of a place and its civilization and cultures have deeper psychological impacts on the generations that once thrived on them. Folklores of Himachal Pradesh that have been documented in books and research papers by eminent scholars like Karl Khandelwal and Vijay Sharma who is a prominent literary figure, will be described in the paper, besides the Research paper published in Mellow Journal by Kuldeep Sharma on the folklores of Chamba will also be discussed. The stories of submerged towns have been written about in various novels and books like Stuart Woods' *Under the Lake*, Mabel Esther Allan's *Pendron Under the Water,* and many such books with lakes and submerged towns in the backdrop of the stories would be referred to in general and the translated stories of SR Harnot's "The River has Vanished" in particular will be evaluated for delineating the impact of the Hydroelectric project in the hills. The Town of Bilaspur was submerged in the dam waters has been depicted in the history book and the poem on the Old Town by Shakti Singh Chandel and Abhyudita Gautam in the story "Gods Reinstated" and the book *The Town Under the Lake*, where the folksongs on the Old Town have been mentioned, will also be examined to emphasise the emotional bearing that these submerged towns have on the people's mind.

Keywords: Sanctity, Sacred, Human Sacrifice, Submergence, Exodus, Rehabilitation, Environmental Degradation

This paper attempts to bring forth the theme of water, a sanctified symbol of human sacrifice, submergence and exodus as a dire consequence of building dams in the hills. The elixir called water sustains life but has deeper implications when we look into its multifaceted manifestations, acquiring myriad cultural and civilizational connotations, especially in the hills of Northern India.

Given the importance of water to life, it is not surprising that as a potent symbol, it flows through literature, as a symbol of life, purity, rebirth, cleansing, sustenance, power, wisdom and grace. In Hinduism, water, one of the five elements of the earth, in the form of river is worshipped as a Goddess and assumes an even more important role when the rivers are assimilated into the ocean, considered to be a mighty form of God that encompasses the mysterious aquatic world and shelters the Lord Vishnu himself.

> The symbolism of water has a universal undertone of purity, clarity, refreshment, mystery and fertility…Water is, of course, mutable and sublime, sustaining and destructive, and throughout literature water serves as a representation not only of birth but of death, not merely of placidity but of violence…Fresh water represents good health and polluted water symbolizes bad health. …In literature the river is a sign of ease, grace and fluidity. It is used to represent the calm beauty of nature. Certain types of rivers are often described as auspicious and healthy…To Mark Twain water represents a boy's dreams, and a future of success. According to him 'High and fine literature is wine, and mine is only water; but everybody likes water.' (Roy)

The mountains have been a subject of wonder and awe expressed by creative writers and cinematographers in their works. Being the omnipresent geographical wonders, these forms of the earth's surface have captivated audiences with their aesthetic beauty and snow-lined horizon. The water in these mountainous regions has flowed through them as perennial rivers, rivulets, streams and brooks that have descended from the mountains as waterfalls. Water has been universally and religiously recognized as a purifying natural symbol cleansing the dirt, and of rebirth, washing the sins metaphorically, connecting people, places, and other forms of life, and inspiring and sustaining diverse cultural beliefs, values, and lifestyles. Mamang Dai writes about the rains in her poems that depict the spiritual sublimity of the rains.

> Drop the rainbow down,
>
> the rain is potent drink
>
> for spirits seeking heavenly brides. (Dai 3)

Water in the mountains has been in abundance catering to the needs of humans, but there are many instances in history where we hear stories of human sacrifices being carried out to please the deities and gods who were believed to bless and bestow the place with the bounties of nature and water. Human Sacrifice as an oblation to God, was symbolic of the belief system and the act represents an unquestionable faith that people depicted. Also in question is water's importance, which remained elusive in the highlands that lay much above the rivers with the water table down under the ground. The areas were barren and believed to be cursed and forsaken due to the wrath of Gods which is normally attributed to the past sins committed by the inhabitants or similar incidences that may have provoked the deities of that area.

In ancient times, the practice of Vedic Purusha Medha, meaning human sacrifice has been referred to as a practice that was prevalent. The various rationales behind human sacrifice are the same that motivate religious sacrifice in general. Human sacrifice is typically intended to bring good fortune and to pacify the gods, for example in the context of the dedication of a completed building like a temple or bridge. In ancient Japan, legends talk about *hitobashira* ("human pillar"), in which maidens were buried alive at the base of or near some constructions to protect the buildings against disasters or enemy attacks and almost identical accounts appear in the Balkans as the Building of Skadar and Bridge of Arta, where a lady and a boy were sacrificed respectively. We have heard of the great wars that have been fought to capture water resources in history and how the mightiest civilizations have settled near the rivers for ages across the world. The rivers, particularly in the Himalayan range of India, have originated from the glaciers of the mountains.

The hills of Himachal Pradesh resonate with the songs eulogizing such sacrifices that are generally made by the women folk of the ruling class of the regions where the moral responsibility of dealing with the problem of the scarcity of water lay on the rulers. The common theme in the tales of these sacrifices is the strong belief in the deities that often appeared in dreams of the ruler of that area and asked for a human sacrifice from one of the members of his family. After consultations with the courtiers and the advisories, the oracles and sorcerers, it is usually decided that the Queen or the Woman of the house would be the right person for the sacrifice, though it is believed that the woman herself offers her life to be laid down for the sake of her kingdom and to quench the thirst of the parched land and its people.

The most known story is that of Queen Sunanyna who lived during the tenth century, in Chamba town in Himachal Pradesh and was entombed alive on the top of the hill overlooking Chamba town. The story as narrated through the centuries is that the old capital of the kingdom which was shifted from Bharmaur to Chamba, faced a dearth of water. The erstwhile King, Sahil Verman, constructed a water channel from a natural water source flowing along the town. However, when the water didn't enter the newly built channel, it appeared in the dream of the king in the form of a spirit prophesying that it needs human sacrifice from the royal family if the king wanted water to flow through the channel. After a lot of consultations and contemplation, it was decided that the daughter-in-law of the King would be the right person for the sacrifice. "Such sacrifices", says historian Khandalavala, were not unknown in those far off days when the divine powers were believed to speak through the mouths of priesthood leading in extreme cases even to sacrifice of human life" (10). During the Sui fair, celebrated to commemorate the sacrifice of the Queen, young girls decked in their finest and traditional costumes, sing an elegy called 'Sukraat' in the local dialect. Sukraat symbolises the very night when the water of the Sarotha nullah reached the town.

> ….The story is deeply embedded in the folk songs of the district. In fact, in the traditional folk song of Chamba, called Dholaru, which is usually sung in the month of March on the beginning of New Year, according to Indian calendar, by the local folk singers, the sacrifice of the queen is commemorated by and large by them moving house to house..
>
> Kuhal supne ayi ho ranya jo
>
> Kuhal supne ayi na!
>
> Kuhal ke glandi oh bhayio
>
> Badiyan baliyan mai leni na!
>
> Kuhal appeared in the dream of king
>
> Kuhal appeared in his dream!
>
> Oh brothers! What the kuhal utters is
>
> Human sacrifice!
>
> …..The legend unravels the historical positioning of women of the royal palace where feministic stance of the folklore cannot be side lined. The folksong subtly unearths the patriarchal structuring of woman where a king was considered next to God, but for as far as the concept of appeasing the spirit for public welfare it was woman whose life was supposed to be put on stake. The king neither sacrificed himself nor his wife and son but the daughter-in-law who genetically didn't belong to his family. (Sharma 145)

Another story of a woman of a ruling class being sacrificed for ending the dry spell and rejuvenating the water resources is about Rukmani. The entire Auhar region, in the present-day Bilaspur district, was in trouble because of the scarcity of water despite their repeated efforts to dig wells. Once the ruler of Barsandh dreamt that if his son or daughter-in-law is offered as a sacrifice, the wells that have run dry would be flowing and brimming with water. The legend goes that a newly married young lady named Rukmani of Taredh Village married to the son of the Rundh family, Rajput ruler of Barsandh village, was buried alive by the side of the spot which was selected for digging a Baoli (Tank). The present Rukmani Kund, a blue-colored pond is believed to be

formed at the same spot, where she was buried alive. Due to her selfless and courageous act, she was immortalised as a Goddess in the region. People of her father's village Taredh, still refrain from drinking the water of the Kund which is the source of drinking and irrigation water in the area, adhering to the age-old custom of not consuming water from the daughter's home.

