IGES

Institute for Global Environmental Strategies

Climate Security Challenges in the Asia-Pacific: Securing Energy, Trade and Transition

Organizer:
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South Asia stands at a crossroads

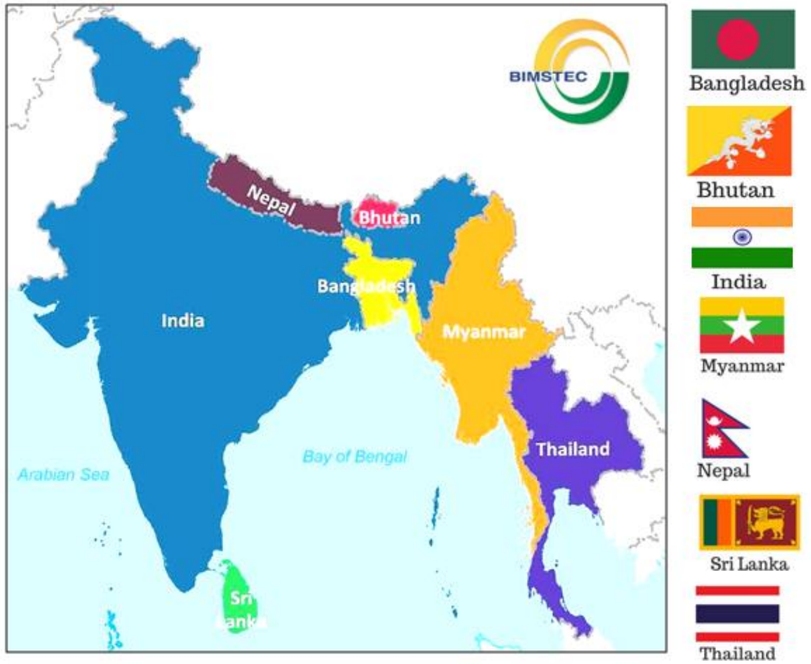
- climate disasters,
- energy insecurity,
- and resource conflicts threaten stability,
- but a resilient energy transition offers hope.

South Asian regional entities

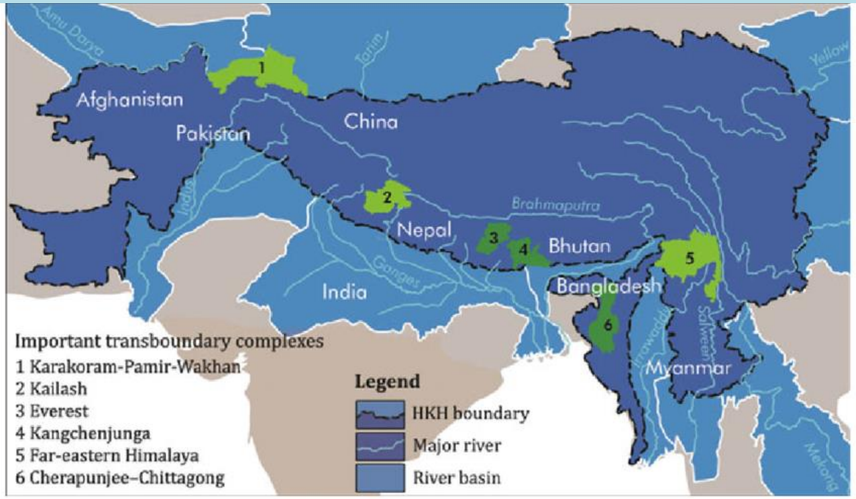
1. SAARC
2. BIMSTEC
3. ICIMOD

SAARC

BIMSTEC



ICIMOD



Objective

- Examine how regional cooperation, adaptive infrastructure, and integrated policies can secure South Asia’s future.

Scope

- Focus on vulnerability, energy challenges, and actionable solutions

South Asia’s Climate Vulnerability

- Region hosts 1.9 billion people, with 70% exposed to climate risks (World Bank, 2023).
- Annual economic losses from disasters: $15 billion (UNESCAP, 2022)

Examples:

- Pakistan’s 2022 floods: 33 million displaced (UN OCHA, 2022).
- Himalayan glacial melt: 40% retreat by 2050, threatening water for 240 million (ICIMOD, 2021).

