

CSR

Turning the tables on farmers' weather risks



Walker Institute Syngenta Foundation for Sustainable Agriculture

Farmers in developing African and Asian countries are particularly vulnerable to the weather. Better information and solutions reduce their risks. A new international partnership aims to provide both. The University of Reading's Walker Institute and the Syngenta Foundation for Sustainable Agriculture (SFSA) are partnering to help smallholder farmers cope better with weather challenges. Smallholders worldwide produce food for their families, and sell any surplus. Even small fluctuations in the weather can significantly affect their yields and income; drought or flooding can be disastrous. Smallholders need appropriate information and training on agricultural technologies, together with insurance solutions and better support services. These help them to increase production sustainably and reduce the impact of climate and weather risks on their livelihoods. The new partnership aims to improve farmers' access to weather and climate information, and to corresponding risk solutions. The Walker Institute and SFSA will help smallholders use weather data to make informed decisions about what, when and how to plant. They will also promote evidence-based practices to enhance crop yields. Political decision-makers will learn more about smallholders' weather and climate risks, and how to mitigate them. In particular, the partnership will help provide agricultural insurance solutions within broader risk management programs. The

initial focus is on Indonesia and Bangladesh, where SFSA already supports several initiatives, including weather insurance.

Professor Ros Cornforth, Director of the Walker Institute, says: "This exciting partnership paves the way for collaborative research with SFSA. Using our collective expertise, interdisciplinary research and innovative approaches to capacity-building, we can improve the livelihood choices of farmers in some of the poorest regions. Improving access to the latest innovations and expertise will not only benefit individual families. It also has the potential to strengthen the food security of entire nations."

SFSA Executive Director Dr. Simon Winter comments: "De-risking smallholders' investments in improving food production means protecting them from financial catastrophe in the face of increasingly volatile weather. This can be achieved through climate insurance solutions. There is an urgent need for more experts in this field. Our partnership with the Walker Institute is a great step forward. It will institutionalize SFSA knowledge, experience and expertise gained over the last decade, and help transfer it to young professionals."

The Walker Institute is an interdisciplinary research institute supporting the development of climate-resilient societies. Its research aims to help address fundamental questions around social, economic, technological, and political strategies around the world.

The Syngenta Foundation for Sustainable Agriculture, a non-profit organization based in Basel, Switzerland, helps smallholders become more professional growers. The Foundation works with partners in developing countries and emerging markets to extend science-based know-how, facilitate access to quality inputs, and link smallholders to markets in profitable ways. This adds value to rural communities, and sustainably improves food security.

Source : syngentafoundation

Challenging traditional farming practices



Challenging traditional farming practices Bihar is endowed with fertile soils and water resources. Most of the population depends on agriculture for livelihood. Farming through traditional methods is labor-intensive and does not yield good results, leading to losses. Adoption of modern farm machinery can come to the rescue of farmers, thus increasing agricultural produce and profits. However affordability of these machines is sometimes a barrier for farmers to procure them.

Sehgal Foundation, under its village development project in Bihar, provides farm machinery to poor farmers at subsidized rates. Apart from reducing drudgery, these machines save time and labor. The project focuses on and identifies marginal farmers in the village and provides them with training and capacity building on farm mechanization. The project beneficiaries receive the machines on the premise that they share the benefits with fellow villagers, simultaneously working for the betterment of the community as a whole. The project also focuses on building an enterprise model where the farmer receiving the machine at subsidized cost benefits by receiving extra income by renting out the machines to fellow farmers.

Rampukar Kushwaha, a farmer from Pakri Dayal, Chakia Block, East Champaran, has been assisted by Sehgal Foundation since



he became aware of farm machinery and the advantages of using it on the field.

"Even though I was always open to using farm machinery, but I did not know how to access them and also couldn't afford them because of their high prices.

After I learnt about the community meetings held by Sehgal Foundation on good agricultural practices, I decided to attend the meeting held in my village. I was impressed by the team's demonstration of the machine and learned about the advantages of farm mechanization.