According to O.C. Handa, in Buddhist Art & Antiquities of Himachal Pradesh, up to Eighth Century A.D., such stories of Woman sacrifices were common instances in which women were sacrificed to Naga Devta for the sake of water. Similar stories can be taken into consideration like Rupi Rani of Gushal Village in Lahaul Valley, Rani Nayana of Raja Sahil Varman of Chamba, Bichi of Sirmaur, and Kandi Rani of Kishtwar in Jammu who were sacrificed to Naga Devta for the sake of water. Human Sacrifices to Naga Devta have been one of the most conspicuous features of the Austric Tribes, who are believed to have been present in the Himalayan ranges in the present-day world.

Besides the sacrifice of life for water, another aspect of this elixir and its manifestation as the provider and mainstay for electricity and irrigation for the teeming millions is the reservoirs created due to the backlogging of the rivers on which the multipurpose dams are built in the mountains. Though the lakes and their waters channelised to the far-flung deserts have boosted agriculture and also lit up the homes of the lesser privileged people living in the margins, the cost at which these developmental works is attributed to the sacrifices made by the residents of the submerged towns and villages who faced forced exodus and were rehabilitated at other places. The emotional and psychological impact that the submergence had on the generations that once thrived on the old town is the subject of many novels and stories written by many literary figures in Hindi Literature. This paper has taken up the study of the Old Town of Bilaspur which is one of the district headquarters of Himachal Pradesh and also other submerged areas of this hilly state.

Shakti Singh Chandel in his book *Bilaspur Through the Centuries* delineates the aftermath of the submergence of the town of Bilaspur in Himachal Pradesh that was completely drowned under water. Besides the residents' houses, monuments of archaeological importance like the palace of the royal family and temples too were devoured. Even the geographical wonders like the sprawling ground called the 'Saandu Maidan', which was believed to be the largest ground in the state and the whirlpool in Satluj River, were lost in the waters of the reservoir. The town's residents were rehabilitated at a hill above the submerged town and faced physical and emotional trauma during shifting. The impact of the exodus and rehabilitation inflicted psychological wounds on the older generation the most who had spent a major part of their lives in the old town. The book *Submerged and Rehabilitated* carries a story "Gods Reinstated" with the backdrop of the submerged town and a poem "Submerged and Rehabilitated" that narrates the agony of the people who were shifted. The book *A Town Under the Lake* is a pictorial account of the submerged town with a mention of the history and the folk songs dedicated to the old town. One has been mentioned below: -

Chal Mei Zinde

Nawi Duniya basani

Doobige Ghar Baar

Aai gaya Paani

(Jwala Prasad)

Oh my beloved! Come let's start a new life, our houses and property have been drowned as the water has come up…

Further a song by Jwala Prasad and Achar Singh Parmar titled, "Neele Jheelan Da Paani" depicts the plight of the oustees of the Old Submerged town of Bilaspur in the following lines:

Nave towna basi ne purane jo ronde .apne hi saamne apni kahani,

Teri anokhi kahani, tera bada dugha paani,

…….khatir tere tan asan jo doboya, buzurga ra sinjura bagh khoya (Prasad 24)

(We have settled in the New Town but we still long for the Old Town, your tale is mysterious and unique, your waters are so deep…for you we have devoured ourselves, we have lost the yards that our ancestors had cherished…)

The impending dangers of building a dam that brings along environmental complexities which result in the loss of ecosystems, traditional machinery and a changed course in the river is depicted in SR Harnot's story "The River Has Vanished" originally written as "Nadi Gayab Hai" in Hindi. With the backdrop of these issues of concerns, the story narrates the people's fear of losing their lands and also the environmental hazards

The novel *Paani Mein Chubhte Kaante* has been written by Trilok Mehra and deals extensively with the subject of the submergence of villages in the Reservoir formed due to the Pong Dam and delineates the pathos of the people who faced exodus. Naveen Halduvani too has presented his perspective on displacement caused by the pong dam water. Many such tales of devastation can be heard in other areas as well of the Himalayas. A dam called Surangani in the Chamba region was built in 1970 in the Baira Suil tributaries three phases resulted in the same consequences as the song below further portrays tensions that the natives of the area face as a large number of 'Kahu' trees were cut down during the process.

Chhoti-Surangani badda dam baneya

Kahuweri kuhadi ra maidan baniyan

Surangani is smaller and the dam is bigger

Forest of Kahu is converted into plain (Sharma 145)

The history of dams and resulting reservoirs is riddled with tragic stories of displacement and blatant disregard for the inhabitants of the town that are submerged in the waters of the reservoirs. Blind pursuit of hydroelectric power and the reservoirs that are created by dams submerge a vast area of cultivable land with rich biodiversity, destruction of cultural and historical sites, and displacement, with indigenous groups becoming victims of collateral damage. It is essential to tell the stories of those who were disenfranchised by dams, in order to bring awareness to the situation, push for recognition and justice and prevent future harmful projects from causing irreversible damage. The most famous of these drowned towns is the "Lion City" of Shi Cheng in China. An ancient city, Shi Cheng dates back hundreds of years and is now beneath the waters of Qiandao Lake. The city was drowned in 1959 to provide a reservoir for a hydroelectric dam, and now the white stone buildings seem to glow beneath the water. Many stories and novels like Stuart Woods's *Under the Lake*, Mabel Esther Allan's *Pendron Under the Water,* Eileen Dunlop's *Valley of the Deer* revolve around the theme of artificial lakes formed that drowned the cities and towns.

Water is used plentifully, quenching the thirst of millions at places where Queen Sunayana and Rukmani sacrificed their lives, their sacrifices immortally celebrated every year as fairs and festivals, lest they be forgotten. Much water has flown in the rivers since the dams were constructed, and the new towns and settlements have dwelled as the submerged cities lie underwater, frozen in time, sinking in silt, embedding the history with themselves. The human sacrifices and the exodus faced by a large number of people authenticate and affirm that water and the benefits derived from its tapping are far more important than life itself. Water is life but, in the mountains, life is for water.

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HUMAN EDUCATION IN 3RD MILLENNIUM AND NATIONAL EDUCATION POLICY 2020

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Abstract

Present education system is lacking with the basic needs of society that are love, affection, compassion, happiness, harmony, tenderness, kindness, ethics and social cohesiveness. Pivot of life is happiness; a happy individual creates a happy family that leads to happy society and at last happy World. Man is a social animal and social institutions are fabricated with love and affection. Are we leading toward emotionless mechanical and robotic society? And many more questions to be answered. Present education system is imparting only in the field of economic, industrial, mechanical growth but least in social growth. Anarchy, unrest, hate, greed, political supremacy, self-centered approach, violence, cheating are diseases spreading like pandemically in society and uprooting the social fabrications. Here is need to cultivate new education system.

- Key Words: Knowledge of India, Cheating, Violence, Tolerance and Equality. Empathy

Introduction: Early education always starts from the birth of child; mother makes the child fertile with love and passion. We see that children are very innocent and happy filled with love and affection in their childhood. But with the passage of time by getting modern education they become adult filled with anger and an unhappy individual. By education we are creating unhappy human beings. Is this right? Present time education directly or indirectly responsible for violence in the different societies of the world. Unrest and violence among people mainly youth in the various parts of the world directly indirectly seeded by education.

Modern education mainly dealt with senseless and robotic development of society. We only engaged in to create consumers and consumer goods. But not nurturing good human values such as love passion affection to each other. The western concept of education is mainly concerned with the materialistic and consumeristic development of society. This system is mainly responsible for the unrest amongst the various social and religious groups of the world. After all we all belongs to human race that have a sense to understand the emotions of each other. We are organized social animal, different from wild animals. We have no right to penetrate in wild atmosphere. So, there is urgent need to introduce new format of education that should have ability and capacity to sow seeds of love, passion affection in society to create happy human being, happy society and happy world.

