ICRISAT

Communication Resources Catalogue

April 2020

To Order: Please contact Geetika S, Senior Manager, Communications and Knowledge Management, Strategic Marketing and Communication (s.geetika@cgiar.org)

Note: Products can be translated into French.
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Aflatoxin Timeline
Building Climate-Smart Villages
Pulses are smart food
Smart food Millet Recipes
Making a difference – ICRISAT’s work to help achieve SDGs
Visitors Handbook
Green Fodder Production – A Manual for Field Functionaries
ICRISAT Annual Report 2018
GLDC Annual Report 2018
ICRISAT West and Central Africa – Highlights 2018 – English
ICRISAT West and Central Africa – Highlights 2018 – French

Useful links

Links to key ICRISAT work

New logos are being inserted wherever old logos are appearing
ICRISAT’s holistic approach to research for development
Inclusive Market-Oriented Development (IMOD)

![IMOD Diagram]

IMOD
Inclusive Market-Oriented Development

From food deficit to surplus
Subsistence
Innovations
Re-invest gains: the engine of growth
Resilience
Development assistance & safety nets
Access to inputs and market opportunities

Prosperity
Higher-value agriculture
Market-oriented
Harness Markets
Science-based innovation
Manage Risks

ICRISAT
INTERNATIONAL CROPS RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS

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Vision/Mission

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What will make smallholder farming sustainable and profitable

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Posters

ICRISAT Crops

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Chickpea
High-quality protein
Nitrogen-fixing trait
Imported to soil improvement
Huge international trade, potential income for rural communities
6.7 million tons global production in 2022

P21

Chickpea
High-quality protein
Nitrogen-fixing trait important in soil improvement
Huge international trade, potential income for rural communities
6.7 million tons global production in 2022

P22

Groundnut
Rich in protein, edible oil, essential nutrients, and anti-oxidants
Income and nutrition source of dryland farmers
Nitrogen-fixing trait important in soil improvement
Largely grown by women farmers

P23

Pigeonpea
High levels of protein and amino acids
Climate resilient—combating drought, salinity and diseases
Improves soil fertility and structure
Income and trade potential

P24

Pearl millet
High in iron and zinc—especially good for children and pregnant women
Well adapted to severe drought, poor soil fertility, and high temperatures
Major income source of over 50 million poor people in the drylands
Multiple uses—food, biofuels, and fermentation industries, health foods

P25

Pearl millet
High in iron and zinc—especially good for children and pregnant women
Well adapted to severe drought, poor soil fertility, and high temperatures
Major income source of over 50 million poor people in the drylands
Multiple uses—food, biofuels, and fermentation industries, health foods

P26

Sorghum
Nutritious, rich in protein, fiber and micronutrients
Dietary mainstay of over half a billion poor people
Climate change-ready, grows well in hot, dry environments
Highly-valued as a source of food and fodder for livestock

P27

Sorghum
Nutritious, rich in protein, fiber and micronutrients
Dietary mainstay of over half a billion poor people
Climate change-ready, grows well in hot, dry environments
Highly-valued as a source of food and fodder for livestock

P28

Finger Millet
Rich in calcium (3X milk), zinc, iron and fiber—especially good for children and pregnant women
Hardy and well-adapted to drought, low soil fertility and high elevation
Important subsistence crop grown by farmers in 25 countries
High yield potential and stone seed

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Statistics posters

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Nutrition for Growth
- Diversified farming
- Nutritious and resilient crops
- Education
- Hygiene, health care and sanitation

Integrated nutrition training
Dietary diversification
Processing for best nutrient retention
Infant food recipes
Combining sorghum and millet with peanuts, cowpeas, moringa, baobab
Breastfeeding
Health and hygiene

Increasing bioavailability
Sorghum is:
- Heat and drought tolerant
- High in iron, zinc and energy
Fermentation and malting increases nutrient absorption

Policies can improve nutrition
- Millets are:
  - Rich in iron, zinc, calcium and energy
  - Drought and heat tolerant
- Indian government now introducing millet in school feeding

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Smart Food

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Some of the biggest global issues are:
- poor diets (malnutrition to obesity)
- environmental issues (climate change, water scarcity and environmental degradation)
- poverty.

