



COVID-19

A strategic guide: Working towards food security in the drylands, through COVID-19 and beyond

ICRISAT is well positioned to significantly contribute to efforts towards restoring food security in the drylands, while combating the COVID-19 pandemic-related impacts and beyond. Here is a quick guide outlining ways in which we can collaborate with our partners and influence positive outcomes for smallholder farmers.

Short term



Immediate needs for relief and recovery

ICRISAT is specialized in and can partner for ensuring domestic food production and access to improved varieties that are more nutritious, safe, high-yielding and sustainable.



Analysis & Strategies

Contributing to governments and organizations with a **wide range of scientific tools** – from GIS and remote sensing to modeling and social tools.



Getting seed to farmers

This is critical to ensure sustainable food production. Through **formal and informal seed systems**, the right varieties need to be made available for the specific needs of the time of season, short duration, low inputs situations etc.



Supplies & market access

Community and regional solutions can be developed in partnership, through **innovation platforms, farmer produce organizations** and **digital solutions**.



Design and deliver nutritious foods

Incorporating millets, sorghum and legumes in feeding programs ensures a balanced diet that has critical micronutrients and proteins. Ready-to-cook mixes/recipes designed for all. Specific focus on children (first 1,000 days) and women with high iron, zinc and calcium requirements.

Medium-long term



Adaptive and transformational change to build resilience to cope with stresses

ICRISAT can help along the entire value chain



Cross-cutting issues

- Mainstreaming nutrition**
- Empowering women** – women are consulted, involved and supported to lead
- Attracting youth** to agriculture
- Digital innovations**

Approach for adoption

- Participatory approach and partnering** – working side by side
- Building capacity** – at a national and local level
- Integrating communications** – to build awareness and share knowledge
- Monitoring and evaluation** – for feedback and adjustment
- Policy support** – work closely with government to encourage the needed policies

Background

The COVID-19 pandemic has caused phenomenal disruptions in the food system – a major contributor to global livelihoods and health. Such major disruptions typically impact vulnerable geographies the most, such as the semi-arid tropics or drylands. Smallholder farmers are particularly at risk because of pre-existing lags in nutrition, health, and income goals.

Our strengths:

- **Extensive network of staff and partners** on the ground, across sub-Saharan Africa and Asia
- **Technical and scientific knowledge** to partner with development teams
- **Specialization in the drylands**
- **A wide range of scientific tools** – from GIS and remote sensing to genomics, modeling and social tools
- **Nutrient-dense and drought-tolerant mandate crops** – millets, sorghum, groundnut, chickpea and pigeonpea
- **Scaling expertise** for a range of solutions
- **Agribusiness innovation platform** to support agri-entrepreneurs with product development and market analysis
- **Digital solutions** across the whole value chain

Eastern and Southern Africa: Equipping smallholders with tools to combat COVID-19

A 3-point strategy for getting agriculture back on its feet



Photo: L Lazarus, ICRISAT

Addressing the food systems disruption in Eastern and Southern Africa (ESA), due to the COVID-19 pandemic, will require collective action. ICRISAT reaffirms its commitment to work with our partners to help the semi-arid tropical (SAT) communities in the region in the recovery efforts and to build resilience capacities in the medium and long terms.

Over the last five years, the ESA region agriculture has faced shocks and stresses ranging from cyclic floods and droughts, fall armyworm (*Spodoptera frugiperda*) and the recent desert locust (*Schistocerca gregaria*) infestation and diseases such as maize lethal necrosis in Eastern Africa. The COVID-19 crisis further compounds this food crisis.

We propose a plan to work along with our partners to mitigate these challenges. Broadly, the plan covers three critical phases:

Phase 1: Recovery and Coping Phase

Availing baseline and decision-making data for recovery interventions: Our social scientists can work remotely to analyze food delivery and market logistics in conventional value chains. We can provide science-based evidence to policy makers and decision makers to help inform their deliberations on strategies and options including:

- Vulnerability analyses to identify those who are most likely to suffer and ensure that they receive the most intensive assistance;
- Preparatory, preventive and coping measures, such as early-warning systems and insurance; and
- Safety nets such as grain, fodder, and seed banks and emergency food reserves.

Technical advice on non-perishable and nutritious food grains: The technical advice on locally/regionally sourced sorghum, millets, pigeonpea, groundnut and chickpea focuses on best management practices on post-harvest activities, food safety and nutritional quality of grain legumes (aflatoxin, beta-carotene, iron, zinc, oil), food storage

and processing to reduce food loss and aflatoxin. This knowledge will be critical to stakeholders managing food banks and Small and Medium Enterprises (SMEs) involved in food distributions.

Providing small packs of drought-tolerant, short-duration and nutrient-rich cereal and grain legume crops through our innovative informal and formal seed delivery models that involve communities and private seed companies. These models can also be used for delivery of seeds for other crops including vegetables.

Digital platforms: For example, cell phones for information and cash transfers services, online advisory services and communities of practice for knowledge sharing.

Phase 2: Adaptive Phase

Development of adaptation strategies: We have longstanding experience developing strategies for coping with stresses, and in modeling future scenarios of change. They include:

- Genetic improvement strategies for critical traits, such as tolerance of drought and heat;
- Natural resource management strategies to improve supplies of water and nutrient resources and to increase system resilience (ability to withstand and recover from stress);
- Farm management strategies – such as agricultural diversification and affordable, efficient and sustainable small-scale irrigation – that hedge risks and broaden opportunities; and
- Capacity-strengthening strategies that improve knowledge flows; to monitor and reduce aflatoxin contamination in groundnut and other grains.

Development of Geospatial maps: These are powerful aids for visualizing the driving forces associated with poverty, hunger, malnutrition and environmental degradation in different geographic areas in the tropical drylands.

Sustainable systems for multiplying and disseminating high-quality seed: We have extensive knowledge and experience in approaches and toolkits for sustainable high-quality seed production: designing tailor-made seed delivery models from community seed banks, quality declared seed and private sector led systems with clear forward linkages to grain demand and backward linkages to early generation seeds (breeder, foundation).

Promotion of integrated farm and landscape management: ICRISAT is implementing an array of scalable, integrated farm and landscape management models e.g. soil health and water management practices, watershed management, crop-livestock integrated systems, etc.