Here is need to combined ancient Indian knowledge with modern education. Because in ancient Indian knowledge has capacity to create good human being with traits of love compassion, kindness and tenderness. Educationists and Philosophers say that education mainly related to brain development

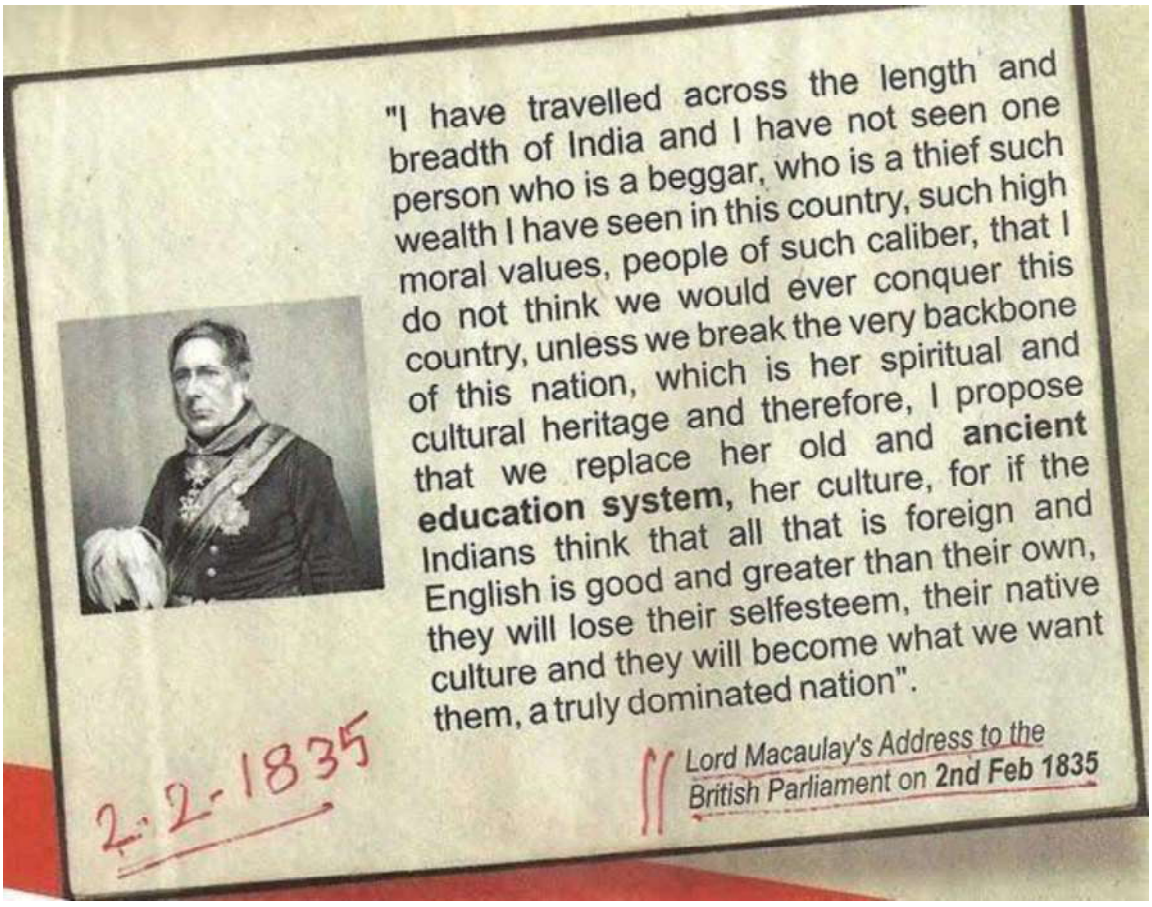
of an individual. By imparting education brain can be developed and utilized for construction or destruction. So, this is our responsibility to create constructive minds not destructive minds. The gun culture is growing in the western part of the world mainly youth in the schools open fire to exert their anger.

Same time question arises that, is the religion is playing an effective role in education in some context? No, the education is a light that guide us to think above religious paradox. Here if we think about the nature of human. It is more compassionate to take care of others. Taking care of others with kindness compassion and affection is a basic principle of education.

About teacher, a teacher may be a great scholar but without smile love tenderness and kindness he is a dangerous monster. Kindness love affection tenderness is the basic traits of a good teacher.

Especially in this age of science and technology we need education to inculcate moral and ethical norms which inherent social values, which create the fabric of the society to maintain a harmonious lives and awareness about the idea of unity in diversity.

Present time world economies are heading toward cut throat competition to catch the markets to reach out to the consumers especial to the Asian countries.



Now we need to revive our ancient education system that have the potential and strength to create Good human being. Let us work for……

Provisions in National Policy on Education 2020

1. "Knowledge of India" will include knowledge from ancient India and its contributions to modern India and its successes and challenges, and a clear sense of India's future aspirations with regard to education, health, environment, etc. These elements will be incorporated in an accurate and scientific manner throughout the school curriculum wherever relevant; in particular, Indian Knowledge Systems,

including tribal knowledge and indigenous and traditional ways of learning, will be covered and included in

- Mathematics
- Astronomy
- Philosophy
- Yoga
- Architecture
- Medicine
- Agriculture
- Engineering
- Linguistics
- Literature
- Sports
- Games, as well as in governance
- Polity
- Conservation.

Specific courses in

- Tribal ethno-medicinal practices
- Forest management
- Traditional (organic) crop cultivation
- Natural farming, etc. will also be made available.

An engaging course on Indian Knowledge Systems will also be available to students in secondary school as an elective. Competitions may be held in schools for learning various topics and subjects through fun and indigenous games. Video documentaries on inspirational luminaries of India, ancient and modern, in science and beyond, will be shown at appropriate points throughout the school curriculum. Students will be encouraged to visit different States as part of cultural exchange programmes. By inculcating these elements in Indian education system, our education system shall become capable to incorporate various socio-cultural values among young learners.

2**. *Students will be taught at a young age the importance of "doing what's right",*** and will be given a logical framework for making ethical decisions. In later years, this would then be expanded along themes of

- Cheating
- Violence
- Plagiarism
- Tittering
- Tolerance
- Equality
- Empathy, etc.

with a view to enabling children to embrace moral/ethical values in conducting one's life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. As consequences of such basic ethical reasoning, traditional Indian values and all basic human and Constitutional values Such as

Seva

In Hinduism and Sikhism, is the concept of selfless service that is performed without any expectation of result or award for performing it. Such services can be performed to benefit other

human beings or society. Seva means "service". A more recent interpretation of the word is "dedication to others.

Ahimsa

Ahimsa (Sanskrit: अहिंसा, IAST: *ahiṃsā*, lit. 'nonviolence), less commonly spelled ahinsa, is an ancient Indian principle of nonviolence which applies to all living beings. It is a key virtue in the Dhārmic religions: Hinduism, Buddhism, and Jainism.

Ahimsa is one of the cardinal virtues[2] of Jainism, where it is first of the Pancha Mahavrata. It is also the first of the five precepts of Buddhism. *Ahimsa* is a multidimensional concept, inspired by the premise that all living beings have the spark of the divine spiritual energy; therefore, to hurt another being is to hurt oneself. *Ahimsa* has also been related to the notion that any violence has karmic consequences. While ancient scholars of Hinduism pioneered and refined the principles of *ahimsa*, the concept also reached an extraordinary development in the ethical philosophy of Jainism. Lord Parsvanatha, the twenty-third *tirthankara* of Jainism, revived and preached the concept of non-violence in the 9th century BCE. Mahavira, the twenty-fourth and the last *tirthankara*, further strengthened the idea in the 6th century BCE. Between the 1st century BCE and 5th century CE, Valluvar emphasized ahimsa and moral vegetarianism as virtues for an individual, which formed the core of his teachings. Perhaps the most popular advocate of the principle of *ahimsa* in the modern times was Mahatma Gandhi

Swachchhata

Mahatma Gandhi devoted his life so that India attains 'Swarajya'. Now the time has come to devote ourselves towards 'Swachchhata' (**cleanliness**) of our motherland.