Implications:

- Food insecurity, migration, and heightened regional tensions.

Energy Insecurity: The Current Landscape

- 70% of energy from fossil fuels; 40 million lack electricity (IEA, 2023).
- India’s coal dependency: 55% of power generation (CEA, 2023).

Challenges:

- Rising demand: 4% annual growth (IEA, 2023).
- Climate disruptions: Hydropower output fell 20% in 2022 due to droughts (IPCC, 2022).

Opportunity:

- Solar potential: 1,500 GW; wind: 300 GW (IRENA, 2021).

Transboundary Resource Conflicts

- Shared rivers (Indus, Ganges, Brahmaputra) spark geopolitical friction.
- Example: India-Pakistan Indus Waters Treaty disputes intensified by climate stress (Chellaney, 2021).
- Upstream damming reduces hydropower potential downstream.
- Cooperative resource management to prevent conflict and ensure energy stability.

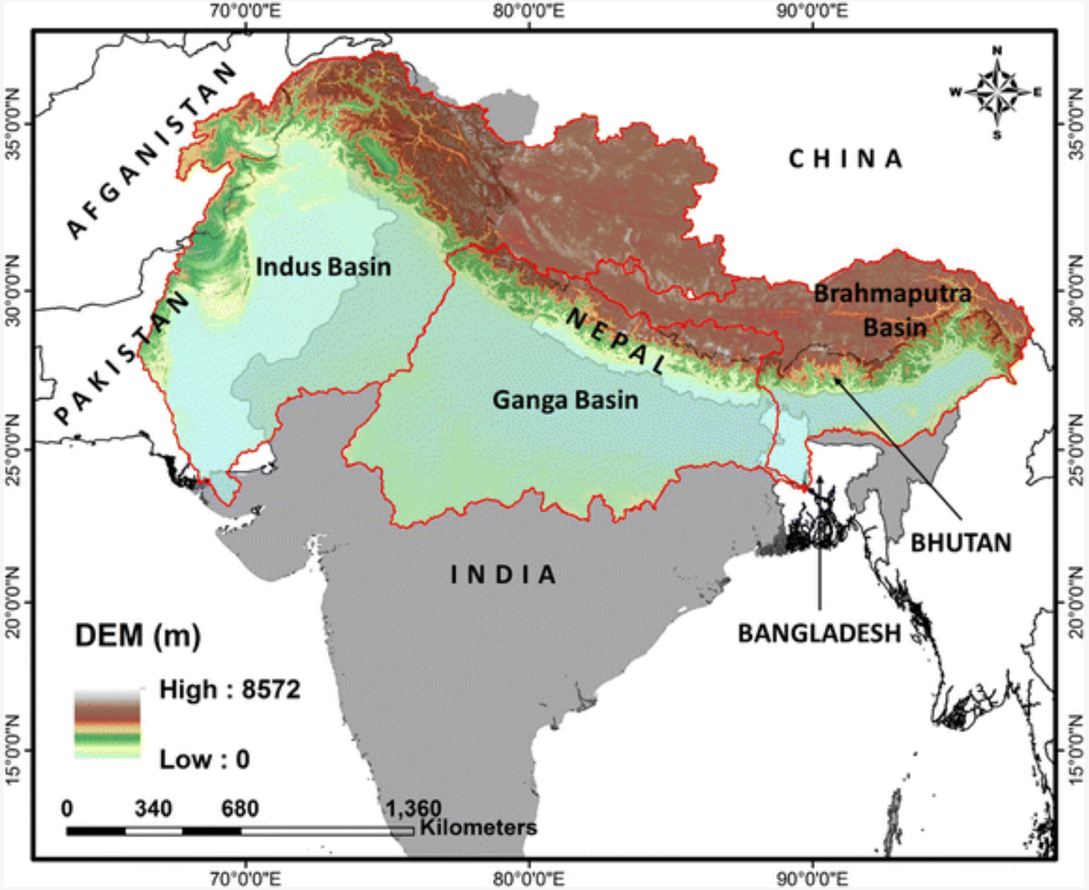


Fig. Major Himalayan rivers of South Asia

Source:https://www.researchgate.net/publication/315651259_Risk_and_Opportunity_Assessment_for_Water_Cooperation_in_Transboundary_River_Basins_in_South_Asia/figures?lo=1

Vision for a Resilient Energy Transition

Definition:

- ❖ A shift to sustainable, climate-proof energy systems that bolster security and equity.