Soon I got in touch with team members and had more discussions with them. My potato farming was not giving good yields, so I decided to invest money in a potato planter. My family members were not in favor, as they did not trust modern technology in the field and preferred the traditional ancestral methods. But I decided it was worth taking a risk. So I bought the machine. In this process, I had to contribute only Rs 20,000 and the rest was covered by the foundation."

"The potato planter has benefited me a lot. In terms of monetary savings, laborers charge around 400 rupees per kattha (one acre equals 32 kattha) for field preparation for sowing.

The money that would have previously been spent in hiring labor was saved. In terms of time, a potato planter can sow almost five acres of land at once. Manual labor would amount to Rs 3,200 per acre, but the machine brings the cost down to 1,800 rupees."

Noticing the impact of the potato planter, Rampukar decided to buy another machine, a laser land leveler. A laser leveler helps make the land level and suitable for farming. He adds, "**Sehgal Foundation contributed 50,000 rupees and also helped in the process of availing the rest through a government subsidy and from the Agriculture Department.**"

Rampukar rents his machines to fellow villagers at an affordable rate, thus earning additional income by extending the benefits and motivating farmers in the process.

He is a promising and active community member who is a perfect example of learning by doing.

General

Aug-Sept likely to see normal rainfall, says Met in forecast update



45 per cent probability for rains to be 100 per cent of long period average Rainfall during the second half of the monsoon (August and September) for the country as a whole is forecast to 100 per cent of the long period average (LPA) with a model error of ± 8 per cent.

The forecast suggests that the rainfall during second half of the monsoon season most likely to be normal (94 -106 per cent of LPA) with a probability of 45 per cent.

Normal August

This was stated in the long-range forecast for the second half of the monsoon issued by India Met Department (IMD). Rainfall for August is likely to be 99 per cent (± 9 per cent) of LPA as was predicted in June.

The IMD also retained the June-based forecast for the seasonal (June to September) rainfall over the country as a whole to be likely to be normal (96 per cent ± 4 per cent).

The outlook comes on the back an unexpectedly good July that produced around 4 per cent more rain than what is normal for the month, which is considered the rainiest of the four monsoon months.

This had helped reduce the rain deficit from a high of 33 per cent at June-end to single digits (9 per cent) after July saw the monsoon revive and scale up to a peak over Central, West, and North-West India.

The robust monsoon current is expected to stay as such into the first week of August, the second rainiest month, which IMD now expects to yield normal rainfall.

EL NINO, IOD IMPACT

Analysing the monsoon-driving phenomena here and elsewhere, the IMD said that sea surface temperatures as well as atmospheric conditions over equatorial Pacific Ocean indicate neutral to borderline El Nino conditions.

The latest forecasts from both Monsoon Mission Coupled Dynamical Forecast System (MMCFS) and other global models indicate that these conditions are likely to continue during the remaining part of the monsoon season.

In addition, other factors such as the Indian Ocean sea surface temperatures have also some influence on Indian monsoon. Currently, positive Indian Ocean Dipole (IOD) conditions are prevailing over equatorial Indian Ocean.

A positive IOD when the western basin of the Indian Ocean warms up relative to the East, is traditionally known to boost a concurrent Indian monsoon.

MMCFS forecast indicates that positive IOD conditions are likely to continue during the remaining part of the monsoon season and weaken thereafter.

Source : thehindubusinessline

Interesting Fact



About 20,000 seeds and fruits of 37 varieties have been found in the remains of ancient toilets at Heijokyu Palace, the nerve center of politics during the Nara Period (710-784).

International



The 'Pocket-Sized Monster' Terrifying Farmers the World Over

The fall armyworm is hungry, on the move and scaring farmers the world over. The crop-devouring pest has spread from the Americas to Africa and Asia, gorging on rice, corn, vegetables, cotton and more. Europe, Australia and Southeast Asia could be next. In its first three years in Africa alone, it inflicted \$13.3 billion of crop losses. A recent arrival in China, the fast-moving grub may infest the country's entire grain-producing farmland within a year. With food supply chains already facing disruption from the trade war and a global epidemic killing pigs, the world is bracing for the advance of what's been called the "pocket-sized monster."

