Bhutan's experiences from the ongoing CC risk assessments

NAP GSP SOUTH-SOUTH KNOWLEDGE EXCHANGE FORUM
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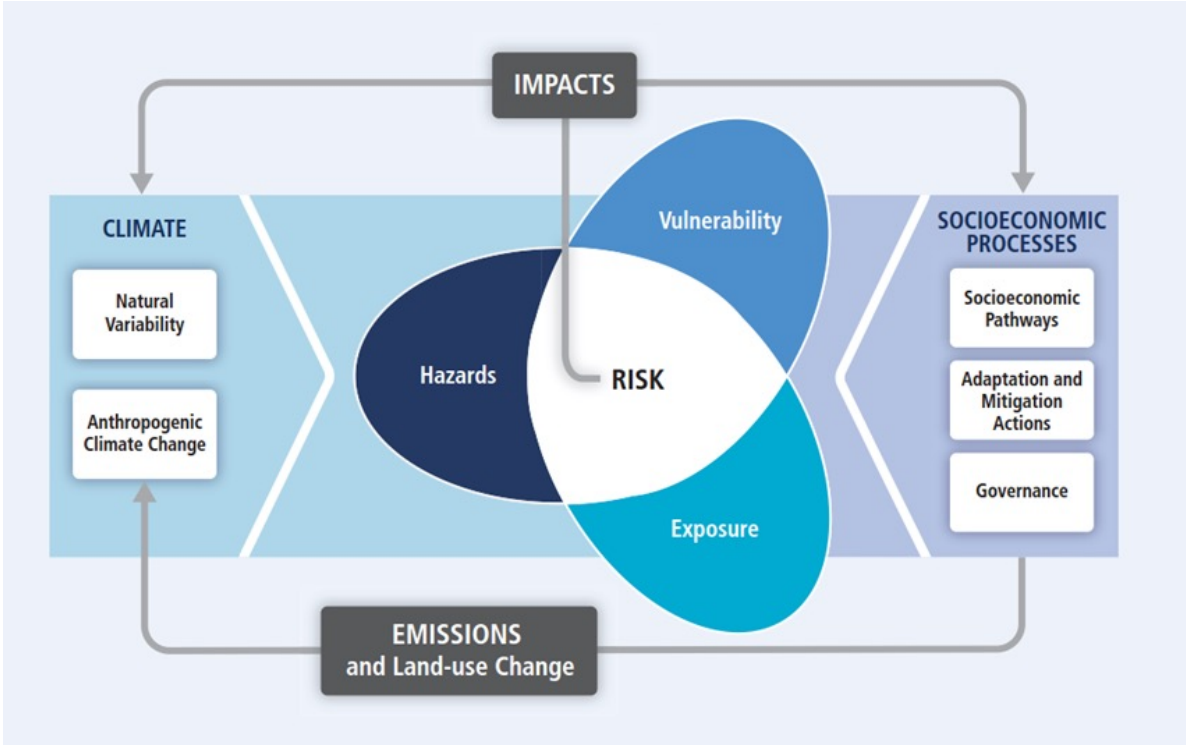
Outline

- Overall approach
- Prioritized sectors
- Assessment and their findings

Overall approach

- Based on IPCC AR 5 Risk framework, Risk = Hazards x Exposure x Vulnerability (Sensitivity and Adaptive capacity)
- Vulnerability and risk assessments adopts a mix of top down and bottom- up approaches.
- Considers 3 scales- 2021-50, 2051-69, 2070-99 for Climate projections



Overall approach

- Makes use of secondary data and local level consultations for the socio-economic vulnerability analyses and mapping
- Relies on granular information, sex disaggregated data, mapping vulnerabilities
- Adopts a Nation –wide approach in understanding the vulnerability

Prioritized sectors

- Independent ‘third party review’ of past works on CCA and sectors of concerns
- Four sectors- water, agriculture, biodiversity and health
- Presenting to the multi-sectoral Project Board and close consultations with the Technical Working Group (TWG)

Climate projections

Temperature

- The climate projections for maximum surface temperatures indicate an increase of about 0.9°C-2.8°C on the mean annual scale over Bhutan under RCP 4.5 and RCP 8.5 respectively during 2021-2050.

- Increase in future minimum temperature is also expected under both the scenarios. An increase of about 1.1-1.6°C is expected under RCP 4.5 and an increase of about 1.3°C-2.3°C under RCP 8.5 during 2021-2050

- Further increases in minimum temperatures are expected under both RCP 4.5 and RCP 8.5 with expected increase of up to 2.6°C for RCP 4.5 and more than 3.7°C under RCP 8.5 during 2070-2099

Climate Projections-Rainfall

- Increase of mean annual rainfall in future under both the scenarios.
- Both RCP 4.5 and RCP 8.5 scenarios indicate an increase of about 10% during 2021-2050.
- During 2070-2099, further increases are expected with more than 20% increase under RCP 4.5 and more than 30% under RCP 8.5.
- An increase in mean maximum and minimum rainfall is expected in future under both the scenarios.