Why It’s Urgent:

- ❖ Cuts emissions by 30% by 2030 if renewables scale (IPCC, 2022).
- ❖ Reduces reliance on volatile fossil fuel imports (e.g., 80% of India’s oil imported, EIA, 2023).

Goal:

- ❖ Integrate climate security with socioeconomic resilience.

Regional Cooperation

Rationale:

- ❖ Shared threats (floods, droughts) and resources (rivers, grids) demand unity.

Opportunities:

- ❖ SAARC Energy Grid: Cross-border trade could save $9 billion annually (SAARC, 2020).
- ❖ Bhutan-India hydropower: 1,500 MW exported, a scalable model (ADB, 2022).
- ❖ Hydropower-rich Nepal will export 40 MW of electricity to energy-starved Bangladesh through the Indian power grid.

Action Steps:

- ❖ Form a South Asia Climate-Energy Alliance.
- ❖ Jointly fund transboundary renewable projects.

Climate-Adaptive Infrastructure

Concept:

- ❖ Energy systems resilient to climate shocks (e.g., flood-resistant solar, storm-proof grids).

Success Stories:

- ❖ Bangladesh: 20 MW floating solar in flood zones (IRENA, 2021).
- ❖ India: 100,000 microgrids electrify remote areas (MNRE, 2023).

Benefits:

- ❖ 50% fewer outages during disasters (World Bank, 2023).

Action Steps:

- ❖ Mandate climate-resilient designs in energy projects.
- ❖ Tap $500 billion in global climate finance (Green Climate Fund, 2023).

Integrated Policies

Objective:

- ❖ Link energy security to socioeconomic stability.

Strategies:

- ❖ Shift subsidies: India spends $11 billion on fossil fuels vs. $2 billion on renewables (IMF, 2023).
- ❖ Job creation: Renewables could generate 3 million jobs by 2030 (ILO, 2022).

Example: Nepal's micro-hydropower: 60% of profits reinvested locally (UNDP, 2021).

Action Steps:

- ❖ Harmonize national energy policies regionally.
- ❖ Prioritize community-led projects.

Overcoming Barriers

Challenges:

- Political mistrust: India-Pakistan tensions delay cooperation (SIPRI, 2023).
- Funding: $200 billion needed for renewable scale-up (IRENA, 2021).
- Skills gap: Only 10% of workforce trained for green tech (UNESCAP, 2022).

Solutions:

- Pilot small-scale collaborations to build trust.
- Leverage international aid (e.g., $100 billion climate pledge, COP26).

Conclusion

Key Message:

South Asia’s resilience lies in unity—cooperation, innovation, and inclusive policies can turn climate threats into opportunities.

Recommendation:

Governments: Lead with bold, regional strategies.
Global partners: Invest in South Asia’s green future.

Closing Quote:

The climate crisis knows no borders; neither should our solutions. – António Guterres (UN, 2022).