Satya

In the Vedas and later sutras, the meaning of the word satya (सत्य) evolves into an ethical concept about truthfulness and is considered an important virtue. It means being true and consistent with reality in one's thought, speech, and action

Nishkam karma

Nishkam Karma is a central theme in the Bhagavad Gita. An important philosophical concept in Karma yoga, it means to act unselfishly, or without personal gain in mind. When acting out of Nishkam Karma, an individual is acting without any expectation that good will be returned to him/her. In Sanskrit, *nishkam* means “action without motive,” “work without desire" or "desire-less.

Shanti

Shanti is a Sanskrit term meaning "peace." In both Hindu and Buddhist practices, shanti is often chanted three times to represent threefold peace in body, mind and spirit.In yoga, the *mantra Om Shanti Shanti Shanti* is often used at the end of a practice as an invocation of inner peace. This same mantra may also be used to close a Hindu or Buddhist worship service as a blessing of peace over the congregation. In India, *Om Shanti* is commonly used as a form of greeting upon meeting or parting with another person, much in the same way that *Namaste* is used. In this sense, Om Shanti can be translated as "peace be with you.’" In meditation practice, Om Shanti can also be used as a mantra in order to develop concentration and focus the mind.

Sacrifice

A *sacrifice* is something important or precious that is given up for the sake of gaining something or allowing something to happen that is considered more important, as in *I had to work hard and make a lot of sacrifices to achieve success*.

The word can also refer to the habitual act of giving things up in this way, as in *Achieving success requires hard work and sacrifice*.

Sacrifice can also be used as a verb meaning to give something up in this way, as in *I had to work hard and sacrifice to achieve success*. Sometimes, the word is used in situations involving surrendering something to prevent something bad from happening, as in *She sacrificed herself*

to save us. In all of these cases, the thing being *sacrificed* can be tangible, like a valued object, or intangible, like time or health, as in, *I would never sacrifice my health just to make more money*.

The word *sacrifice* is often used in the context of religion to refer to an offering or to the act of offering something to the god or gods being worshipped. Such a *sacrifice* might be an animal that is killed. The central figure of Christianity, Jesus, is viewed by Christians as having been a *sacrifice* for the sake of human salvation

Tolerance

a fair, objective, and permissive attitude toward those whose opinions, beliefs, practices, racial or ethnic origins, etc., differ from one's own; freedom from bigotry: *We are an international, multifaith, and multiracial school where the pupils are taught tolerance and respect for those, they may consider different from themselves.*

a fair, objective, and permissive attitude toward opinions, beliefs, and practices that differ from one's own: *The cleric preached religious tolerance and separation of church and state.*

interest in and concern for ideas, opinions, practices, etc., foreign to one's own; a liberal, undogmatic viewpoint: *Tolerance presupposes taking the other's perspective, not just being aware of it.*

the act or capacity of enduring; endurance: I *have a very low tolerance for noise and excitement. Of course, pain is subjective, because everyone has their own level of pain tolerance*

Diversity

The condition of having or being composed of differing elements: variety especially: the inclusion of people of different races (see race entry 1 sense 1a), cultures, etc.

Pluralism

Pluralism is a term used in philosophy, meaning "doctrine of multiplicity," often used in opposition to monism and dualism. The term has different meanings in metaphysics, ontology, epistemology and logic

Righteous conduct

Righteousness is the quality or state of being morally correct and justifiable. It can be considered synonymous with "rightness" or being "upright". It can be found in Indian religions and Abrahamic traditions, among other religions, as a theological concept. For example, from various perspectives in Hinduism, Buddhism, Islam, Christianity, and Judaism it is considered an attribute that implies that a person's actions are justified, and can have the connotation that the person has been "judged" or "reckoned" as leading a life that is pleasing to God

Gender sensitivity

Gender sensitivity is the process by which people are made aware of how gender plays a role in life through their treatment of others. Gender relations are present in all institutions and gender sensitivity especially manifests in recognizing privilege and discrimination around gender; women are generally seen as disadvantaged in society. Gender sensitivity trainings are used to educate people, usually employees, to become more aware of and sensitive to gender in their lives or workplaces. They are becoming more popular in the United States, particularly in areas of the service industry, such as healthcare and education

Respect for elders

Respect of elders is usually invoked to accuse younger generations of disrespect, or shaming them into conforming to standards of the past. But that’s not what it is really about. Yes, youth come with inherent naivety — and with age, wisdom — they always have. But using “respect” as a command in this fashion seems to prescribe a negative connotation to the idea. It turns it into a scolding when it should be so much more. Respect, after all, is defined as “a feeling of deep admiration for someone or something elicited by their abilities, qualities, or achievements.”

Respect for all people and their inherent capabilities regardless of background

- **Respect for environment**
- **Helpfulness**
- **Courtesy**
- **Patience**
- **Forgiveness**
- **Empathy**
- **Compassion**
- **Patriotism**
- **Democratic outlook**
- **Integrity**
- **Responsibility**
- **Justice**
- **Liberty**
- **Equality**
- **Fraternity**

will be developed in all students. Children will have the opportunity to read and learn from the original stories of the **Panchatantra, Jataka, Hitopadesh**, and other fun fables and inspiring tales from the Indian tradition and learn about their influences on global literature. Excerpts from the Indian Constitution will also be considered essential reading for all students.

- Basic training in health
- Including preventive health
- Mental health
- Good nutrition
- Personal and public hygiene

disaster response and first-aid will also be included in the curriculum, as well as scientific explanations of the detrimental and damaging effects ***of alcohol, tobacco, and other drugs.***

Indeed, The* National Policy on Education 2020 *is a document that have the potential to create good responsible citizens with all traits of civic man. By implementation of this policy, we can easily cope up with many current social evils and become able to uprooted them. By cultivation various life skills and good human values India can rejuvenate his old Indian cultural social values.

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संस्कृत वाङ्मय में नारी महत्व

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शोधसार

किसी भी राष्ट्र की सभ्यता व संस्कृति के निर्माण में तथा उसके विकास में नारी का महत्वपूर्ण योगदान है नारी में अनेक गुण विद्यमान है- दया, ममता, उदारता व त्यागादि नारी के इन्हीं गुणों के कारण न केवल वैदिक वाङ्मय में अपितु समस्त वाङ्मय में तथा यहां तक की दैनिक जीवन में भी उसका महत्व दृष्टिगोचर होता है। यद्यपि समय और परिस्थितियों के साथ-साथ उसे निन्दित शब्दों का सामना भी करना पड़ा तथापि सृष्टि प्रक्रिया में, गृहस्थ जीवन में, पति तथा संतान की कामना में उसका महनीय योगदान रहा है। नारी अपने इन महान गुणों के कारण न केवल अपने जीवन को महान बनाती है अपितु पति के जीवन को भी महान बनाने में उसका महत्वपूर्ण योगदान है तभी तो मनु ने कहा है कि जहाँ नारियों की पूजा होती है वहाँ देवता निवास करते हैं।[1] नारी के महत्व को शब्दों द्वारा न तो वर्णित किया जा सकता है और न ही इसकी आवश्यकता है क्योंकि हम अपने दैनिक जीवन में इसे स्वत ही अनुभव कर सकते हैं तथापि मैंने अपने इस लघुशोध प्रबंध में नारी के महत्व को वर्णित करने का प्रयास किया है।