Phase 3: Transformative Phase

Collaborating with partners to increase the resilience of dryland farming by developing system, policy and technology options and building capacities.

Deploy our research-for-development technical capacities to generate products and innovations: These include:

- Our ongoing genomic and genetic research using modern molecular methods to rapidly transfer desirable traits such as resistance to new pests and diseases; drought tolerance and drought avoidance (short-duration to medium-duration varieties); nutrition-dense and other traits demanded by market or processors.
- Development of innovative mechanization tools to reduce postharvest losses, reduce drudgery, especially oriented towards women's needs; improve fertilizer use efficiency e.g. microdosing technology.
- Investigation of last-mile delivery bottlenecks of improved soil management options, water harvesting technologies and sustainable smallholder irrigation.

Promotion of public-private sector partnership to facilitate technology adoption: Our Hybrid Parents Research Consortium (HPRC) is a good example. We can also develop a wide range of partnerships with NARES (National

Agricultural Research and Extension Systems), community-based and private sectors, both within and beyond the realm of agricultural research-for-development.

Develop evidence-based risk-reducing policies: For example, crop insurance, early warning systems, joint landscape management, crop-tree-livestock systems, seed systems and policy research on grain legume, blending of cereal flour.

Promote agro-enterprise incubation, digital agriculture platforms using experiences from ICRISAT Asia region: These initiatives will target women and youth in SAT.

West and Central Africa: From recovery to transformation via adaptation in a COVID-19 scenario

A stepwise plan for farmers to cope with COVID-19 in West and Central Africa



Photo: A Dama, ICRISAT

Taking our mission statement: ‘...to reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics’ as a framework, in collaboration with our partners, we aim to assist rural and urban communities in West and Central Africa (WCA) to become more self-reliant through a three-step process.

As on 15 May, the COVID-19 outbreak has hit 54 African countries, among which 27 are in WCA. It is expected that both rural populations on the brink of subsistence farming, and urban populations that form the market for agricultural products, will be most affected. This crisis, combined with climate change, recurrent droughts, and fall armyworm (FAW) and locust infestations, will be challenging for the very fragile food security and livelihoods in the WCA region.

The following three-step plan is proposed.

Step 1: Recovery and Coping Phase

- To support production of quality certified seed, interventions in partnership with seed companies and farmers’ cooperatives will prioritize adequate warehousing and supply of targeted breeder seed.
- Helping development/food aid programs through digital platforms that remotely monitor crop/environmental conditions, farming activity, commodity prices and supply chain transactions.
- Making our mandate crops available for WCA countries can ease difficulty in securing food due to COVID-related lockdowns.
- Using warrantage and other extension systems to mobilize funds and services for agricultural risk management.
- Providing yield forecasting support to operational early warning systems.
- Monitoring seed voucher usage to enable smallholder farmers’ access to quality seed of improved varieties.
- Studying the impact of climate change as a compounding risk factor on farmers livelihoods, and using the lessons learned to design adaptation measures in the context of COVID-19.

Step 2: Adaptive Phase

Going beyond specific interventions, we can design solutions for the pandemic’s impacts in gender- and location-neutral ways.

- Developing crop varieties and hybrids more resilient to climate change and responding to high-nutrition needs (to strengthen general immunity against the virus). Nutritionally rich varieties of millet such as CHAKTI and some varieties of sorghum to be promoted and made available to smallholder farmers.
- Using blockchain approach to bring together input supply, market linkages for agricultural produce, and field-level agronomic and performance monitoring, while ensuring complete traceability.

- Encouraging and promoting a system diversification approach to provide alternative sources of food and income to rural communities.
- Building on adaptive scaling models to strengthen agricultural service extension through virtual tools. For instance, online meetings between farmers and extension workers, training seed companies and farmer organizations to produce certified seed through virtual meetings, radio and TV communication campaigns to inform availability of seed sources and agronomic practices, etc.

Step 3: Transformative Phase

- A long-term response to current and post-COVID-19 periods require improved investment in domestic production of highly nutritious food crops such as millet, sorghum and groundnut through breeding modernization.
- Modern plant breeding tools to rapidly develop high-yielding, climate-resilient, drought-tolerant, disease/pest-resistant, and farmer/market-preferred improved sorghum, pearl millet and groundnut varieties.
- Making make national value chains more competitive by:
 - 1) Promoting industrial/private sector financing of agricultural research;
 - 2) Supporting national policies that favor rebalancing of supply chains through multi-stakeholder PPPs that cover the entire value chain;
 - 3) Promoting inclusive contractual agriculture schemes that ensure safe participation of smallholders into market-driven agriculture;
 - 4) Developing vocational training infrastructure that catalyzes the rural job market for youth employment.
- Conducting cost-benefit analysis to determine value of digital solutions introduced in the wake of the pandemic-necessitated lockdowns.
- Considering gender-specific constraints regarding access to land and finance, and increasing advocacy on increased access to land, finance and productive resources for women.
- Assessing extent of price/changes in agricultural trade and market.

As a CGIAR research institution working towards better livelihoods for smallholder farmers in the semi-arid tropics, we are aware that now, more than ever, it is important to support them with mechanisms to ensure nutrition, food security and livelihoods. With our modern breeding programs and knowhow related to nutrition and climate-smart agriculture, we are ready with immediate as well as longer-term solutions to rebuild impacted food value chains.

We thank our partners and funders for their support, as we continue to push, as OneCGIAR, towards food and nutrition security across Africa and Asia.

What African farmers and processors say about the COVID-19 pandemic and lockdowns

Maintaining the dialog with the farming community and industry

Farmers and other key stakeholders in Nigeria, Mali, Niger, Ghana, Burkina Faso and Senegal speak up about how the COVID-19 outbreak is affecting them and what their concerns are as they approach the 2020-2021 cropping season. Digital extension and advisory services, online payments and fund transfers, and virtual learning platforms were among the key needs outlined by them. These need to be fulfilled quickly, not just for the current scenario but also for the future.

Ms Hajia Salamatou Garba, Executive Director, Women Farmers Advancement Network (WOFAN), Nigeria

About 80-85% of smallholder farmers whom we work with are at risk of losing all their dry season investments as a result of the lockdown due to COVID-19. More worryingly, there are almost no extension services except for the skeletal visit-and-train system. Farmers and processors are left without field demonstrations. They're unable to apply the critical second-phase urea fertilizers and appropriate pesticides. We fear that they will be unable to feed their families or the nation as food security is dependent on their performance.