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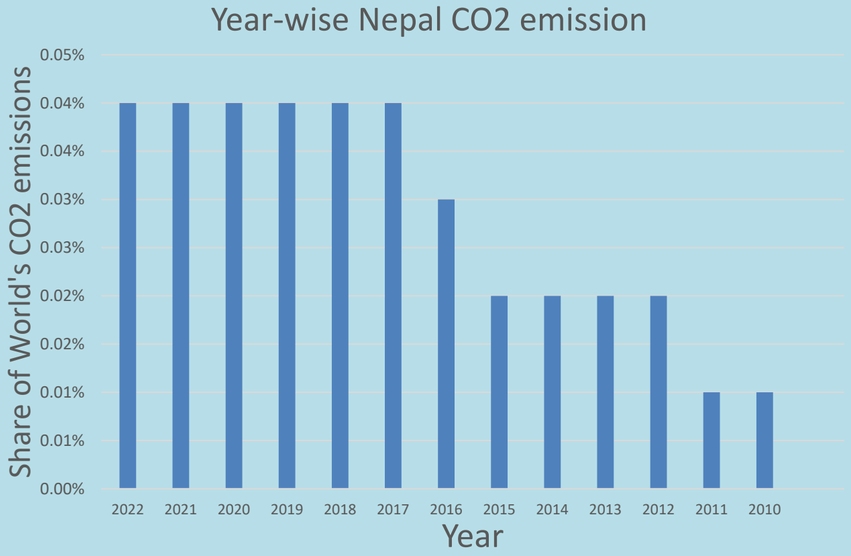
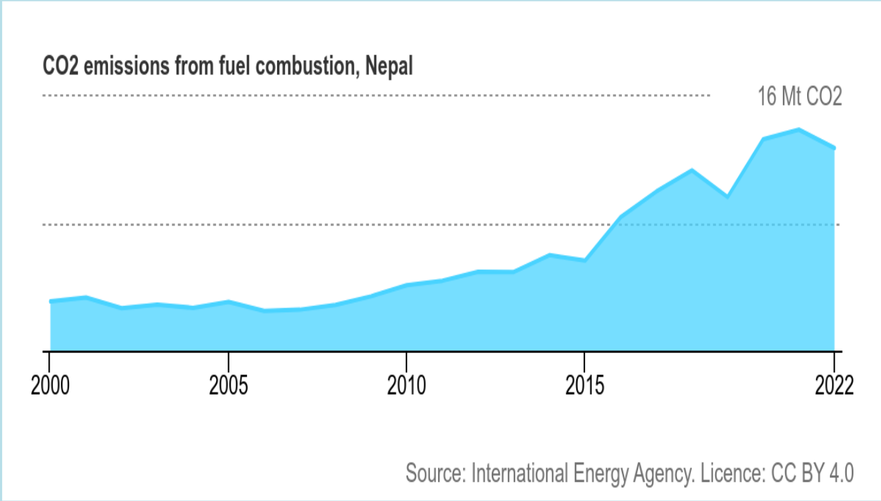
Section –I

Climate change and effect on agriculture and Role and need of Electric Energy in agriculture