प्रमुखशब्दा:- नारी, ब्रह्म,कल्याणी, कठोपनिषद्, रामायण, राज्याभिषेक, वाङ्मय

संस्कृत वाङ्मय में नारी के लिए स्त्री,योशिता, अवला, नारी, वधू, वामा, वनिता,तथा महिला[2] आदि अनेक शब्द प्रयुक्त हुए हैंनारी के सामाजिक तथा पारिवारिक कर्तव्यों की दृष्टि से समाज में उसके विभिन्न रूप दिखाई देते हैंमधुर एवं कामनीय स्वभाव के तथा माता-पिता की प्रिय होने के कारण वह कन्या है।[3] पत्नी रूप में उसे सहधर्मिणी,अर्धांगिणी भार्या,जाया व पाणिगृहिती आदि नामों से किया गया है[4]। नारी का सबसे प्रमुख रूप माता है जो उसे स्थायित्व और पूर्णता प्रदान करता है माता के रूप में उन्हें जनयित्री, प्रसूता जननी व अम्बा[5] भी कहा गया है। इन सभी रूपों में नारी सम्मान के योग्य है।

वैदिक युग में नारी को उचित सम्मान व अधिकार प्राप्त हुए हैं। वेदों में उसे प्रेरणादायी शक्ति कहा गया है। स्त्री ब्रह्मा हुई है[6] अर्थात स्त्री ही ब्रह्मा के समान मानव की जन्मदात्री और जीवन निर्मात्री है। ऋग्वेद में पत्नी को गृह की साम्राज्ञी[7] कल्याणी तथा वीर सन्तान को जन्म देने वाली[8] कहा गया है। माता के रूप में नारी को वेद में सर्वाधिक उच्च स्थान प्राप्त है। ऋग्वेद में माता को मही कहा गया है। नारी के बिना पुरुष अधूरा है इसलिए ब्राह्मण ग्रंथों में पत्नी के साहचर्य के बिना पुरुष अपूर्ण माना गया है, इसलिए अपत्नीक पुरुष को यज्ञ में बैठने का अधिकार नहीं था।[9] अतः नारी पुरुष की सहधर्मिणि थी जिसके बिना धार्मिक अनुष्ठान संपन्न नहीं हो पाते थे। पत्नी पति की साखा थी।[11] शतपथ ब्राह्मण में कहा गया है कि पत्नी पति की भी अर्धांगिनी है अतः जब तक व्यक्ति विवाह नहीं करता तथा संतान उत्पत्ति नहीं करता तब तक वह पूर्ण नहीं है।[12] नारी गृह की स्वामिनी है तथा घर की लक्ष्मी है।[13] भवभूति ने भी नारी को घर की लक्ष्मी कहकर संबोधित किया है।[14]

उपनिषद ग्रंथों में भी नारी की महता को प्रतिपादित किया गया है कठोपनिषद में इंद्रादि देवताओं के गर्भ को समाप्त करने वाली तथा ब्रह्म का उपदेश देने वाली हेमवती उमा नारी ही थी।[15] अन्यत्र कहा गया है कि जिस प्रकार माता पुत्र की रक्षा करती है उसी प्रकार ब्रह्मविद्या भी रक्षा करती है।[16] नारी के गौरव को मातृ रूप में प्रतिपादित करते हुए कहा गया है- मातृ देवो भव[17] ,माता ही सबसे बड़ा देवता है रामायण सीता के माध्यम से नारी के महान चरित्र को प्रभावित करने वाला महाकाव्य है।[18] वाल्मीकि जी ने कहा है कन्या के दर्शन को मंगल का हेतु बताया है। राम के राज्याभिषेक के समय भी अक्षत तथा सुवर्ण से युक्त पत्र लेकर कन्याएँ उनके आगे-आगे चलती रहती थी।[19]

महाभारत में कहीं-कहीं नारी कन्या को पुत्र के समान माना गया है[20] उस समय भी नारियों को उनके कर्तव्य और कर्मों की शिक्षा देने की व्यवस्था घर पर ही कर दी जाती थी जैसा कि उत्तरा को नृत्य गीत वादनादि की शिक्षा देने के लिए राजा विराट् ने वृहन्नला को नियुक्त किया था।[21] जीवन उपयोगी शिक्षा पर प्राय: कन्या को माता से ही प्राप्त होती थी इसलिए नारी के माता रूप को सर्वश्रेष्ठ बताया गया है[22]। भार्या अर्थात् पत्नी के रूप में नारी का स्थान कन्या से भी उच्च माना गया है। क्योंकि धर्म जो कि मनुष्य का परम पुरुषार्थ माना गया है उसकी विधि पूर्वक पालन में भार्या का महत्वपूर्ण योगदान हैभार्या ही धर्म संग्रह में सहायक है।[23]

नारी को सृष्टि की निर्माणकर्त्री भी कहा गया है क्योंकि माता ही पुत्र के शरीर का निर्माण करने वाली है अर्थात् शरीरोत्पति में माता ही प्रधान होती है। मनुष्य के शरीर रूपी अग्नि को प्रकट करने में माता ही अरणि का स्वरूप है। जिस प्रकार अरणियों से अग्नि प्रकट होती है उसी प्रकार पाँच भौतिक शरीर भी माता से ही उत्पन्न होता है। माता की सभी आर्त व दुखी प्राणियों के सुखों का विधान करने वाली है।[24] संस्कृत वाङ्मय में हमें अनेक विदुषी नारियों के उदाहरण मिलते हैं जो कि उनके महत्व को प्रदर्शित करते हैं। तपस्या अनुभूति तथा विद्वता उनके महान गुण थे। याज्ञवल्क्य ऋषि की पत्नी मैत्रेयी तथा याज्ञवल्क्य से शास्त्रार्थ करने वाली गार्गी ऐसे ही विदुषी नारियां थी।[25] सीता जी को माता सुनयना[26] और श्वसु कौशल्या[27] से पातिव्रत्य धर्म का उपदेश मिलता है जो कि उनकी विद्वता के परिचायक हैं। नित्य श्रवण मात्र से ही वेद के उदाहरणों को मुखाग्र करने वाली शकुंतला का उदाहरण हमें आदिपर्व में मिलता है।[28] इसी प्रकार द्रौपदी,सावित्री,अरुंधति,शाण्डिली आदि आश्रम में निवास करने वाली अनेक विदुषियाँ थी। सुलभा एक ऐसी ब्रह्मवादिनी नारी है जिसने विवाह से विमुख रहकर आजीवन ब्रह्मचारी रहते हुए ब्रह्म ज्ञान प्राप्त किया तथा राजा जनक से उसके विषय में शास्त्रार्थ किया।[29] नारी का सर्वाधिक महत्व माता के रूप में सर्वोपरि है इसलिए अपराध करने पर भी माता को अवध्य कहा गया है।[30] इसी तथ्य को ओर अधिक महत्व देते हुए मनु ने हजार पिता से भी बढ़कर माता का गौरव माना है।[31]

निष्कर्ष रूप में यह कहना जा सकता है कि इस सृष्टि प्रक्रिया में, गृहस्थ में तथा समाज में नारी का योगदान महत्वपूर्ण है। उसे गृहस्थ में सम्मान देकर गृह की साम्राज्ञी कहा गया है, यज्ञ की अधिकारिणी कहा गया। उपनिषदों में मातृ देवो भव और अन्यत्र नास्ति मातृ समो गुरु: कहकर नारी के महत्व को प्रतिपादित किया गया है। संक्षेप में कहा जा सकता है कि नारी का महत्व न प्राचीन काल में कम था और ना आज कम है। नारी आज भी समाज, सृष्टि तथा गृहस्थ के लिए उतनी ही आवश्यक है जितनी पहले थी अत: हमें नारी का सम्मान हर रूप में करना चाहिए। मैं अपने इस लघु शोध के माध्यम से आधुनिक पीढ़ी को नारी के महत्व और सम्मान के प्रति सजग करना चाहती हूँ।

संदर्भ ग्रंथ सूची :