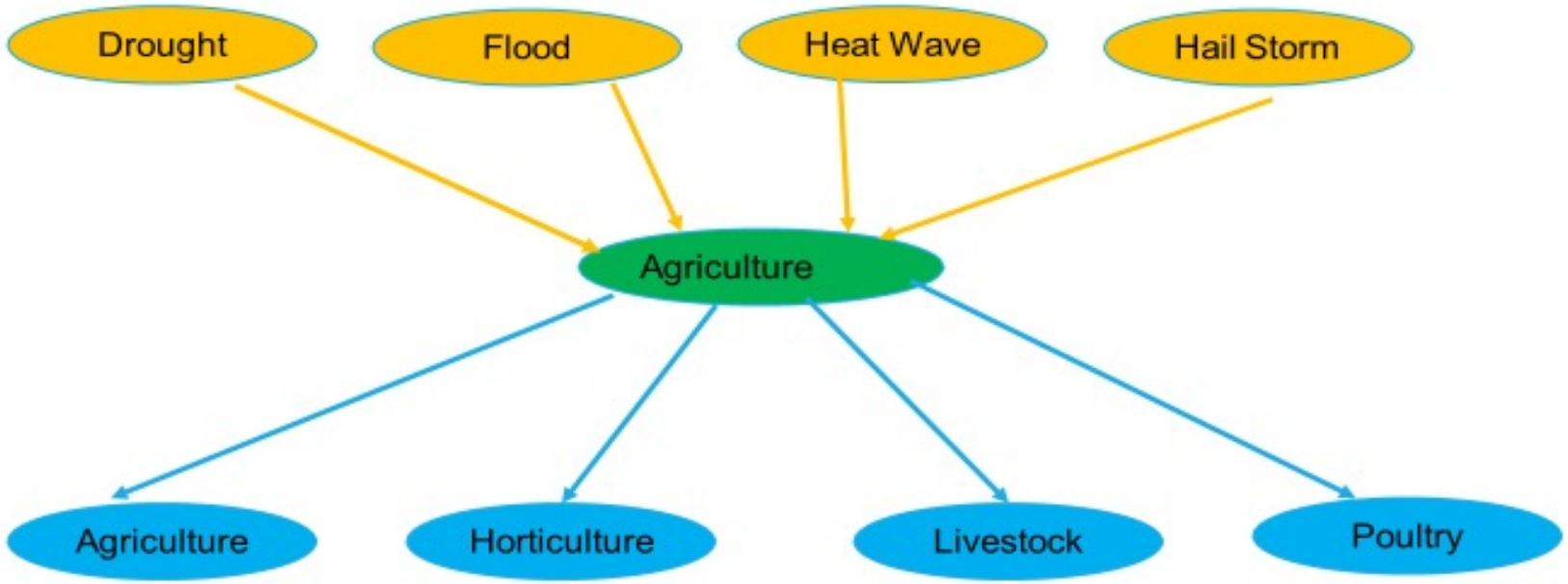
Climate Risks Assessment on Agriculture

Enable a greater understanding of the areas of the country that are most vulnerable to climate change and the farming systems that are under threat

Climate Risk Analysis was done for 11 economically important crops based, threats on dairy farming and poultry.

Crop suitability map was created using Arc GIS, simulation model DSSAT - (Decision Support System for Agro-technology Transfer)

Risk & Vulnerability and Affected sectors under Agriculture



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- Crop suitability analyses under CC scenarios point to increase in productivity for cardamon, citrus (mandarin), kiwi, chili, tomato, potato, maize and rice for both RCPs and time slices

- Rice productivity in high and very high productive zones are also likely to increase

- Productivity of apple is expected to decrease with RCP 4.5 scenario in future and increase to a maximum of 62.5 % in 2070-99 period under RCP 8.5

- Quinoa production is expected to decrease under RCP 4.5 scenario but increase under RCP 8.5

- Impacts on dairy and poultry farming, impacts of hazards on agriculture under analysis.

CC risk assessment on health

To understand baseline situation in Bhutan, current climate impacts on health and future projections especially focussing on Water-and vector-borne diseases

- The future projections for Dengue show that over the next 30 years, in a BAU scenario, the number of cases in Bhutan can increase to around 3,000 cases per year

- For the period 2070-99, the total number of cases is likely to increase to 4,400 cases per year

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- Under RCP 4.5 malaria cases will double increasing to around 150 cases per year. Higher percentage share of malaria cases can be seen in the eastern Dzongkhags on the southern border of Bhutan.