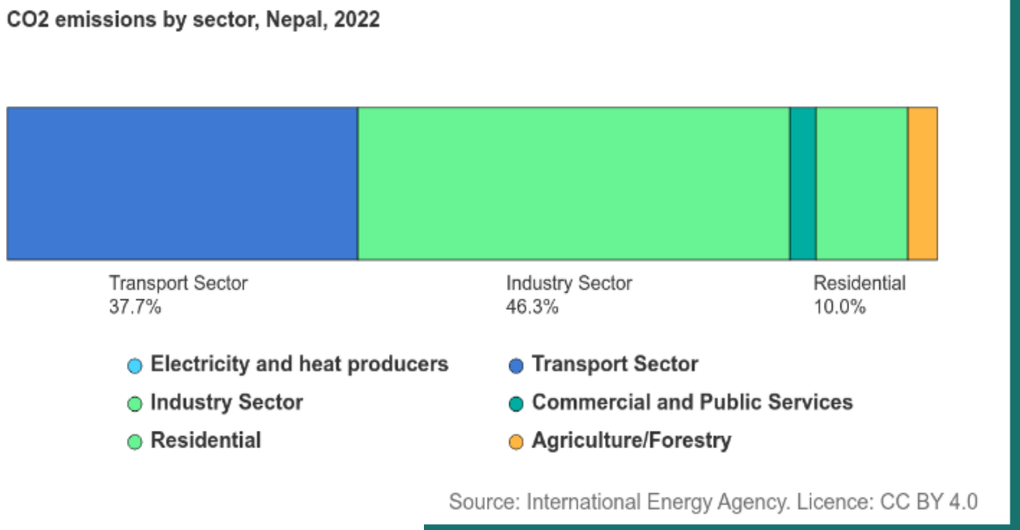


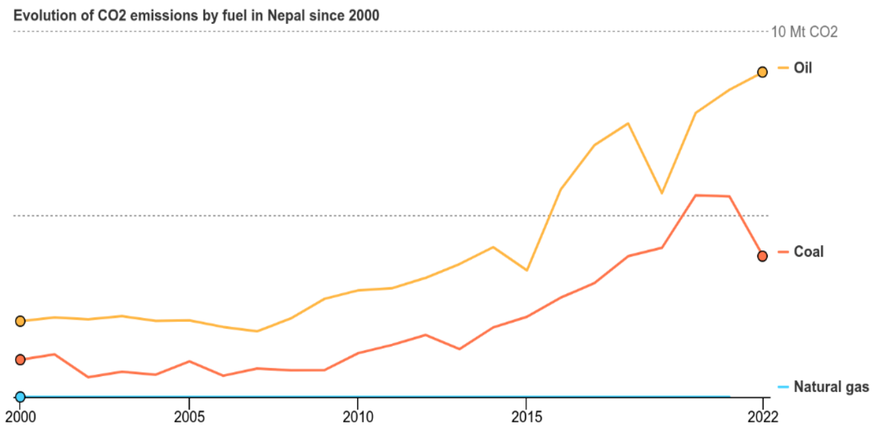
Introduction

- In 2022, Nepal's share of global CO2 emissions was just 0.04%.
- This low percentage is due to Nepal's limited industrial activities and low reliance on fossil fuels
- In contrast, countries like China and the United States are among the top emitters, with shares of 32.88% and 12.6% respectively
- Despite its small carbon footprint, Nepal is highly vulnerable to climate change impacts due to its geographical and socio-economic conditions.
- The country's reliance on agriculture and its mountainous terrain make it particularly susceptible to climate-related challenges.

Main Contributors of Greenhouse Gas

1. **Energy Sector**: The burning of fossil fuels for energy production is Nepal's largest contributor to CO2 emissions. This includes the use of coal, oil, and natural gas for electricity generation and heating1.
2. **Transportation**: Vehicles that run on fossil fuels also contribute significantly to CO2 emissions.
3. **Industrial Processes**: Cement and other industrial activities contribute to CO2 emissions.
4. **Residential and Commercial**: The use of fossil fuels for heating and cooking in homes and businesses adds to the CO2 emissions





Source: International Energy Agency. Licence: CC BY 4.0

Global Adoption of EVs in Agriculture

- Countries like the USA, Germany, and India are investing in electric tractors and farm equipment.
- Advancements in battery technology enhancing the viability of EVs in farming operations.
- Government incentives and subsidies promoting the shift to electric agricultural machinery.

Suitability of EVs for Nepal's Topography

- Development of small, lightweight electric tractors suitable for terraced farming in hilly regions.
- Designing EVs with robust suspension systems to navigate rugged terrains.
- Establishing solar-powered charging stations in remote areas to support EV infrastructure.

Policy Recommendations and Implementation Strategies

Government Initiatives:

- Providing subsidies and financial incentives for farmers adopting electric machinery.
- Investing in research and development to customize EV technology for local agricultural needs.
- Developing infrastructure for EV charging, focusing on renewable energy sources.

Collaborations:

- Partnering with international organizations to facilitate technology transfer and capacity building.
- Engaging local communities in the planning and implementation process to ensure acceptance and sustainability.