1. यत्र नार्यस्तु पूज्यन्तेरमन्ते तत्र देवता।
यत्रैतास्तु न पूज्यन्ते सर्वास्तत्राफला क्रिया॥ मनुस्मृति ,3/56
2. अमरकोष,2/6/2
3. हलायुधकोष, पृ॰ 168-169
4. अमरकोष, 2/6/5,6
5. अम्बा सवित्री जननी च माता। हलायुध कोष ,2/504
6. स्त्री हि ब्रह्मा बभूविथ। ऋग्वेद ,8/33/96
7. सम्राज्ञी श्वसुरे भव सम्राज्ञी श्वश्रवांभव ,वही10/85/44
8. अघोरचक्षुरपति घ्न्येधि शिवा पशुभ्य: सुमना:सुवर्चा:।
वीरसूर्देवृकामा स्योना शं नो भव द्विपदे शं चतुष्पदे॥ वही 10/85/44
9. मही माता। ऋग्वेद ,5/47
10. अवज्ञो वा ह्येष:। योऽपत्नीक:। तै॰ ब्रा॰ 2/2/2/6
11. सखा ह जाया। ऐ॰ब्रा॰,7/13
12. अर्धो ह वाऽएषऽआत्मनो यज्जातस्माद्यावज्जायां
न विन्दते नैव तावत्प्रजायते असर्वो हि तावद् भवति।
अथ यदैव जायां विन्दतेऽथ तर्हि हि सर्वो भवति॥ श॰ ब्रा॰ 5/2/1/10
13. श्रिये वाऽएतद्रूपं यत्पत्न्य:। वही ,13/2/6/7
14. इयं गेहे लक्ष्मी .....उत्तररामचरित ,1. 38
15. .....केन॰ ,3/12
16. मातेव पुत्रान रक्षस्व श्रीश प्रज्ञां च विधेहि न इति , प्रश्नोपनिषद्, 2/13
17. तैतिरीयोपनिषद्, 1/11/2
18. काव्यं रामायणं कृत्स्नं सीतायाश्चरितं महत्। वा॰ रा॰ 1/4/7

19. अक्षतं जातरूपं च गाव: कन्या: सहद्विजा: ।
नग्न मोदकहस्ताश्च रामस्य पुरतो ययु:॥ वही ,7/128/38
20. पुत्रेण दुहिता समा । म० भा० अनुशा० ४५/१२
21 . महाभारत, विराटपर्व ,10/8-10
22 नास्ति मातृ समो गुरु: । म० भा० शांति पर्व,106 /16
23. नास्ति भार्या समो लोके सहायो धर्म संग्रहे । वही ,142/10
24. अस्य मे जननी हेतु: पावकस्य यथारणि: ।
माता देहारणि: पुंसां सर्वस्यार्तस्य निर्वृति: ॥ वही 285/25
25. बृहदारण्यकोपनिषद्, 3/6, 4/5
26. पाणिग्रदानकाले च यत् पुरा त्वन्निसंनिधौ ।
अनुशिष्टं जनन्या मे वाक्यं तदपि मे धृतम् ॥ वा०रा० 2/118/8
27. साध्वीनां तु स्थितानां तु शीले सत्ये श्रुते स्थिते ।
स्त्रीणां पवित्र परमं पतिरिको विशिष्यते ॥ वही० 2/39 / 24
28. महाभारत, आदिपर्व, 68/61-63
29. वही, शांतिपर्व, अध्याय ,308
30. अवध्या हि सदा माता पिता चाप्यपकारिणौ वही,109 /18
31. सहस्र तु पितृन्माता गौरवेणातिरिच्यते ॥ मनुस्मृति ,2/145

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AWARENESS, USAGE, AND PERCEPTIONS OF ARTIFICIAL INTELLIGENCE AMONG TEACHER TRAINEES OF HIMACHAL PRADESH

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KeyWords
AI among Teacher Trainees, AI in Education, Perception of AI

ABSTRACT

Artificial Intelligence (AI) is playing an important role in modern education. It is important to understand how the future teachers perceive and engage with AI with respect to teaching learning process. Himachal Pradesh is a leading state in India to introduce the digital educational technology to improve the student learning. In order to study usage and perception of AI among teacher trainees of Himachal Pradesh, a descriptive survey was conducted using an online questionnaire. A total of 65 participants responded, representing diverse locations in Himachal Pradesh. It has been observed that a majority of participants actively use AI for personalised learning and to explore new topics. Its use for pedagogical tasks such as lesson planning remains limited. Most participants are aware of general-purpose AI tools like ChatGPT, but few are familiar with AI applications designed specifically for education. There is a strong positive perception of AI's potential to enhance teaching and learning. But teacher trainees are concerned about over-reliance on AI and its impact on critical thinking. There are also concerns over ethical issues such as data privacy. The study highlights the need for development of explainable AI for education and structured training on AI integration within teacher education programmes to support informed and effective use of these tools in future classrooms.

INTRODUCTION

Artificial Intelligence (AI) is a field of computer science, which deals with the development of systems, which are capable of performing tasks, which usually require human intelligence [1]. AI has applications in various fields including healthcare, finance, education, transportation, agriculture, and cybersecurity etc. AI in education enhances learning experiences in education through personalized content and intelligent tutoring systems [2].

There are different points of view on integrating AI in education reflecting on its potential benefits and associated challenges. One point of view is that AI can personalize learning, automate administrative tasks, and provide real-time feedback, which shall result in improving educational efficiency and outcomes. It can also help identify students' strengths and weaknesses, enabling personalised instruction. On the other hand, critics express concerns regarding data privacy, ethical use, and the risk of widening the digital divide. There are also apprehensions about over-reliance on technology and the potential reduction in human interaction, which is essential for holistic learning [3].

Teacher trainees are an important part of the change in the teaching-learning process of the future because they are the future educators who will implement innovative pedagogies, integrate emerging technologies, and address diverse learner needs. Their training equips them with contemporary skills such as critical thinking, digital literacy, and inclusive practices, which are essential for modern classrooms [4]. With the change in education system, teacher trainees play an important role in shaping and adopting to upcoming changes in the education systems to keep teaching, learner centred.

Himachal Pradesh is a state in India, where education is changing through a combination of policy reforms, digital integration, and quality enhancement initiatives. The state has historically maintained high literacy rates and wide access to schooling, but recent developments reflect a shift towards improving learning outcomes and aligning education with 21st-century needs. AI can be a supportive tool for teachers and teacher trainees as well, using AI, teachers can improve their teaching efficiency. AI can assist teachers

in handling multi-grade and multi-level classrooms effectively [5].

It is important to study the perception of teacher trainees towards AI in education because their attitudes, understanding, and readiness will significantly influence the effective integration of AI tools in future classrooms. As prospective educators, their acceptance and competence in using AI can determine how successfully these technologies are adopted to enhance teaching and learning processes. Moreover, their perceptions can highlight gaps in training programs, reveal ethical or practical concerns, and guide the development of targeted interventions to ensure responsible and meaningful use of AI in education [6].

Studying the use and perception of AI in the teaching–learning process by teacher trainees in Himachal Pradesh is important because their beliefs, attitudes, and readiness directly shape how AI tools will be implemented in future classrooms. The objectives of this study are to examine the awareness, usage and perception of AI tools among teacher-trainees. In addition to this, to identify the challenges faced by them in using AI for teaching learning process.

METHOD

A descriptive survey research method was employed to assess the awareness and usage of Artificial Intelligence (AI) tools, among teacher-trainees of Himachal Pradesh, in the teaching-learning process. The data was collected through a structured online questionnaire developed using Google Forms. The questionnaire included both close-ended and open-ended items designed to capture demographic details, awareness, usage patterns, and perceptions regarding AI in education. Convenience sampling was used to select participants who were accessible and willing to respond online. The data was collected in the month of June, 2025.

The survey was distributed electronically to teacher-trainees across various districts of Himachal Pradesh. A total of 65 participants responded to the questionnaire. Among them, 42 were female and 23 were male. Regarding age distribution, 44 participants were in the 20–25 years age group, 15 participants were between 26–30 years, and 6 participants were above 30 years of age. In terms of educational qualification, 36 participants were postgraduates, while 29 were graduates. The participants were enrolled in teacher education programme Bachelor in Education (B.Ed.).