Photo: WOFAN

In order to mitigate the shock of the pandemic and its related effects on smallholder farmers and processors, building capacities and providing financial and marketing support for the first six months of the closedown would be essential.

E- extension becomes very important as an innovative way of working with extension workers and farmers. Farming needs to be led by information and communications technology (ICT) and should turn into a demand-driven vocation. After the pandemic is over, impact on the nation and the need for Nigeria to diversify from an oil-dependent country to one with an agriculture-led and technology-driven agribusiness systems will need a re-shaping and re-thinking of our *agricultural models.

Ms Stella Thomas, Managing Director, [Tecni Seeds Limited, Nigeria](#): At Tecni Seeds we perceive COVID-19 as a setback for agricultural business. The



Photo: Tecni Seeds Limited

pandemic is already affecting business because cost of haulage and cost of inputs have doubled due to unavailability of labor. So, we are trying to create an online presence for sales, and increase machines to reduce human labor. It takes almost two weeks to move goods from Kano to Ibadan due to interstate issues and bad vehicles. It is a trying time for everyone, but it will pass. Let's keep safe and keep looking out for new ways in seed Agribusiness.

Mrs Coulibaly Maimouna Sidibe, CEO of [Faso Kaba, Seed Company, Mali](#): COVID-19 has slowed down our activities and reduced our revenues enormously this year.



Photo: A Diama, ICRISAT

With no flights, we have missed many orders of inputs, including seeds, sprayers, pesticides etc. that we import from overseas and due to restrictions in transport, it's difficult to go into the field to buy inputs.

We've had to cancel our annual meetings with farmers as they do not have the means to hold virtual meetings and make online purchases. The process of certification and provision of seeds to be distributed to producers of certified seeds will be delayed this year. This will lead to a lack of availability of seed for the production of certified seeds by individual farmers, associations and cooperatives.

While normally our seed shops are equipped at this time of the year, we are still in the process of collecting samples. We ask our donors to please facilitate access to basic inputs even at subsidized prices. We need support for paying salaries to our staff. We will also need more preventive kits for the farmers' field demonstrations and trainings this year. Virtual meetings have become essential and our farmers need to be there.

Mrs Fanta Diamoutene, President of women farmers group in Farakala, Mali:

Most farmers like me do not have these smartphones and other virtual platforms that those in the cities are using to connect, and we do not have the knowledge to hold such virtual meetings. Therefore, we are very concerned about missing the season's activities. We hope that partners will help us get some protection kits in the near future, pending a solution to this pandemic.



Photo: A Diamo, ICRISAT

Mr Yalaly Traore, member of ULPC (Local Union of Cereal Producers), Dioila, Mali:

Farmers do not have the same perceptions about the pandemic. While some believe it does exist, others believe it is a government policy to make money. However, they all agree on one thing: this pandemic is affecting us, because all activities – planning, meetings, training – have slowed down.



Photo: A Diamo, ICRISAT

There has been an increase in the prices of agricultural inputs (fertilizers and herbicides) and the shortage of certain products on the market.

Due to the closing of the borders, members of our cooperatives have not been able to sell their stocks while these cooperatives have taken loans to build up their stocks.

At ULPC we have not yet succeeded in equipping our farmers with masks or handwashing kits. We are actively in contact with partners, including NGOs, to see how they can support our farmers with these essentials. They are very needed by farmers who are producing to feed our communities.

Mrs Nasser Aichatou Salifou, General Manager, Ainoma Seed Farm, Niger:

From the start, we initiated awareness campaigns on preventive measures because we noticed that our producers were not informed enough about the pandemic.

Currently, their concern is whether they can go to the field when the rains come. In my opinion, awareness campaigns should be increased through community radios and posters/flyers to better inform farmers. There is still a lot of prejudice because producers are



Photo: A Diamo, ICRISAT

not informed enough about the disease and then those who have access to social media have wrong information or fake news.

As for the pandemic, we are feeling the effects on marketing of our produce and this could have an impact on our turnover. We have put some kits at our administration office and at our production site. However, our financial means do not allow us to reach producers or distributors with the kits. Although, right now, the marketing of food products is not too impacted by the pandemic, our worry is that the isolation of the city of Niamey prevents us from setting up inputs shops at our points of sales.

Also, the training sessions that we generally offer our producers, agro dealers and technicians is being affected in particular because of the social distancing restrictions. We must continue to collaborate in order to adapt our solutions for meetings / training with farmers while respecting preventive measures. And, finally, we need our donors support to help raise more awareness about the pandemic.

El Hadj Abdul Razak, Director General, Heritage Seeds Company, Ghana:

We cannot go to market to sell our seeds and it is difficult to reach our farmers. Also, because of social distancing, we cannot engage many workers for weeding and/or applying fertilizers, etc. If this continues, we may have to decrease our acreage in production.



Photo: A Diamo, ICRISAT

Planning for the future is very difficult because we don't know what will happen in the next moment. We had clients coming from Accra city in the previous years but not this time because of the lockdown in Accra. Everything else can wait but production cannot, we need enough seed in the system. Even if there is one man in the earth, he will still have to eat. Seed is feed security. We need to maintain that.

Bougouna Sogoba, Director General, Malian Awakening Association for Sustainable Development (AMEDD), Mali:

This pandemic is a major health and economic crisis that can have a negative impact on the rural economy. We lack the manpower for cropping season activities and also difficulty in getting services



Photo: A Diamo, ICRISAT

to inputs by the private sector and extension services. The donor countries of most NGOs and foundations being strongly impacted, it could have repercussions on financing.

For our NGO, the main challenge has been to carry out our activities while putting in place preventive measures against contamination. We hope that, in Mali, the cropping season and the production will not be much affected.

However, this pandemic is also an opportunity to explore new ideas such as the use of digital solutions. We must use this crisis as an opportunity to refresh our approaches and technologies.

