FEED THE FUTURE
The U.S. Government's Global Hunger & Food Security Initiative

TINY PACKAGE, BIG IMPACT

GIVING SEEDS AN ADDED BOOST TO SURVIVE HARSH SAHELIAN CLIMATES

Home to the harshest cropping environment in the world, the Sahel region of Africa hosts poor, sandy soils, low and erratic rainfall, and excessive soil surface temperatures. A team of researchers from the University of Hohenheim and partnering institutions is working to improve seeding success rates and combat these harsh conditions with a tiny capsule that may revolutionize Sahelian cropping systems: the seedball.

The seedball, a technology that is part of a long-term collaborative research effort with INRAN and farmer organization Fuma-Gaskiya in the Maradi region of Niger, is small enough to fit in the palm of your hand, but holds the power to change the lives of farmers in the Sahel.

According to Ludger Herrmann, the project's principal investigator, the greatest challenge faced by the research team is how to improve major staple cropping in the region in order to increase food security and resilience. Sahelian farmers often have limited space for cropping, very low incomes and restricted access to inputs such as fertilizer and pesticides. This combination of limitations makes it difficult for farmers to subsist on their cropping operations, and nearly impossible to sell their crops for income.

"Millet stand establishment is often a problem with emergence followed by intermittent drought so seedlings die, which forces the farmer to sow again, and then even a third time," says Timothy J. Dalton, Director of the Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet, which funded the project.

By creating microenvironments that can capture moisture and make nutrients more readily available, the seedball has the potential to break this cycle.

Herrmann and his team invested in "local fertilizer" to create the seedballs, using a combination of products that are easily accessible to subsistence farmers in the Sahel. Wood ash, a resource available in every household, provides water soluble phosphate while urine is used to close the nitrogen gap. Potassium from wood ash also allows for stomal closure in the emerging plant, which allows for higher water use efficiency. Because of this, Herrmann says it is expected that plants emerging from seedballs have a higher drought tolerance and can survive longer dry spells than plants that are dry scattered as seeds. If so, he said, seedballs will increase labor efficiency and reduce seed demand.

"These fields often fail to produce yield due to the fact that plants emerge after little rain that is followed by drought," he said. "The nutrient formulation of the seedballs should support early plant growth, root growth in particular, so that seedlings are able to exploit a larger soil volume."

While physical optimization of seedballs may be a challenge, the project's long-term goal has been to define additives so seedball seeds germinate with a defined minimum amount of rainfall.

"We believe that seedballs can improve the local millet and sorghum cropping systems by reducing seed expenditures, increasing seedling survival, enhancing nutrient and water use, and finally by reducing cropping risk, increasing yield and thus income and resilience," Herrmann says.

The seedball is a powerhouse in its miniscule packaging. It is a low-cost technology with low application risk for farmers, particularly women who are often even more limited in their access to inputs. With its low investment requirements, the seedball offers exciting potential in semi-arid landscapes with sandy soils like those found throughout the Sahel.

PROJECT CONTACTS

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FUMA GASKIYA

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Collaborative Research on Sorghum and Millet

INNOVATING SCIENCE TO BUILD THE CROPS OF THE FUTURE...

DRIVING INNOVATION

The Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet is a global hub of cutting-edge research focused on increasing the resiliency of small-scale sorghum and millet producers in the face of climate change and creating entrepreneurial opportunities to reduce poverty and hunger.

The Lab's portfolio is aimed at the development of new technologies, management practices and food and feed products to help serve some of the world's most vulnerable populations. It enlists more than a hundred researchers, postdoctoral associates, graduate students and project management team members representing research centers, national programs and universities from around the globe to create a robust and impactful program to drive innovation in addressing food insecurity.

WHAT WE ARE DOING:

CLIMATE-SMART AGRICULTURE

Harnessing both time-tested breeding methods as well as the most advanced in genomic tools to create new crop varieties that are more drought, disease and pest resistant for improved yields and higher incomes for the smallholder farmer

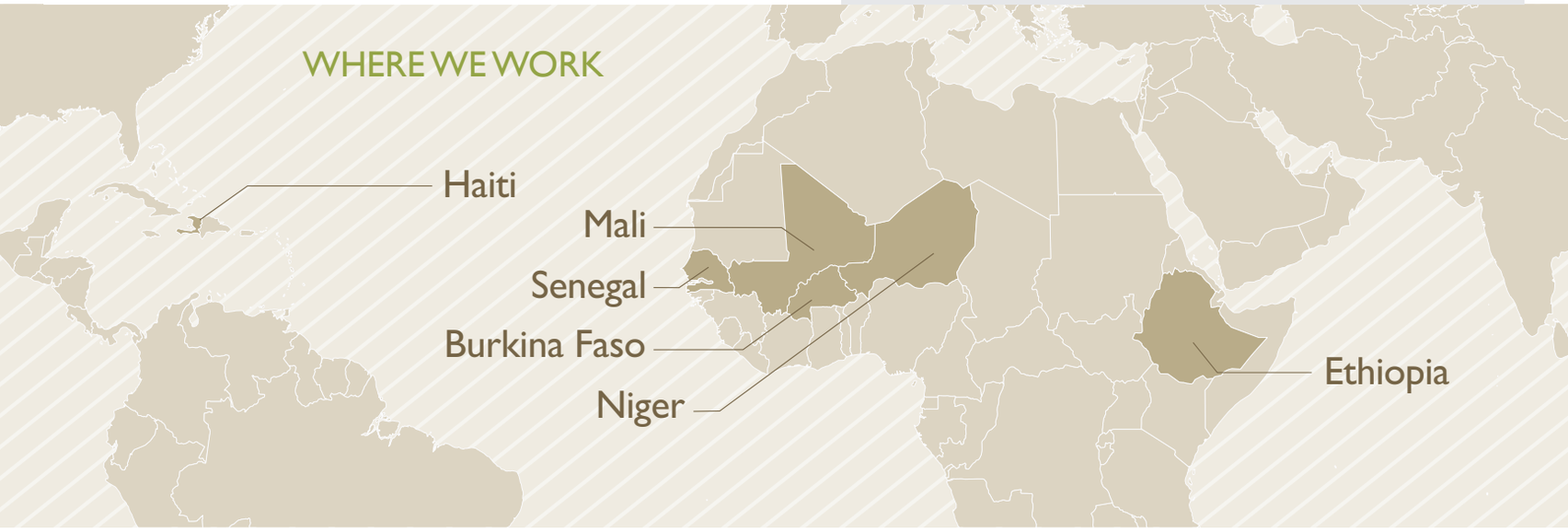
IMPROVED RESILIENCE

Designing innovative production techniques aimed at improving crop performance while combatting devastating pests in order to increase food security throughout rural areas

MARKET ACCESS AND DEMAND

Working to drive improved nutrition, business opportunities and higher crop value through a new wave of processed and fortified food products that meet growing demands by urban and rural populations alike

WHERE WE WORK



Collaborative Research on Sorghum and Millet

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