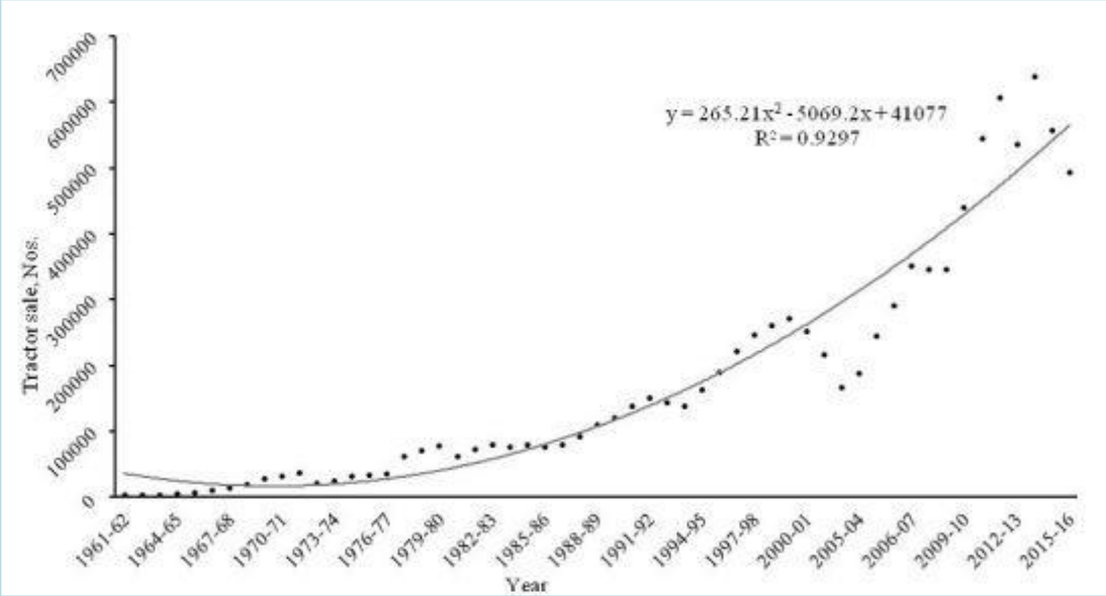
Initiatives being taken by Kathmandu University to develop climate resilient technology in Nepal

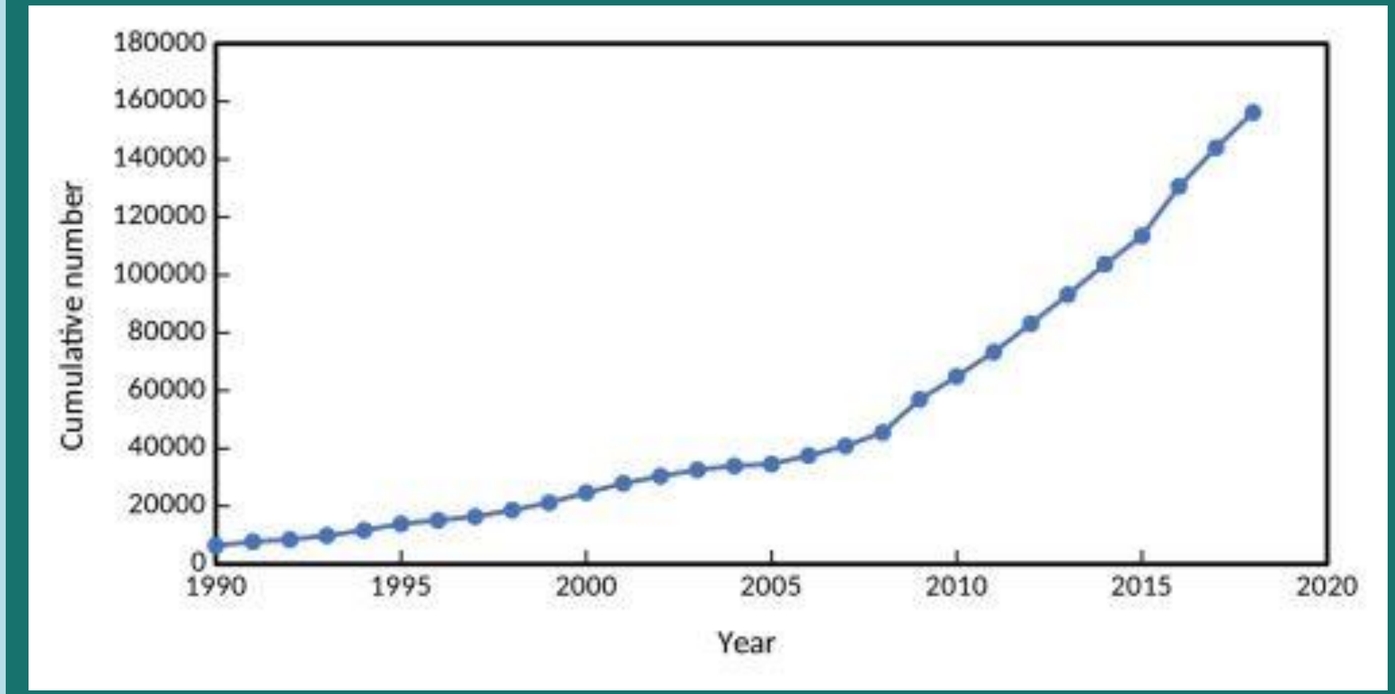
ELECTRIC TRACTORS: A SUSTAINABLE FUTURE FOR AGRICULTURE IN NEPAL AND INDIA

BACKGROUND

- Tractors are essential equipment in agriculture, and electrifying them presents an opportunity to reduce greenhouse gas emissions and operational costs.
- The adoption of electric tractors is gaining momentum globally, driven by environmental concerns and economic benefits.