Mr El Hadj Ibrahima Diouf, President of the GIE-Jambar (Groupe d'Interet Economique), Meouane, Senegal:

In Meouane, we are well aware that this is a global phenomenon and we are trying our best to keep ourselves safe with

preventive measures such as lockdown and social distancing. We also perform prayers to ask for divine grace. Due to the geographic location of our village (about 150 km from Dakar) and the scattered distribution of the houses in the village, we strongly believe we will keep safe from the pandemic.

The GIE usually receives pre-basic seeds of millet and peanuts from ISRA (Senegalese research institution). Due to the COVID-19 outbreak in Senegal in early March, we have not yet received the seeds. Also, the seeds we produced last year still need to be certified, packaged and distributed to farmers. All the processes have been stopped due to the pandemic, while the rainy season is about to start.

Although the number of people tested positive has unprecedentedly increased (100 people per day, on average, since 1 May), the government of Senegal has recently decided to unlock the containment, allowing



Photo: A Diamo, ICRISAT

the seasonal workers to travel to rural areas. We are worried that this decision may favor the propagation of the COVID-19 in rural areas.

Roger Kabore, Minim Sông Pânga Association, Burkina Faso:

In the beginning, farmers had lot of fears of being contaminated by people coming back from cities especially since there are no remedy.

Today there is less fear.

Farmers are mainly informed via radio and TV on the Covid-19. However closings of markets, borders and gold panning sites have cut off the sources of income of some producers. We are concerned that insufficient and high cost of imported agricultural inputs may affect production. Therefore, our association has put lot efforts on producing and using of local inputs (compost, seeds, and phytosanitary products). This pandemic is a real threat but there are opportunities to be seized for the future by building a strong local economy network and safety nets for the benefit of producers.



Photo: A Diamo, ICRISAT

Recently [CORAF](#) has recommended that a concerted effort be made to ensure availability and access to certified seeds of major staple food crops in the Economic Community of West African States (ECOWAS) and Permanent Interstate Committee for drought control in the Sahel (CILSS) region to avert the looming consequences of the COVID-19 pandemic on agricultural production. Like several other nations, around the world, the African Union (AU) is also exploring a plan to support farmers. As Ministers of Agriculture from around the world and the FAO discuss the implications of the COVID-19 pandemic for food security and nutrition in Africa, the concerns expressed by farmers need to be heard and considered.



Author:

Agathe Diamo

Head - Regional Information
ICRISAT-West and Central Africa

New multipurpose sorghum variety captures attention in Burkina Faso

A new variety of sorghum that delivers high yields of grain and stover is gaining popularity in Burkina Faso, a region where livestock feed remains a challenge. The ICRISAT-developed variety, *Soubatimi*, can be grown in the rainy and post-rainy seasons, benefiting farmers and livestock owners alike.



Dr Baloua Nebie and Mr Leon Badiara in a ratooning field of *Soubatimi* in post-rainy season. Photo: M Nitiema, INERA

Mr Leon Badiara, from the Ministry of Animal and Fisheries Resources, and founder of Genetic Center, Burkina Faso, first heard about *Soubatimi* at the SAGE (Société Africaine de Génétique) launching conference in Ouagadougou, in November 2018. He visited the ICRISAT stall where Dr Baloua Nebie, sorghum breeder, was exhibiting a poster on multipurpose sweet sorghum varieties.

When he heard that *Soubatimi* combined high grain yield with high stover yield, and that it could be grown in rainy season as well as post-rainy season mainly for livestock feeding, Mr Badiara was immediately interested in testing *Soubatimi* in his field. The next year, he obtained the seed from ICRISAT and planted it at his Genetic Center in Ouagadougou. He harvested 1.8 tons of grains and 8 tons of dry stover from 0.4 ha. "After harvesting the grains and fodder, cut at 0.5 cm from the ground, I continued to irrigate the field once a week and that will be again harvested for animal feeding," said Mr Badiara.

In order to popularize *Soubatimi*, the office of the National Direction of Animal Production organized a guided tour to the Genetic Center farm at Boulbi near Ouagadougou on 11 March 2020. Genetic Center, which specializes in dairy production, has a critical need of 30-50 tons of fodder yearly. This high-yielding variety, developed by ICRISAT and partners (Institute for Rural Economy (IER), [CIRAD](#) and Farmers organizations in Mali, with support from the [McKnight foundation](#)) was produced during the rainy season for the first time and the ratoons in dry season 2019/2020 showed good stover and grain yields.

Soubatimi - a star multipurpose sorghum variety

- Grain for household consumption
- Fodder for livestock feeding
- Stover remains green until physiological maturity (stay-green).
- Sweet stem juice with 16% Brix can be used to make sorghum syrup or bioethanol.
- Possibility of off-season production.

The field visit received a lot of attention because sorghum production during off-season is uncommon in the region; most varieties grown in Burkina are photoperiod-sensitive and therefore produced during a specific period of time (June-October). Mr Badiara said, "We want more actors to take advantage of this new variety that will help better feeding of their livestock, as this variety produces stover of superior quality than what we usually cultivate."

Participants of the field day also tasted dishes made from *Soubatimi* sorghum. "Generally the tô made from the grains of dual-purpose sorghum is not very appreciated for human consumption, but the dishes produced from this specific dual-purpose sorghum variety are very good," said Mr Hamadou Bougoumpiga, fodder seed and dairy producer in Saaba.

Mr Issa Sawadogo, Director General of the Animal Production Service, said that the new variety should be popularized through more visits, field days and guided tours. Mr Badiara urged sorghum producers to adopt *Soubatimi*, saying, "There are very few and very poor pastures here to graze animals. If we want to produce milk or meat, it is in our interest to produce good quality fodder to feed our animals."

Formally created since 2008, the Genetic Center is specialized in the production and sale of high-performing animals, artificial insemination, training of livestock value chain actors, advisory services in plant and dairy production.

In addition to high grain and stover yields (3.5 t/ha and >10 t/ha respectively), *Soubatimi* has sweet stem and the juice is used to produce sorghum syrup that can be used like honey in different diets. Due to its low photoperiod sensitivity, *Soubatimi* can be cultivated as an off-season crop, unlike most of other varieties of sorghum. Also, it is adapted in climatic zones receiving rainfall ranging from 600-1200 mm. The variety has good ratooning characteristics and at least two harvests can be obtained from only one sowing.

