

Research finds ways to address effects of climate change in agricultural production in Nepal

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Nepal is one of the most vulnerable countries in terms of climate change and its impacts. Rising average temperature, delayed monsoon, reduction in the number of rain days but increased intensity of rain are some of the climatic phenomena observed in the recent years. Mountainous and hilly regions are more affected by the changing weather patterns.

The chiefly agrarian population of Nepal has started feeling the effects of [climate change](#) with reductions in [crop yields](#) due to the changing climatic pattern. There is a strong need to adapt with changing pattern and customize agricultural practices accordingly to avoid the risk of food insecurity.

A recent article in the *Agronomy Journal of Nepal* discusses ways to cope with such changing climate patterns. Dr Mina Nath Paudel, Principal Scientist at the National Agriculture Genetic Resource Centre, Nepal, analysed the climatic pattern of 10 years' meteorological data of Kakani in the high hills and Dhangadhi in the southern plains for maximum and minimum temperatures, total rainfall and the number of rainy days in a year. The assessment found a significant rise in both minimum temperature and the maximum temperature. The assessment showed a clear change in Nepal's climatic pattern.

History has shown that changed climatic pattern largely reduces crop yield globally and in Nepal. For example, weak monsoon rains resulted

in a huge reduction in crop production in the South Asian region in 1987. Likewise, the severe winter cold wave in Nepal in 1998 hugely impacted agricultural production by reducing yields of potato (27.8%), leaf mustard (36.5%), mustard seed (11.2%), lentil (37.6%), and chickpea (38%), according to Nepal Agriculture Research Council. Similar impacts were observed in other regions of the world.

Rice and wheat are the two major crops of Nepal, and their yield largely depends on the rainfall pattern. Much of the lifestyle and cultural practices in Nepal revolve around sowing, transplanting, harvesting and consuming rice. However, rice production has been continuously decreasing in the past few years.

"Rice needs to be transplanted within the month of June for best yield. If it is delayed, the yield will reduce at the rate of 50kg per hectare every day," says Dr Paudel. "But, I haven't found rice being transplanted on time for the past 10 years due to delayed rainfall."

The delayed rainfall followed by the delayed rice transplantation not only reduces the yield but also disturbs the whole cropping cycle.

Dr Paudel explains, "Solar radiation moves north from September 23, and rice should have flowered by October 15. After that, the temperature starts going down and the yield also starts going down. Moreover, the delay in rice harvest delays wheat plantation" which also affects reduction in wheat yield.

"Wheat should be planted by November 15 and harvested before March for best yield. When the rice harvest is delayed, wheat plantation is delayed and it cannot start flowering until March. The rise in temperature reduces wheat yield," he adds.

Impacts of climate change have been observed in many other areas. The

snowline is rising due to the increased [average temperature](#) and plants that used to grow only in the tropical region are found in higher altitudes these days, shares Dr Paudel. "In the 1970s you would not find a single mango, banana or papaya tree in Kathmandu valley. Nowadays, these trees have become quite common here," says Dr Paudel.

Adapting to the changing climatic pattern and customizing farming practices is the only way to cope with climate change. "Climate change is a natural phenomenon and it cannot be stopped. It used to happen in the past, too. All we can do is adapt with the changing climate," says Dr Paudel.

In his research article, Dr Paudel has recommended ways of coping with climate change. Changing crop varieties is one, and altering farming technology is the other important ones. Drought-tolerant varieties or varieties that can withstand submerged conditions should be used depending on whether the place is drought prone or flood prone.

"Traditionally, we have been transplanting rice on submerged fields both to provide water and to prevent weed. But, there are rice varieties which can be directly sown in non-submerged land. Such varieties and practice should be promoted," says Dr Paudel. He has suggested varieties such as Chandannath-1 & 3 in the research article for high hills conditions of Jumla district where rice is cultivated in the highest elevation (3050m) in the world.

Likewise, he recommends cultivating seasonal and off-season vegetables inside plastic tunnel houses and using improved irrigation techniques like drip irrigation protects the plants from drought, hailstorms, torrential rain and frost. He also suggests planting fruit and timber trees such as citrus fruits, tea and coffee on sloping land instead of tilling and planting crops prevents soil erosion as well as protecting from the risks of unpredictable climatic extremities.

More information: Mina Nath Paudel. Consequences of Climate Change In Agriculture and Ways to Cope Up Its Effect In Nepal, *Agronomy Journal of Nepal* (2016). [DOI: 10.3126/ajn.v4i0.15514](https://doi.org/10.3126/ajn.v4i0.15514)

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