

Helping Nepalese farmers adapt to climate change

This story appeared originally on the [Borlaug Global Rust Initiative](#) website to mark Earth Day on April 22, 2016. Linda McCandless is associate director for communications, International Programs, College of Agricultural and Life Sciences at Cornell University. She also oversees communications for the Delivering Genetic Gain in Wheat project.

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SINDHULPALCHOWK, Nepal (BGRI) -- Farming the terraced hillsides above the Indrawati River Valley of Nepal, Nabaraj Sapkota and his wife Muthu Dei experience the impacts of climate change on an almost daily basis. Erratic rains make planting difficult. Warm, misty conditions and prolonged winter temperatures increase the incidence of wheat rusts that reduce yield. Unpredictable hailstorms flatten wheat and rice before they can be harvested.

“When we need rain, there is no rain. And when we don’t need rain, there is plenty of rain,” says Nabaraj. “We used to only have rain from May through July, now we have rain and mist from November.”

Khim Lal Bastola grows wheat, maize and rice in rotation and sustains four generations in his 12-person household near Pokhara. “The change is obvious: man produces something with his hard labor but strong winds and hailstorms destroy it,” he said.

“The climate change scenario for Nepal — where temperature are likely to increase and precipitation is likely to be more erratic — will disproportionately affect smallholder farmers,” said Dhruva Thapa, a senior scientist with the Nepal Agricultural Research Council. “For Nepal, the cost of not adapting to climate change will be high.”

Like many farmers in Nepal, Bastola and the Sapkotas need technical assistance to help them adapt to climate change. They eagerly soak up the education offered by people like Thapa, Sarala Sharma, and Sunita Adhibari, NARC scientists who distribute disease resistant varieties of wheat and help farmers learn to identify diseases.

Scientists and farmers also soak up training from the [Borlaug Global Rust Initiative](#) (BGRI), and specialists like Dave Hodson, a wheat surveillance specialist with CIMMYT, who shows them how

to scout for wheat rust and upload data into the global [RustTracker](#) monitoring system.

FARMING PERVASIVE BUT DIFFICULT IN NEPAL

Farming in Nepal is hard, backbreaking labor predominantly done by hand in fields rarely more than one-quarter of an acre in size. Men plow the small plots on the terraced hillsides with oxen. Women break up the clods with heavy adzes. Although rarely above subsistence level, small farms are of vital importance in sustaining the multi-generational communities scattered throughout the Himalayas in the high hills to the north, the temperate mid-hills, and the subtropical terai to the south.

The livelihoods of more than 75 percent of the people in Nepal are based on agriculture and forestry, and almost 65 percent of the agriculture is rainfed, Nepal is among the 25 nations in the world with the lowest GDP per person and also ranks among the 25 with the greatest decrease in forested land. Rural populations are heavily clustered in river basins whose annual monsoon-fed flood cycles are likely to be exacerbated by warming. Deforestation adds to the problem, intensifying flooding and contributing to the likelihood of landslides.

HELPING FARMERS ADAPT TO CLIMATE CHANGE

Using disease resistant and improved seeds, and adopting different planting and harvesting calendars helps farmers adapt to climate change.

In Chhampi, north of Kathmandu, Krishna Bahadur Ghimire and the local farmers' cooperative of which he is president, are now producing improved rice, wheat and maize on 140 ropanis of land. Ghimire supplies beans, rice, eggplant, soybeans, wheat and vegetable seeds to his neighbors. He started farming on one ropani of land (~ 500 sq.m) in 1997 but switched to the seed business when he found himself having to drive two hours to Kathmandu to get the improved varieties he needed.

“Our local varieties were not climate smart. We went to Kathmandu to get improved seeds from the Nepalese Agricultural Research Center because their seeds are more disease resistant, higher

yielding, and higher quality,” said Ghimire, who has worked with Thapa for 11 years. “New varieties are less lodging and scattering during storms and high winds than the local ones.”

“Farmers need climate smart crops that have been improved for yield and disease resistance, but they also need seeds adapted for variable weather conditions whether we have drought or excess rainfall,” said Thapa. “NARC screens many lines and then provides seeds of promising lines to farmers for participatory variety selection trials, like with Ghimire’s group.”

Naparaj, the Sindhupalchowk farmer, initially received 300 grams of seven varieties of improved wheat from Thapa. “I was thinking how I could uplift them (*my neighbors*),” said Naparaj. “I thought to myself, the lives of these people must be uplifted through improved seeds which would give them good production. We used to get one muri (~3.5 liters or 70 kg) of wheat per one ropani (~500 sq.m.). Now we are threshing three or four times more. It is a huge profit.”

Ghimire’s 25-year-old nephew Saroj Kumar Bista, speaks of another problem affecting farmers that requires gender-sensitive initiatives. “Many young men are going to the Middle East to work and not moving into the farming sector,” he said.

Nowhere is this more evident than in Godhavari, where Manju Khavas, Radha Basnet and Janaki Silwal’s sons have gone to the Middle East or Japan to work. Their husbands work off the farm, leaving them in charge. “At first we were overwhelmed,” said the 52-year-old Khavas. “We could not find someone to dig the fields. Now it is easier because of the handheld tractor.”

Thapa introduced improved eight or nine varieties of wheat to their community as well as agronomic practices like planting in rows, incorporating manure for fertilizer, and using handheld tractors (*similar to heavy duty rototillers*).

How does Khavas count improvement? “When we were 7 or 8 members in the family, the produce of this land was not enough. Now the produce is enough for 13 to 14 people,” she said. Wheat yields are so improved that she and her friends want a wheat threshing machine so they don’t have to thresh the greater quantities by hand.

Although the women said they have yet to “evaluate” climate change, they noted the “environment has been spoilt.”

“During the harvesting season of the wheat, we suffer from the fear of rain,” said Khavas. “Hailstorms also scare us. The moment the wheat becomes yellow, we begin to feel afraid whether we will be able to harvest it or not. And then when the wheat is harvested amid the fear of rain, in the paddy rice planting time, there is no rain.”

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