For more on our work in sorghum, [click here:](#)

For more on our work in Burkina Faso, [click here:](#)

This work contributes to UN Sustainable Development Goals



Projects: (01) **Networking4Seed**, (2) **Dual-Purpose Sorghum and Cowpeas Phase II**, (03) **Enhancing Smallholder farmers' Productivity, food and nutrition security in West Africa using High-Yielding and nutritious sorghum and pearl millet hybrids and Varieties** (ESPHYV)

Partners:

Research: Environment and Agricultural Research Institute (INERA), Institute for Rural Economy (IER), Agricultural Research Centre for International Development (CIRAD) and ICRISAT

Farmers organizations: AMSP, Burkina Faso; UGCPA/BM, Burkina Faso; ULPC, Mali; USCPMD, Mali; COOPROSEM, Mali; Djigiseme, Mali and Sene Yiriwaton, Mali

Funders: The McKnight foundation, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)

CGIAR Research Program: Grain Legumes and Dryland Cereals

Africa's most vulnerable are called to bear the brunt of a pandemic



Photo: DNN Africa

Securing farming communities through and after COVID-19 is a priority

Original post on [DNN Africa](#)

One of world's harshest terrains for farming threatens to crumble under COVID-19. West Africa's farmer collectives, small businesses and other stakeholders in agriculture reveal their plight as rains approach and call out for support through logistics facilitation, digital extension, awareness creation and financial backstopping to prevent food, nutrition security and livelihoods going downhill.

"Farmers have varying perceptions about the pandemic. While some believe it is real, others believe it is a doing of governments. However, they all agree on one thing: the response to the pandemic has affected everybody because all activities have slowed down," notes Yalaly Traore, a member of Local Union of Cereal Producers in Dioila, Mali.

"We initiated awareness campaigns for preventive measures because we noticed that our producers were not informed adequately," says Nasser Aichatou Salifou of Ainoma Seed Farm in Niger. "Currently, farmers' concern is whether they can go to the field when the rains come. Awareness campaigns should be increased to educate farmers as they are not

adequately informed and then those who have access to social media have wrong information."

Logistics – the seed of hardship

Farmer cooperatives are among the worst hit as they are unable to dispose of their seed stock, which they produced with borrowed capital.

"We cannot go to market to sell our seeds and it is difficult to reach our farmers. Also, because of social distancing, we cannot engage sufficiently big workforce for weeding or applying fertilizers. If this continues, we may have to decrease our acreage in

production," says a worried El Hadj Abdul Razak of Heritage Seeds Company, a farmer-centric organization in Ghana.

Suddenly, without flights, orders for inputs including seeds, sprayers and pesticides that are usually imported to countries like Mali are now not possible. Restrictions in transport makes any local procurement of inputs difficult.

"Rising cost of haulage and cost of inputs have doubled due to non-availability of labor. We are trying to create an online presence for sales and increase machines to reduce human labor. It takes almost two weeks to move goods from Kano to Ibadan in Nigeria

due to interstate issues and bad vehicles,” Stella Thomas of Techni Seeds Limited in Nigeria points out.

Among the implications are a costly delay in certification of seeds, explains Coulibaly Maimouna Sidibe of Faso Kaba Seed Company, a predominantly women-run seed organization in Mali. “This will lead to a lack of availability of seed for the production of certified seeds by individual farmers, associations and cooperatives,” she adds. Any dip in quality of seeds entering farms can jeopardize incomes and food security.

The pandemic has also hit seed systems in Senegal, according to El Hadj Ibrahima Diouf of Jambar, an economic interest group or Groupe d’Interet Economique. “The seeds we produced last year still need to be certified, packaged and distributed to farmers. All the processes has been stopped due to the pandemic, while the rainy season is about to start,” he said.

Recently, the international non-profit association, [CORAF](#), called for a concerted effort to ensure access to certified seeds of major staple food crops in the West Africa and Sahel region to soften the impact of the pandemic on agriculture.

Digital Extension – the elephant in the room

“About 80% of smallholder farmers we work with are at risk of losing their dry season investments as a result of the lockdown. Farmers are left without field demonstrations as skeletal visit-and-train extension services is all there is. They are unable to apply critical second-phase urea fertilizers and necessary pesticides. We fear they cannot feed their families or the nation,” rues Hajia Salamatou Garba of the Women Farmers Advancement Network in Nigeria.

Digital extension services are yet to come of age in rural Africa, even as rest of the world accustoms itself to a new norm – social distancing and increasing reliance on digital technologies.

“Most farmers like me do not have smartphones and other virtual platforms that those in the cities are using to connect. Therefore, we are very concerned about missing the season’s activities,” Fanta Diamoutene, of a women farmers group in Mali’s Farakala says echoing the concerns of farmers.

Financial backstopping

As the rainy season approaches, farmers’ collectives and small seed enterprises cannot weather the pandemic without financial support, the stakeholders say, and Ms Garba adds support is needed for six months post lockdown. The price of agricultural inputs

like fertilizers and herbicides is increasing, and an impending shortage is likely to further limit availability and drive costs up.

Funding support is key to help African food producers adjust to the new norm by taking precautions to prevent contamination. Many of the stakeholders interviewed said they are not in a position to make prevention kits – masks, sanitizers or handwashing soaps, available to all their members. Seeing how most countries in the region are affected, NGOs like Malian Awakening Association for Sustainable Development look hopefully beyond the region to mitigate the fallout from the pandemic. He thinks this pandemic is also an opportunity to explore new ideas such as the use of digital solutions. “We must use this crisis as an opportunity to refresh our approaches and technologies” he concludes.

A three stage robust plan to secure farming communities through and after COVID-19

Recently ICRISAT has developed a three stage robust plan to secure farming communities through and after COVID-19 in for West and Central Africa. Taking on ICRISAT’s mission to “reduce poverty, hunger, malnutrition and environmental degradation in the dryland tropics” as framework, our investments in agricultural programmes will assist rural and urban communities to become more self-reliant, mitigate the impact of covid-19 sanitary shock by contributing to ensure more sustainable food systems and food security.