SALES OF TRACTOR IN NEPAL AND INDIA





Conclusion

- Transitioning to electric vehicles in agriculture offers a viable solution to reduce GHG emissions and combat climate change.
- For Nepal, adopting EVs aligns with national strategies for sustainable development and environmental conservation.
- Collaborative efforts between the government, private sector, and farming communities are essential to drive this transformation.

Section –II
Plastic waste

Introduction

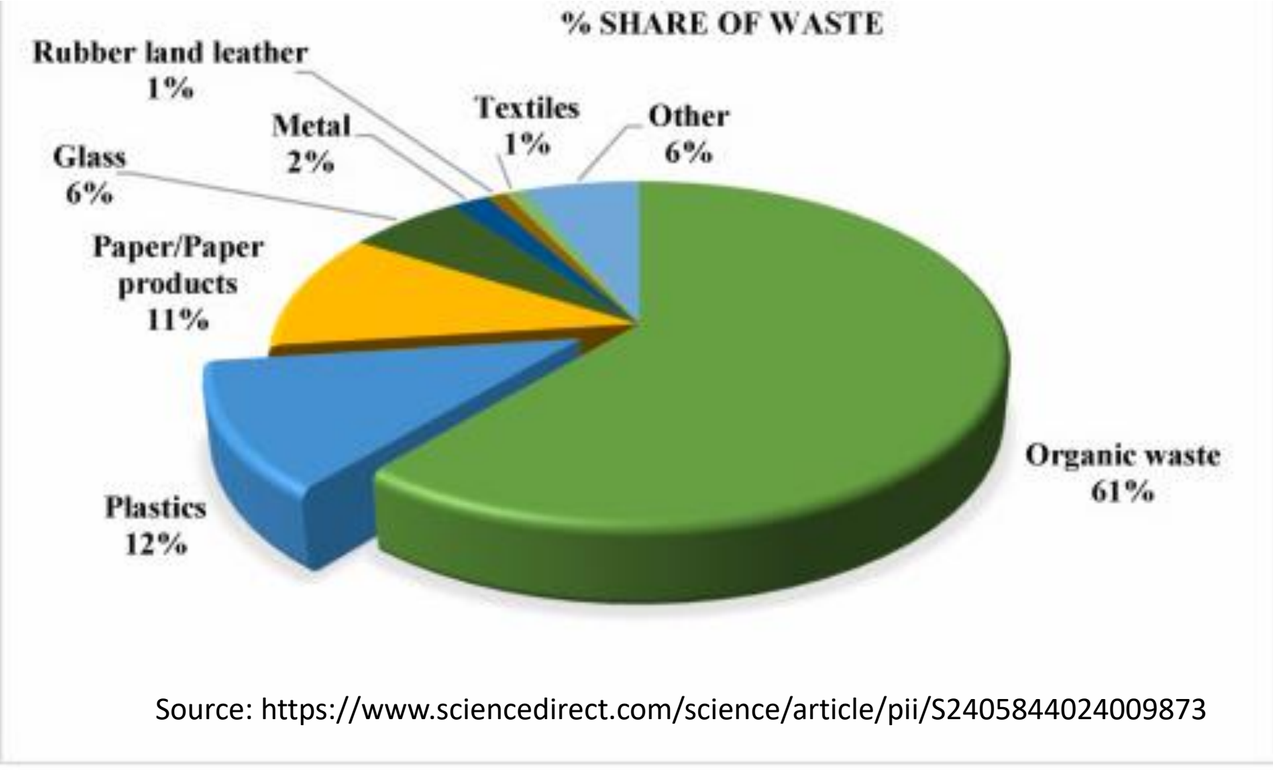
- Plastic production has surged from 2.1 million tones in 1950 to over 400 million tones annually
- This rapid increase has led to significant environmental challenges worldwide