Smart Food is one of the solutions that contributes to addressing all these issues in unison.

The UN has identified the need for Sustainable Diets; they define as “diets with low environmental impacts which contribute to food and nutrition security...”, and believes that it is essential to set targets to strive towards this.

JOIN IN: www.icrisat.org/smartfood

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Smart Foods (millets)

**Millet**

**GOOD FOR YOU**

**MULTIPLE HEALTH BENEFITS**

- Millets for DIABETICS
- LOW GLYCEMIC INDEX (GI)
- Millets for THE GLUTEN INTOLERANT
- GLUTENFREE
- Millets for PREVENTION OF CANCER, HEART DISEASE
- ANTI-OXIDANT PROPERTIES

**NUTRIENT DENSE**

- Millets are rich in PROTEIN, CARBOHYDRATES, VITAMINS and MICRONUTRIENTS

- FINGER MILLET
  - Calcium: 3 times more than milk

- PEARL MILLET
  - Iron: 6 times more than milk

**HIGHEST FOLIC ACID**

- Millets are rich in folic acid, which is important for pregnant women,
  especially in the second and third trimesters.

**CRITICAL NEED FOR DIET DIVERSITY**

- Millets can help in diversifying diets and reducing nutritional deficiencies.

**GOOD FOR THE PLANET**

- **HARSH AND DROUGHT TOLERANT**
  - Millets are the only cereal crop that grows on dryland, without irrigation.

- **FOOD SOLUTION IN A CHANGING CLIMATE**
  - Millets can grow in a wide range of climates, from arid to temperate.

- **HEAT TOLERANT**
  - Millets can withstand high temperatures and are adapted to extreme climates.

- **GROW FASTER**
  - Millets can mature in a short time, allowing for multiple crops in a season.

- **A CROP TO BRING DIVERSITY ON FARM FOR SUSTAINABLE AGRICULTURE**
  - Millets can be grown alongside other crops, promoting biodiversity.

**NEW SOLUTIONS NEEDED**

- To feed 9 billion by 2050

**HUGE SCOPE FOR GROWTH IN MILLETS**

- Millets are high in protein, fats, and fiber, making them ideal for food security.

- **GREAT YIELD POTENTIAL FOR MILLETS**
  - Millets can yield up to 5 tons per hectare in favorable conditions.

- **CRUCIAL STAPLE IN THE DRYLANDS**
  - Millets are the lifeblood of farmers in water-scarce regions.

- **MULTI USES EXIST UNTAPPED**
  - Millets can be used for food, feed, and fuel, providing multiple benefits.

**ICRISAT**

INTERNATIONAL CROP RESEARCH INSTITUTE FOR THE SEMI-ARID TROPICS
Posters

Smart Foods (millets) In French

[Image of a poster with text in French]
Posters

Why Grain Legumes

Why Dryland Cereals

Back to Index
Why Drylands are Important

Why the Drylands?

- 40% of the world’s land area
- Covers 55 countries, over 1/3 of global population
- 2.5 billion people in drylands
- 1/3 of the people depend on agriculture
- 644 million people affected

Drylands are home to many of the poor

- Poverty, food insecurity, limited water, and environmental degradation are widespread
- Rapidly growing population, high urbanization, increased unemployment, and a changing climate due to global climate change

Climate change is making the drylands a tougher environment to develop and survive

- 10% increase of dryland areas of the world
- New climate change
- More variability and occurrences of extreme events (drought and floods) during the cropping season

Drylands are huge areas globally

Crisis in sub-Saharan Africa will be drier and hotter

ICRISAT
International Crops Research Institute for the Semi-Arid Tropics

10% increase of dryland areas of the world

42% of children in the drylands are malnourished

40% of the world’s land area

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Posters

ICRISAT Ambassadors of Goodwill

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As an athlete, I work hard for the country, the farmers, to win laurels. I will try my best to promote the critical work ICRISAT does - meeting the needs of smallholder farmers, the value of scientific research, and the importance of nutritious crops that also are better for the environment.

- Saina Nehwal
Olympic medalist and co-branding player of India

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Research breakthroughs in agricultural biotechnology hold the potential for increasing crop productivity and the resistance of food crops to pests and diseases, thereby helping solve the food crisis. The future food demand cannot be met merely from incremental gains through conventional plant breeding. A quantum change in yield improvement is needed.