1. What is the fall armyworm?

It's actually a caterpillar, not a worm. Fall armyworm (*Spodoptera frugiperda*) is native to the North and South American tropics and measures about 3-4 centimeters (1-1.5 inches). The grubs have a distinctive upside down Y on their heads and four dots on their second-to-last segment. They get their name from the way they advance en masse with military precision, feasting on the leaves and stems of some 186 plant species, including economically important crops such as wheat, soybeans and sugarcane.

2. Why are they such a dreaded pest?

The aggressive munching can denude crops, cutting corn yields by 20-50% and sorghum by 16%. What's more, a female moth can lay as many as 1,000 eggs during her lifetime, reproduce in a month under

favorable conditions and fly up to 100 kilometers (62 miles) in a single night. Multiple generations can traverse some 2,000 kilometers during the species' annual migration. They are so ravenous that the young caterpillars feast on their own siblings, ensuring that only 1 to 3 fully grown larvae remain on each plant.

3. How are they spreading?



They were detected for the first time in Africa -- in the western nations of Benin, Nigeria, Sao Tome and Principe, and Togo -- in early 2016, possibly introduced via trade or weather systems associated with El Nino events in 2014-2016. The fall armyworm is now in virtually all of sub-Saharan Africa. In July 2018, it was confirmed in India and Yemen. By January, it had been reported in Bangladesh, Myanmar, Sri Lanka, Thailand and China. Corn farmers on the Indonesian island of Sumatra have reported infestations there since March.

4. What's the impact in China?

Advancing from China's southern border, the pest had affected grain production in 18 provinces covering more than 90,000 hectares (222,400 acres) as of early June. Authorities have employed an emergency plan to monitor and respond, but it's predicted fall armyworm will reach the corn belt in the northeast during the summer. There's a "high probability" that it will spread to the entire country's grain-producing area in the next year, the U.S. Department of Agriculture says, since most farmers don't have the means or training to effectively manage it. That may push them to grow crops that aren't susceptible, such as cassava and sweet potatoes. The damage to existing crops and any switch to

new plants might exacerbate disruptions to food supply caused by a nationwide outbreak of African swine fever and an ongoing trade war with the U.S.

5. Where will it go next?

That depends on the weather. Fall armyworm has only invaded areas with a climate similar to its tropical home. In China, it's projected to move northward as spring temperatures rise and crops develop along major growing areas in the center, north and, eventually, the northeast. Seasonal factors, such as the timing of the monsoon and the number of typhoons, will influence its movement and impact. South and Southeast Asia and Australia also have favorable climates, not to mention strong trade and transportation links with infested countries, putting Australia, Malaysia and the Philippines at high risk. Fall armyworm's advance into Europe is harder to predict. Small areas of Spain, Italy and Greece might provide suitable conditions, but in general low temperatures halt the pest's advance.

6. What can be done?

Crops genetically engineered to express genes from the soil bacterium *Bacillus thuringiensis* are protected, without the need for broad-spectrum chemicals that may harm beneficial insects. Problem is, some fall armyworm strains have developed tolerance to that naturally occurring deterrent. The Chinese Academy of Agricultural Sciences has identified 21 chemical pesticides that could mitigate the caterpillar's spread and impact. Scientists with the academy's Institute of Plant Protection are seeking to deploy an army of predatory stink bugs, a natural enemy of fall armyworm. Early detection is essential as the pest can only be effectively controlled with insecticides while larvae are small. The non-profit Centre for Agriculture and Bioscience International offers more rudimentary advice: "See it. Squash it. Stop it."