Environmental impact of plastic waste

- Approximately 82 million tones of plastic waste are mismanaged annually, with 6 million tones entering rivers and oceans
- This pollution adversely affects marine life, ecosystems and human health

Plastic waste in Nepal

- Nepal generates approximately 700,000 tones of waste annually
- Plastic products manufacture in Nepal amount to 165,000 tones per year
- The country faces challenges in waste management due to inadequate infrastructure and limited recycling facilities

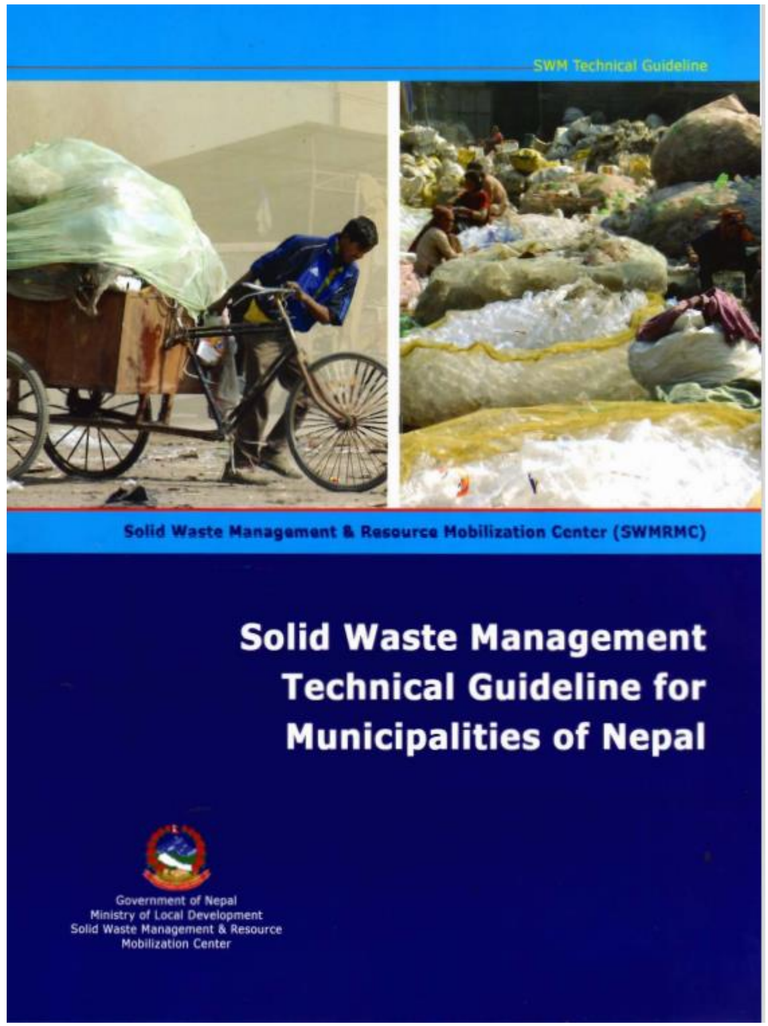


Source: https://www.sciencedirect.com/science/article/pii/S2405844024009873

Challenges in Nepal’s plastic waste management

- Limited waste collection and segregating systems
- Insufficient public awareness regarding plastic pollution
- Dependence on single-use plastics in daily life

Policy measure and government initiatives



- 99 municipalities in Nepal have developed solid waste management and guidelines
- The government is exploring avenues for plastic waste management in collaboration with private sectors and urban municipalities

Sustainable infrastructure Development

- Nepal has pioneered the use of discarded plastic in road construction, addressing waste management and infrastructure needs simultaneously
- This approach offers a practical, cost-effective method to repurpose plastics waste

Conclusion

- Addressing plastic waste requires a multifaceted approach involving community engagement, policy enforcement, and sustainable practices
- By adopting innovative solutions and strengthening waste management systems, Nepal can mitigate the environmental impacts of plastic pollution

THANK YOU

FOR YOUR NICE ATTENTION

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