RESULTS

The findings show diverse patterns in AI usage. More than 70% participants use AI for personalised learning and exploring new topics of interests. Approximately 50% (32 participants) use AI for creating presentations and assignments. While a lower number of participants i.e. 23 participants used AI for lesson planning. More than 90% students are aware of ChatGPT, while 0-2% participants are aware of the AI tools, that are built specifically for educational purposes like CuriPod, MagicSchool AI, Eduaide. AI Usage patterns show that approximately 45% use AI regularly, while 48% use occasionally. The results suggest that proper training may be provided to trainee teachers on use of AI tools to support decision making tasks in teaching learning process, in order to make teaching learning more effective.

The findings indicate a positive perception among teacher-trainees regarding the role of Artificial Intelligence in enhancing the teaching-learning process, as shown in Figure 1. Out of 65 participants, 40 (62%) agreed and 17 (26%) strongly agreed that AI can improve educational practices. This shows that a substantial majority nearly 88% recognize the potential of AI to make teaching more effective and learning more personalized and engaging. Only 8 participants (12%) remained neutral. On further inspection, it was observed that, out of 8 participants who were neutral, 1 used AI rarely, while 7 used occasionally. Indicating lower exposure to AI tools.

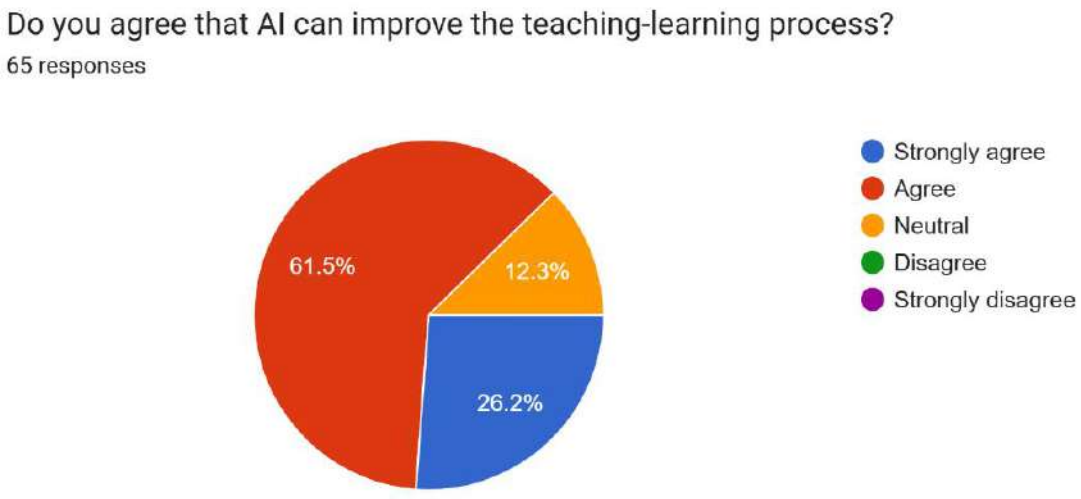

Figure 1: Perception of teacher trainees on improvement of teaching learning process using AI.

There is a strong consensus among teacher-trainees that AI tools can contribute to making learning more personalised and effective, as shown in Figure 2. Out of 65 participants, 45 (69%) agreed and 16 (25%) strongly agreed with this statement, reflecting a high level of confidence in the adaptive and student-centred capabilities of AI technologies. Only 4 participants (6%) remained neutral, suggesting minimal scepticism or limited exposure to such tools.

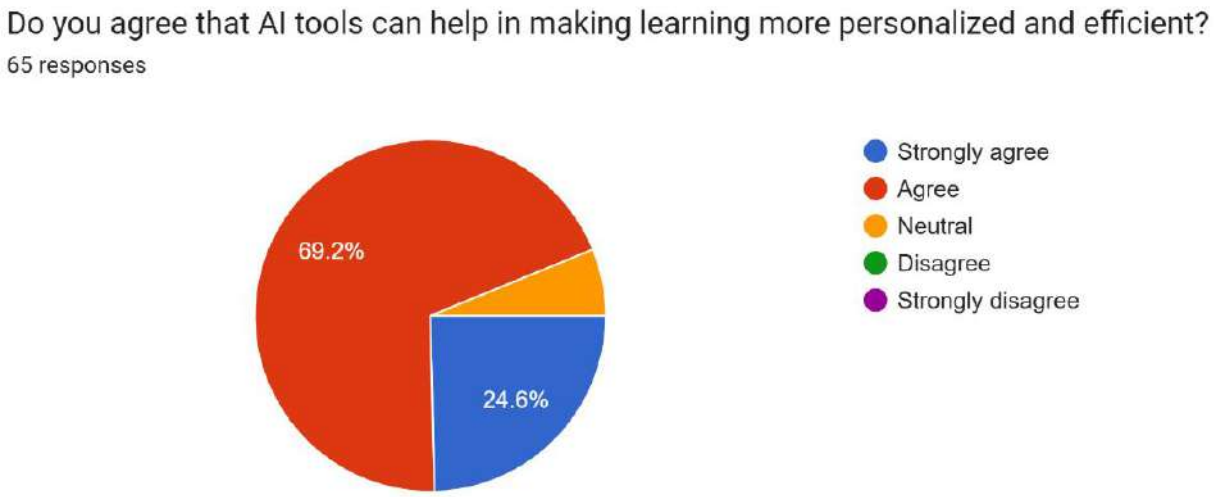

Figure 2: Perception on personalisation of learning.

The responses regarding the concern that over-reliance on AI tools may lead to a decline in the quality and richness of educational content, 29 participants (45%) agreed and 9 (14%) strongly agreed, indicating that a majority recognize the risk of AI diminishing the depth and originality of learning materials, as shown in Figure 3. However, 20 participants (31%) remained neutral, and 7 (11%) disagreed, suggesting that opinions are somewhat divided, with a portion of respondents either uncertain or not perceiving it as a significant issue.

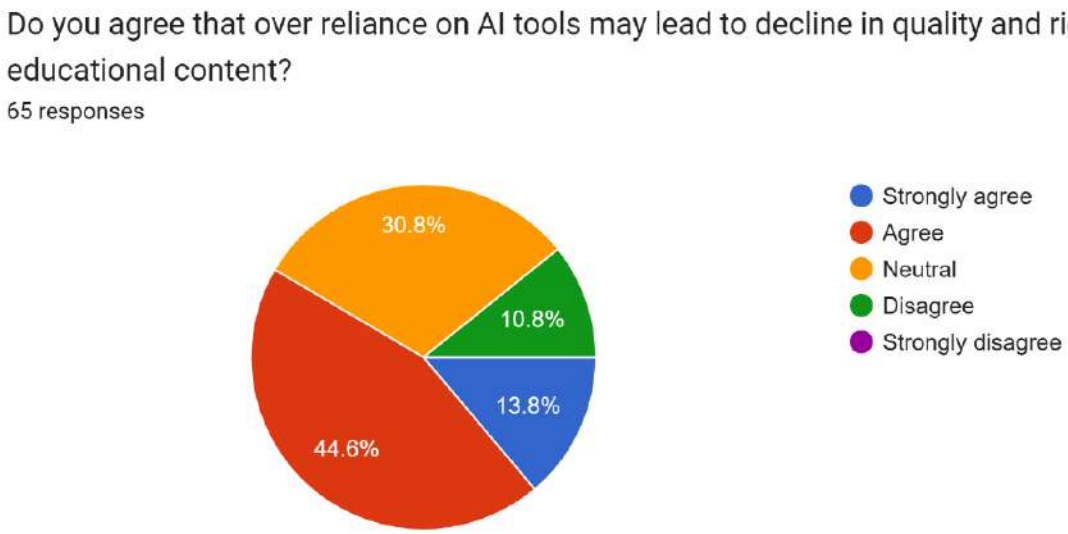

Figure 3: Perception of over reliance on AI

Similarly, when asked whether AI is affecting the critical thinking skills of human beings, the concern appeared more pronounced, as shown in Figure 4. A larger proportion i.e. 31 participants (48%) agreed and 22 (34%) strongly agreed, believing that increasing dependence on AI may hinder the development or exercise of independent thought and reasoning. Only 10 participants (15%) remained neutral, and 2 (3%) disagreed, indicating minimal resistance to this view. These findings suggest that while teacher-trainees acknowledge the usefulness of AI, many also express concerns about its possible long-term effects on creativity and integrity of educational content.