“Keeping a loop the comparative advantage of crop improvement programs, in the recovery phase, ICRISAT’s interventions in West and Central Africa will prioritize on increasing of agricultural production through adequate warehousing and supply of targeted breeder seed to ensure continued support in production of quality certified seed in partnership with selected Seed Companies and Farmers’ cooperatives. The institute is also ready to provide assistance to development and food aid programs targeting relief interventions through digital platforms that can remotely monitor crop and environmental conditions, farming activity, commodity prices and supply chain transactions from remote” says Dr Ramadjita Tabo, Regional and Research Program Director of ICRISAT in West and Central Africa.

Article has been published in



Author:

Agathe Diamo,
Head – Regional Information,
ICRISAT – West and Central Africa

Flipping the script on rainfall data

[Originally published on LinkedIn](#)

In the last few hours before Covid-19 locked [CGIAR](#) centers staff into remote work, a handful of [ICRISAT](#) researchers traveled to Kenya's Makueni County with a dozen seemingly innocuous devices, roughly packed inside plain A4 paper boxes. Virtually unnoticed, they were on a mission to plant what they hope will become a game changer in agricultural risk management: a set of unpretentious rain gauges.



Installation of cheap, recyclable IoT rain gauges prototypes conceived by [Manobi Africa](#) and [Viveris](#) to reduce basis risk, insurance premiums and interest rates on smallholder credit.
Photo: PCS Traore, ICRISAT Manobi Africa

Outwardly old-fashioned if not outright obsolete, these minimalistic receptacles the size of a large mug however hid a powerful stunt: Internet-Of-Things at a very affordable price. And this is significant.

The number of operational ground observation stations decreased by 85% over the past 5 decades in Africa[\[1\]](#). This is a big issue, given the continent's dependence on rainfed agriculture and the considerable spatial and temporal heterogeneity of tropical rainfall. Promising approaches that combine satellite rainfall estimates with scarce ground data have started addressing the problem to provide near real-time, continuous spatial and temporal coverage of weather conditions. Coopted by over 14 national hydrological and meteorological services (NHMS) across Africa, [ENACTS](#) is one such successful example of how the gridded data revolution can improve early warning systems and climate outlooks from regional to sub-national scales. Being deployed in Mali, Ethiopia and Ghana, [CRAFT](#) is yet another innovation to improve the skill, lead time and spatialization of seasonal production forecasts and food security outlooks, down to the district level.

The ubiquitous big data craze meanwhile lures many aspiring businesses into targeting smallholder farmers

with ambitious agronomic advisory services, based likewise on satellite rainfall estimates or other elaborate combinations of remote observing systems and model outputs, some of which are offered as services by the private sector. Claiming to reach farmers by the hundreds of thousands or more, e.g. through SMS and community radios delivering tailored advice on optimal sowing dates and fertilization rates, such services offer rewarding dissemination metrics that tick all the boxes on benevolent donor dashboards. Yet, **the relevance of these services for farm-level decision making, their uptake by farmers and impact on rural livelihoods remain euphemistically elusive.**

The problem is that we are so consumed with fashionable technologies that we tend to lose sight of the actual value of the data they generate, and more generally of **data fitness for purpose**. Satellite rainfall estimates are notoriously unreliable at quantifying the highly localized rainfall events (and dry conditions in-between) that are meaningful for farm-level decision making at the tails of the growing season, when rainfall is most heterogeneous. They are equally known for systematic underestimation of high rainfall amounts, another significant peril to crops and rural dwellers. The disruptive innovation of measuring

rainfall through mobile signal attenuation is still a distant prospect in a continent where mobile tower density is one order of magnitude lower than elsewhere. Restocking NHMS with automatic weather stations is useful but under no realistic scenario will it ever suffice in the medium term to yield skillful rainfall estimates for informed farm-level decisions at scale. Besides, it is rare that such publicly collected data becomes available in the spatial and temporal resolution it is needed for decision-making or for the provision of third-party services.

Enter cheap, recyclable IoT rain gauges. A brainchild concept of [Manobi Africa](#) targeting an industrial manufacturing cost of \$50 a piece and purposefully limited to the sole measurement of daily rainfall as the single most important agro-meteorological variable under the Tropics, these no-frills gadgets should become a standard staple as part of the suite of inputs needed to de-risk agricultural investments.

Leveraging the steady penetration of LPWAN[2] technologies such as NB-IoT and LoRa, they

could provide the next building block of IoT mainstreaming in rural smallholder communities.

Of course, the purists may argue that such layman devices don't meet rainfall measurement accuracy standards. That is true, but irrelevant. Because farmers and agricultural stakeholders don't need accurate measurements 30km away. They need robust measurements that are just good enough, but on their farm.

Of course, it is highly doubtful a smallholder farmer would even consider paying for an IoT rain gauge anytime soon. But that's a non-event. Because the bank will pay for it. And will lower interest rates on the farmer's loan.

Authors:

Pierre CS Traore

S Ndung'u

RK Kyalo

D Annerose

Anthony Whitbread

Ramadjita Tabo

COVID-19 calls for renewed focus on eating right and natural

Post-COVID-19 scenario offers a unique opportunity to seize the moment and repurpose policies towards a food system that is resilient and sustainable



Photo: Liam Wright, ICRISAT

[Original post on Down To Earth](#)

India has achieved significant [poverty reduction](#) in the last couple of years and the middle-class has burgeoned considerably.

A [World Economic Forum research and consumer survey](#) predicted that by 2030, India will no longer be an economy led by the bottom of the pyramid, but by the middle-class. It stated that 80 per cent of Indian households will be middle-income and will drive 75 per cent of consumer spending.

There is need to [boost our immune systems](#), especially in the wake of the novel coronavirus disease (COVID-19) pandemic. Medicines can't fix our immune systems; our lifestyle and what we eat will only help. Several new initiatives such as Eat Right and Smart Food have enhanced demand for healthier and nutritious foods.

India is a nutri-basket of nutri-dense plant-based foods. We need to ensure these are safe, accessible and affordable to all.

Even before the present pandemic, demand for natural and organic products in India was on the rise. Availability of organic food stuff and products grown under natural systems (of agriculture)

has increased manifold. This is manifested by very steep growth in market share of natural (and ayurvedic) products and a corresponding alignment to the trend by competing with multinational companies.

The general observation is that the aspirational consumers are going back to nature and [natural products](#) to live healthier and longer.