- Under RCP 8.5, total cases increase by around 7% and percentage share of cases increase in Samtse

- For 2051-69, the overall cases reduce, however the geographical distribution increase under RCP 4.5 and RCP 8.5

- For 2070-99, cases increase to around 162 per year under RCP 4.5 and 191 per year under RCP 8.5

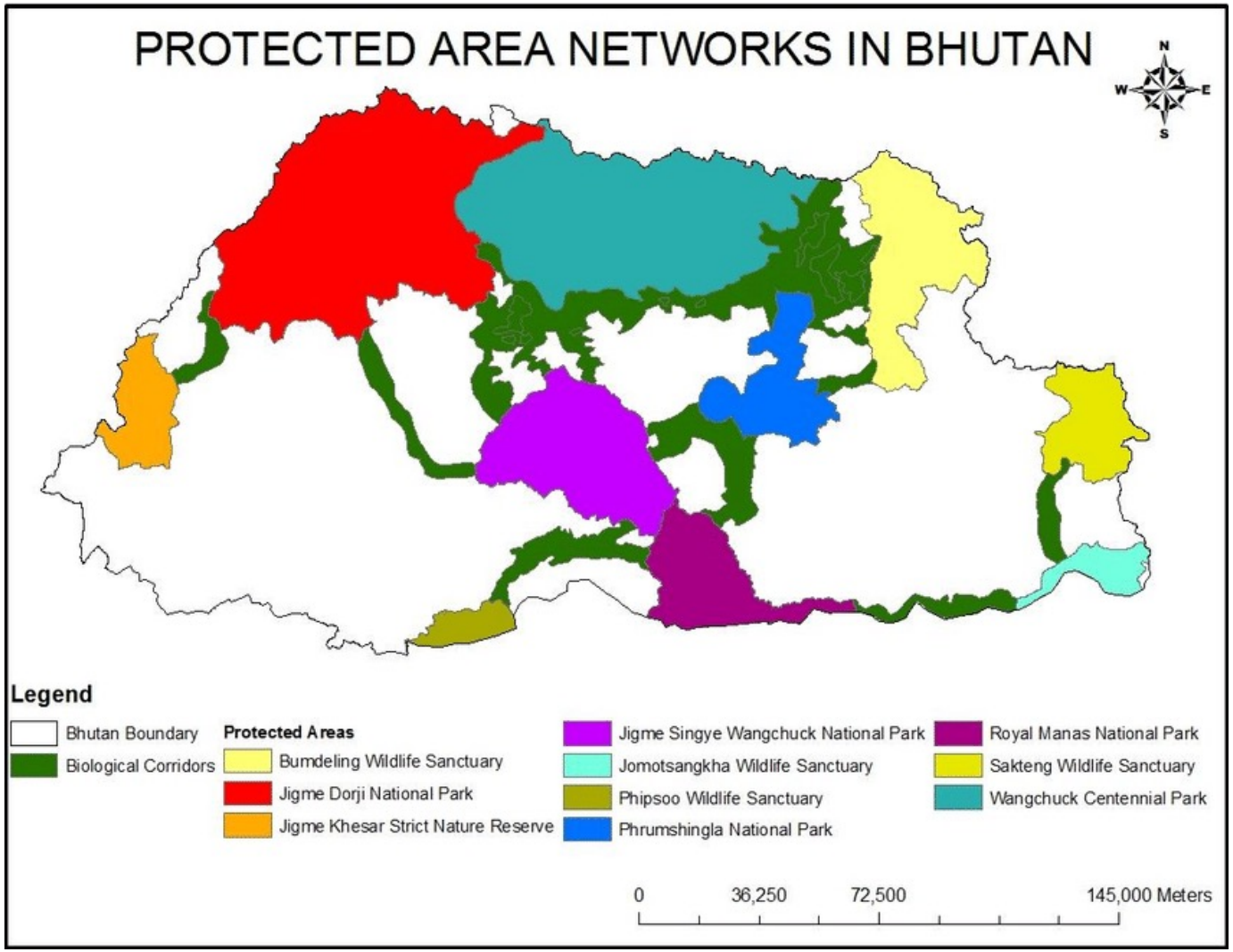
CC risk assessment on Biodiversity

To understand how forest fires incidences will evolve with CC and cause knock on effects and propose measures to mitigate the impacts.

- Used FlamMap 5.0- a spatially explicit fire behaviour model, to simulate surface fire behaviour under different representative concentration pathway (RCP) scenarios
- FlamMap input parameters: topography data (elevation, slope, and aspect), fuel data (canopy fuels and surface fuels), and weather data (temperature, relative humidity, precipitation, wind speed, and wind direction)
- Chir pine, blue pine and mixed conifer forests will be the most impacted.

- A total of 18,490 households will be at increased risk from forest fires from now to 2050 with most risk in broadleaved zone on human settlements, Protected Areas, and biodiversity.

- Broadleaved forests below 2000 masl also host a rich array of biodiversity including endangered flora and fauna



Thank you


National Environment Commission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