In response to the question whether they agree that the use of AI tools raises ethical concerns, such as the risk of personal data being accessed or exposed to third parties, 15 participants (23%) strongly agreed and 39 (60%) agreed, indicating that a substantial

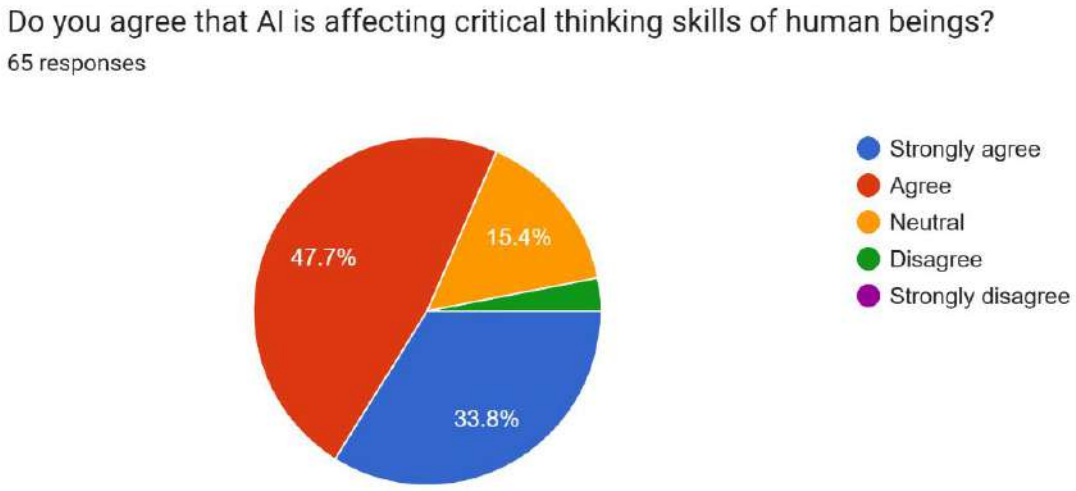

Figure 4: Perception of effect of AI on critical thinking skills

majority (83%) are conscious of the potential privacy and data security risks associated with AI technologies, as shown in Figure 5. Meanwhile, 11 participants (17%) remained neutral, suggesting that some may lack sufficient knowledge to form a definite opinion on the issue.

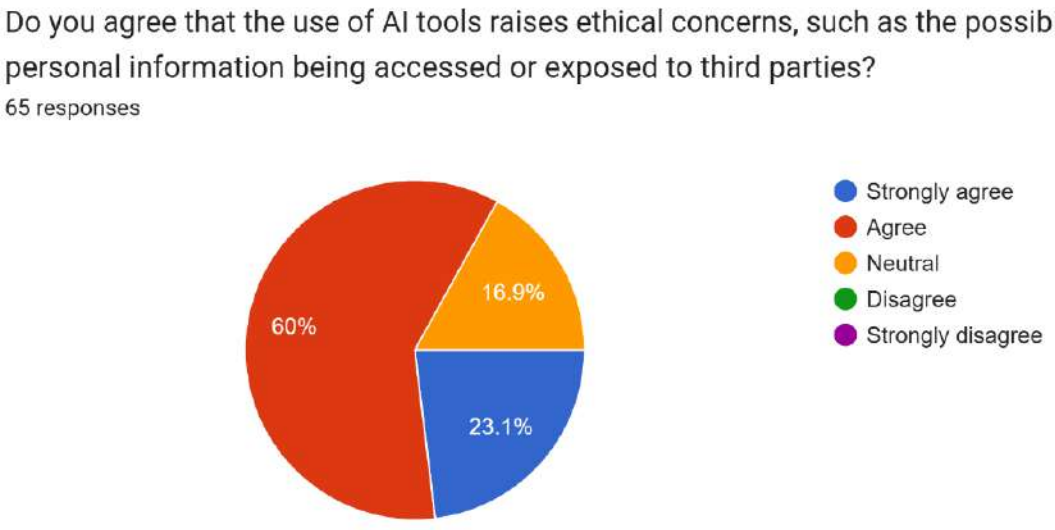

Figure 5: Ethical considerations.

The responses on challenges faced while using AI tools reveal multiple concerns among teacher-trainees. The most common issue cited was privacy and security, with 44 (67.7%) participants expressing concern over how their data might be used or exposed. This was followed by 38 (58.5%) participants who reported a fear of dependency on AI, indicating apprehension about over-relying on

technology for academic or cognitive tasks. Additionally, 25 (38.5%) participants mentioned a lack of trust in AI, reflecting doubts about the reliability or accuracy of AI-generated content. 21 (32.3%) participants identified lack of technical knowledge or training as a barrier, suggesting the need for structured support and skill development. Limited internet access was also noted by 17 (26.2%) participants, highlighting infrastructural limitations, especially in rural areas. A smaller group of 4 (6.2%) participants pointed to language barriers as a challenge.

DISCUSSION

There are diverse patterns in the awareness, usage, and perceptions of Artificial Intelligence (AI) tools among teacher-trainees in Himachal Pradesh. A significant majority of participants have begun integrating AI into their academic practices, although the nature and frequency of usage vary widely. One of the most notable observations is the extensive use of AI for personalised learning and exploring new topics, with over 70% of participants engaging in these activities. This reflects a growing trend towards student-centred learning, where AI supports independent study and differentiated instruction.

More than 90% of respondents were familiar with widely known AI tools like ChatGPT. But, the awareness of AI tools specifically designed for education such as CuriPod, MagicSchool AI, or Eduaide or GradeGuardian, which was mentioned in the report [5] was extremely low (0–2%). This gap suggests the need to introduce teacher-trainees in educational technologies beyond general-purpose AI tools.

A combined 88% of participants agreed or strongly agreed that AI can improve educational practices. Further analysis revealed that neutral responses (12%) were more common among those who use AI less frequently, indicating that exposure may play a significant role in shaping perception. Similarly, 94% of participants believed that AI contributes to personalised and effective learning, showing confidence in the adaptive capabilities of AI tools.

Despite these positive views, participants also expressed critical concerns regarding the overuse of AI. Nearly 59% of respondents agreed or strongly agreed that over-reliance on AI could negatively affect the quality and richness of educational content. An even larger proportion (82%) believed that AI use might hinder the development of critical thinking skills, suggesting concerns about the diminishing role of human reasoning and intellectual engagement in learning.

Ethical concerns were also prominent. A substantial 83% of respondents acknowledged the potential risks of data privacy and security breaches associated with AI use. This awareness is encouraging, as it points to a responsible and reflective approach to technology use among future educators. However, the 17% neutral responses suggest that not all trainees fully understand the ethical dimensions of AI, underlining the need for digital ethics education.

The challenges faced in using AI tools are privacy and data security, followed by a fear of dependency on AI and a lack of trust in AI-generated content, focussing on the need for development of explainable AI in education. Additionally, technical barriers such as limited training, poor internet access, and language issues were also identified. These findings emphasize the importance of infrastructure development, digital literacy, and capacity-building programmes to support the effective and ethical use of AI in education.

Conclusion

AI is increasingly being adopted for personalised learning and exploring new topics, its integration into core teaching tasks such as lesson planning remains limited. A majority of participants expressed positive attitudes toward the role of AI in enhancing the teaching-learning process, particularly in terms of making learning more efficient, engaging, and student-centred. However, the study also uncovered critical concerns among teacher-trainees, particularly related to over-reliance on AI, its impact on critical thinking skills, and ethical issues such as data privacy and security. Challenges such as lack of technical training, limited awareness of educational AI tools, and infrastructural barriers further hinder the effective and responsible use of AI in education. These findings highlight the urgent need for development of explainable AI in education, and structured AI training within teacher education programmes, with a focus on pedagogical applications, digital ethics, and critical engagement. By equipping future educators with the necessary knowledge and skills, AI can be meaningfully integrated to enhance teaching effectiveness, while safeguarding the integrity and richness of educational content.

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