The prevalence of malnutrition in India as revealed from the National Family Health Survey (NFHS) and the latest Comprehensive National Nutrition Survey (CNNS) needs special attention from policymakers to address the complex challenge.

Empirical [studies](#) indicate that malnutrition contributes to most of the country's child deaths, as well as disability in adults.

The CNNS data showed that overweight, obesity, and even early non-communicable diseases, are no longer confined to the adult population. Saving the productive populations of the future requires a serious focus on nutrition. The lockdown during the COVID-19 pandemic has raised serious concerns on reduced access to nutritious foods by the vulnerable sections of the society.

The environmental [trade-offs](#) from agricultural intensification through green revolution technologies are now well-recognised. Depleting water resources; loss of biodiversity and soil degradation / desertification are immediate concerns in the food production systems.

With the climate change looming large, now exacerbated by the COVID-19 pandemic, the government needs to reorient agriculture policies to make the food systems sustainable, while meeting the food security and nutrition challenges for a growing population.

What could drive such a change? How could public policies ensure that safe and nutritious foods are made available, accessible and affordable to the vulnerable sections of the society? How can public policies in unison ensure the farming of more nutritious and safe foods while also sustainably managing the environment's natural resources? What could be the pathways to incentivise this food systems transformation?

As mentioned earlier, post-COVID-19 offers a unique opportunity to seize the moment and [repurpose policies](#) towards a food system that is resilient and sustainable.

The growing consumer demand for healthier and nutritious food has to be intensified through consumer awareness programmes, respecting the culture, taste, food preference, etc. Food safety standards through food labelling and incentives have to be built in the government schemes and programmes. POSHAN Abhiyaan (National Nutrition Mission); Eat Right India; Millet Mission and Swachh Bharat Abhiyaan are examples for convergence of relevant activities aimed at creating a mass movement towards good nutrition outcomes.

Businesses need to also be encouraged to make responsible investments to transform food systems.

Even though many staple and non-staple food crops are long known to be nutritious and good for growth of individuals, food and agriculture policies in many parts of the world are stuck in the 'Big3' staples (rice, wheat and maize).

In India, for decades, the Minimum Support Price and public procurement policies have ignored the diversity of crops and [skewed](#) in favour of staples such as rice and wheat. The enhanced production of these food crops might have taken care of the calorie requirements, but the [double-burden](#) of under-

nutrition and micro-nutrient deficiency has risen further.

Crops such as sorghum, millets and pulses not only have less water demand in comparison to rice and wheat, they also have significant benefits owing to higher percentage of micro-nutrients and protein.

Moreover, millet grains have a low glycemic index, particularly compared to staples like refined rice, that makes them a good alternative staple for managing or preventing diabetes.

Richness of millets in micro-nutrients can be gauged from the fact that few of them could be natural substitutes to correct micro-nutrient deficiencies in an individual. For example, finger millet (*ragi*) has three times more calcium than milk; and pearl millet, another popular nutri-cereal, has highest amount of folate amongst cereals.

Similarly, *kodo* millet is high in dietary fibres — thrice as much as in wheat or maize and ten times than in rice. Additionally, sorghum and millets are gluten-free. They are often termed as smart food being "[good for you, the planet and the farmer](#)" and are fast becoming [food choices](#) for aspiring and health-conscious consumers.

Various kinds of *daal* have been the main source of protein intake in India besides fish and meat for the non-vegetarian segment of the population. Legumes are also an affordable protein source; however, many are not a complete protein source as they are low in one of the essential amino acids methionine.

A recent study showed that millets and legumes combined provide a complete protein, highly digestible and power-packed nutrients. The recent growth in production of major pulse crops is indeed a significant achievement and government must sustain this near self-sufficiency through specific policies and research breakthroughs.

Plant-based protein and meat alternatives are fast catching up in the [West](#). In India, too, consumption of fruits and vegetables and dairy products is growing and this is a good indication on the nutrition sensitivity of Indian agriculture.

Bio-fortification of food crops is now employed to enrich the nutrient profile. Zinc- and protein-rich rice and high protein quality and vitamin-A rich maize varieties have been developed and released by the Indian Council of Agricultural Research (ICAR).

The International Crops Research Institute for the Semi-Arid Tropics (ICRSAT) has developed and released India's first bio-fortified sorghum variety, [Parbhani Shakti](#) in Maharashtra. In Post-COVID-19 scenario, [enhanced investments](#) on research and innovation in this sector could be an effective pathway to boost the health and immune systems of the citizens.

Research efforts in major crops including non-staples would prove very cost-effective and sustainable solution to address micro-nutrient deficiencies in the population. Government programs like PDS, MDM, and ICDS are the best possible delivery channels to leverage healthier and nutritious food products in India.

A recent scientific [study](#) has shown that mid-day-meals served with millet-based products found 50 per cent faster growth in children in comparison to those eating the usual rice-based meals.

Interestingly, as often referred to by economists in food and nutrition discourses, Bennett's law seems to

be very much operating right now for most Indians — as proportion of starchy staples in their diets is going down while income levels are rising.

Post-COVID-19 pandemic is the right time to seize the opportunity and push policies that promote nutritious and sustainable food systems and value chains and create adequate demand for healthy, nutritious, qualitative and safe food, through consumer behaviour change.



Authors:

Dr Arabinda Kumar Padhee

Director, Country Relations and Business Affairs
ICRISAT



Ms Joanna Kane-Potaka

Assistant Director General – External Relations
ICRISAT

Agri-Buzz blog post

World Bee Day

Crops, pollination, food: Why we need bees

One-third of the world's crops need pollination to set seeds and fruits, and a majority of them are pollinated by bees. Along with other pollinators, bees are currently endangered by human activity. There is a global decline in bee population, due to reasons like excessive use of insecticides, habitat loss, habitat fragmentation, bee pests and diseases, and climate change.

In order to raise awareness about their critical role in sustainable development, **the United Nations has declared May 20 as World Bee Day.**

There are nearly 25,000 species of bees: 70-80% of the world's crops/plants are pollinated by wild bees while 15-20% are pollinated by honeybees. These pollinators also provide an important ecosystem service that is essential for sustaining the wild flora biodiversity. As an example in case of pigeonpea, *Apis mellifera*, *A. dorsata*, *A. indica* (Pathak, 1970), *Megachile* spp. (Williams, 1977; Zeng-Hong et al. 2011), and *Xylocopa* spp. (Onim, 1981) are major sources of natural cross-pollination.