Source: [washingtonpost](http://washingtonpost.com)

Germplasm

Gene identified that will help develop plants to fight climate change



Salk team's finding will advance initiative to reduce atmospheric carbon through plants

Hidden underground networks of plant roots snake through the earth foraging for nutrients and water, similar to a worm searching for food. Yet, the genetic and molecular mechanisms that govern which parts of the soil roots explore remain largely unknown. Now, Salk Institute researchers have discovered a gene that determines whether roots grow deep or shallow in the soil.

In addition, the findings, published in *Cell* on July 11, 2019, will also allow researchers to develop plants that can help combat climate change as part of Salk's Harnessing Plants Initiative. The initiative aims to grow plants with more robust and deeper roots that can store increased amounts of carbon underground for longer to reduce CO₂ in the atmosphere. The Salk initiative will receive more than \$35 million from over 10 individuals and organizations through The Audacious Project to further this effort.

"We are incredibly excited about this first discovery on the road to realizing the goals of the Harnessing Plants Initiative," says Associate Professor Wolfgang Busch, senior author on the paper and a member of Salk's Plant Molecular and Cellular Biology Laboratory as well as its Integrative Biology Laboratory. "Reducing atmospheric CO₂ levels is one of the great challenges of our time, and it is personally very meaningful to me to be working toward a solution."



Normal *Arabidopsis thaliana* plant with shallow root system architecture. Right: *Arabidopsis thaliana* mutant showing deeper root system architecture. (Roots are colored yellow in the image for better visibility.)

In the new work, the researchers used the model plant thale cress (*Arabidopsis thaliana*) to identify genes and their variants that regulate the way auxin, a hormone that is a key factor in controlling the root system architecture, works. Though auxin was known to influence almost all aspects of plant growth, it was not known which factors determined how it specifically affects root system architecture.

"In order to better view the root growth, I developed and optimized a novel method for studying plant root systems in soil," says first author Takehiko Ogura, a postdoctoral fellow in the Busch lab. "The roots of *A. thaliana* are incredibly small so they are not easily visible, but by slicing the plant in half we could better observe and measure the root distributions in the soil."

The team found that one gene, called EXOCYST70A3, directly regulates root system architecture by controlling the auxin pathway without disrupting other pathways. EXOCYST70A3 does this by affecting the distribution of PIN4, a protein known to influence auxin transport. When the researchers altered the EXOCYST70A3 gene, they found that the orientation of the root system shifted and more roots grew deeper into the soil. "Biological systems are incredibly complex, so it can be difficult to connect plants' molecular mechanisms to an environmental response," says Ogura. "By linking how this gene influences root behavior, we have revealed an important step in how plants adapt to changing environments through the auxin pathway." In addition to enabling the team to develop plants that can grow deeper root systems to ultimately store more carbon, this discovery could help



From left: Takehiko Ogura and Wolfgang Busch.

scientists understand how plants address seasonal variance in rainfall and how to help plants adapt to changing climates.

"We hope to use this knowledge of the auxin pathway as a way to uncover more components that are related to these genes and their effect on root system architecture," adds Busch. "This will help us create better, more adaptable crop plants, such as soybean and corn, that farmers can grow to produce more food for a growing world population." Other authors included Santosh B. Satbhai of Salk along with Christian Goeschl, Daniele Filiault, Madalina Mirea, Radka Slovak and Bonnie Wolhrab of the Gregor Mendel Institute in Austria.

The work was supported by funds from the Austrian Academy of Sciences through the Gregor Mendel Institute along with a grant from the Austrian Science Fund (FWF I2377-B25) and funds from the Salk Institute for Biological Studies.

About the Harnessing Plants Initiative:

Climate change poses an immediate threat to our future. Rising temperatures from excess carbon dioxide in the atmosphere has led to increasingly extreme and dangerous weather patterns that threaten animals and plants alike. The Salk Institute's Harnessing Plants Initiative (HPI) is an innovative, scalable and bold approach to fight climate change by optimizing a plant's natural ability to capture and store carbon and adapt to diverse climate conditions. This approach can help draw down and store more carbon and that—combined with other global efforts—will mitigate the disastrous effects of climate change while providing more food, fuel and fiber for a growing population.

Source: salk.edu