Effect of bee pollination on crop

- It increases seed yield and fruit yield in many crops.
- It improves quality of fruits and seeds.
- Bee pollination increases oil content of seeds in sunflower.
- Bee pollination is a must in some self-incompatible crops for seed setting.



Crops benefited by bee pollination

- **Fruits and nuts:** Almond, apple, apricot, peach, strawberry, citrus and litchi
- **Vegetable and Vegetable seed crops:** Cabbage, cauliflower, carrot, coriander, cucumber, melon, onion, pumpkin, radish and turnip
- **Oil seed crops:** Sunflower, niger, rapeseed, mustard, safflower, gingelly.
- **Forage seed crops:** Lucerne, clover
- **Cultivated field crops:** Pigeonpea, lentils, clovers, Lucerne, mustard, rape, linseed, sesame, gingelly, buck-wheat, Cambodia, safflower, millet and sunflower
- **Timber trees:** Neem, *Cassia fistula*, Acacia, *Albizzia* spp., Kachnar (*Bauhinia purpurea*), eucalyptus, sandalwood, raintree, wild cherry
- **Natural and ornamental flowers:** Cosmos, shoe flower, golden rod, cup & saucer, *Tecoma stans*, zinnia,

- coral creeper (*Antigonon leptopus*), rose, Rangoon creeper, aster, wild rose (*Kuja*), hydrangea, violet, portulaca, poinsettia, honeysuckle, cornflower, coreopsis, dandelion etc.

What we must do:

- Switch to eco-friendly pesticides
- Minimize intensive agriculture
- Maintain natural habitat within an agricultural mosaic

We hope that a dedicated World Bee Day helps in conservation of these industrious insects that greatly contribute to solving problems related to food and nutrition.

Author:

Jaba Jagadish

Scientist, Integrated Crop Management
ICRISAT

New publications

Seed Needs Assessment in Northeastern Nigeria

Authors: Ajeigbe, HA and Inuwa, AH and Kamara, A and Odoyo, PO and Vabi, MB and Angarawai, II and Ayuba, K

Published: 32nd ISTA Seed Symposium, June 2019, Hyderabad, India

<http://oar.icrisat.org/11444/>

NIR spectroscopy: the gateway to physiology of nutritional traits of the crop

Authors: Choudhary, S and Kholova, J and Chadalwada, K and Mallayee, S and Prasad, KVS and Nankar, AN and Saini, RP and Vadez, V and Blummel, M

Published: NIR 2019, 15-20 september 2019, Gold coast, Australia

<http://oar.icrisat.org/11445/>

Improving Postrainy Sorghum Varieties to Meet the Growing Grain and Fodder Demand in India

Authors: Kholova, J and Chowdhary, S and Mallayee, S and Vadez, V and Prasad, KVS and Blummel, M

Published: NIR 2019, 15-20 September 2019, Gold Coast, Australia.

<http://oar.icrisat.org/11446/>

Exploiting Genetic Diversity for Blast Disease Resistance Sources in Finger Millet (*Eleusine coracana*)

Authors: Manyasa, EO and Tongoona, P and Shanahan, P and Githiri, S and Ojulong, H and Njoroge, SMC

Published: Plant Health Progress, 20 (3). pp. 180-186. ISSN 1535-1025

<http://oar.icrisat.org/11447/>

Heterosis and combining ability for grain and biomass yield in sorghum hybrids for the semi-arid lowlands of Eastern Kenya

Authors: Sheunda, P and Nzuve, FM and Manyasa, E O and Chemining'wa, GN

Published: Academic Research Journal of Agricultural Science and Research, 7 (4). pp. 176-189. ISSN 2360-7874

<http://oar.icrisat.org/11448/>

Gene action of blast disease reaction and grain yield traits in finger millet

Authors: Manyasa, EO and Tongoona, P and Shanahan, P and Githiri, S and Ojulong, H and Rathore, A

Published: Plant Breeders Association conference, 23-25 Oct 2019, Accra, Ghana

<http://oar.icrisat.org/11449/>

Combined application of nitrogen and phosphorus to enhance nitrogen use efficiency and close the wheat yield gap on varying soils in semi-arid conditions

Authors: McBeath, TM and Gupta, VVSR and Llewellyn, RS and Mason, SD and Davoren, CW and Correll, RL and Jones, B and Whitbread, AM

Published: Journal of Agronomy and Crop Science (TSI), 205 (6). pp. 635-646. ISSN 0931-2250

<http://oar.icrisat.org/11450/>

Developing an economic, environmental and agronomic case for the increased use of organic amendments in South Asia

Authors: Rowlings, DW and Liyanage, A and Kholova, J and Jagadabhi, S and Ranwala, SMW and Whitbread, AM

Published: APN Science Bulletin, 9 (1). pp. 52-56. ISSN 2185-761X

<http://oar.icrisat.org/11451/>

Enhancing genetic gains and resilience to climatic stress in pearl millet

Authors: Gupta, SK and Gangashetty, PI and Yadav, OP

Published: 13th International Conference on Development of Drylands, 11-14 Feb 2019, Jodhpur, India

<http://oar.icrisat.org/11452/>

Calibration and Validation of APSIM-Sorghum (*Sorghum Bicolor* (L.) Moench) for Simulating Growth and Yield in Contrasting Environments in Nigeria

Authors: Akinseye, FM and Ajeigbe, HA and Nenkam, A and Traore, PCS and Whitbread, AM

Published: 10th FUTA-AGRIC Conference- Challenges of sustainable Agriculture and food Security in Emerging Countries of Sub-Saharan Africa, 9-12th July, 2019, Akure Ondo State, Nigeria.

<http://oar.icrisat.org/11453/>

Farewells

Retirement



Name: KVSSS Sharma

Designation: Senior Finance Officer
Program/Department: Corporate Services

Date of joining: 25 June 1985

Date of retirement: 31 May 2020

Separation



Name: Jan Debaene

Designation: Global Head – Breeding Program/Department: Deputy Director General – Research

Date of joining: 15 April 2018

Date of separation: 11 May 2020