- Dr APJ Abdul Kalam (1931-2015)
Former President of India
ICRISAT Ambassador of Goodwill

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If agriculture fails, everything else will fail.

- M S Swaminathan
Father of India’s Green Revolution
ICRISAT Ambassador of Goodwill

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ICRISAT crops are great - as they target millions of smallholder farmers globally.

- Mr Bill Gates
Chair, Bill & Melinda Gates Foundation
ICRISAT Ambassador of Goodwill

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I stand and work tirelessly for the new future for Africa, one where the continent is able to feed itself, unlock its agricultural potential and use agriculture as the new driver of growth and prosperity.

- Dr James A. Hiewett
President of the Munich Development Bank
ICRISAT Ambassador of Goodwill

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I believe that ICRISAT has the solution and plays an important role in improving the lives of more than 500 million of the world’s poorest people living in the drylands. I am pleased and proud to be an ICRISAT Ambassador, and to be a part of the solution.

- Dr Nigel Poole
Chairman of Board, ICRISAT Governing Board
ICRISAT Ambassador of Goodwill

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I am very pleased to take on the role as an ICRISAT Ambassador of Goodwill, to help support their important work. Not only does their research improve the lives of the poor, it is also helping farmers in Australia.

- Hon John Keirin AM
Chair of the Central Coast Regional Council
ICRISAT Ambassador of Goodwill

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To overcome poverty, hunger and malnutrition, science is an essential component that must be behind all our efforts. ICRISAT plays an important role in this, particularly in the resource-poor, marginal environments of the world. I am pleased and proud to be an Ambassador of Goodwill for the work of ICRISAT.

- Rt Hon James Bolger
Former Prime Minister of New Zealand
ICRISAT Ambassador of Goodwill

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Prominent/influential people on agriculture

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Make no mistake, it is the world’s most vulnerable people who will suffer most from the consequences of climate. 40% of the land now used to grow maize in sub-Saharan Africa will no longer be able to support that crop by the 2030s.

- Christine Lagarde
Managing Director, International Monetary Fund

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When women are involved in the design and field testing of new technologies, those technologies are actually adopted more rapidly, which increases productivity and incomes faster.

- Hillary Rodham Clinton
Former U.S. Secretary of State

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If all farmers, men and women, had access to the same resources, we could increase agricultural output by 20 to 30 percent. That would feed an additional 150 million people every year.

- Hillary Rodham Clinton
Former U.S. Secretary of State

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Our world is becoming a less predictable and more threatening place for the hungry and most vulnerable. We need to protect and empower them to be able to withstand shocks.

- Nov. Dr Florence Chisamwe
Director of Agriculture, Zambia
Global indignation activist and human rights expert

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Food is the moral right of all who are born into this world.

- Norman Borlaug
Nobel laureate and Father of Green Revolution

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Agriculture is our wisest pursuit, because it will in the end contribute most to real wealth, good morals, and happiness.

- Thomas Jefferson
Third President of the United States of America

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Everything else can wane, but not agriculture.

- Jawaharlal Nehru
First Prime Minister of India
Posters

**VDSA Timeline** Four decades of village-level surveys showing impacts of different policies and developments on the livelihoods of the rural poor

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Posters

Kothapally Timeline

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Innovating against poverty and hunger in Africa (Displayed at FARA 2014)
Posters

Happenings newsletter pages made into posters

Note: Any Happenings story can be made into a poster. Here are some samples:

Transforming agriculture into business through an incubation hub in Mali

According to the World Bank, agriculture is a major source of employment in many African countries. However, the sector is often overlooked by policymakers and investors. The launch of the Mali agribusiness incubation hub (MAHI) is a step towards changing this.

The incubation hub will provide support to agribusiness incubators in Mali, focusing on value addition and market development. It aims to help entrepreneurs turn their ideas into viable businesses, creating jobs and increasing income for farmers and other stakeholders.

Hack4Farming hackathon throws up innovative ideas for agricultural development in India

Over 200 data analysts, farmers, and software developers came together on October 13 to participate in the Hack4Farming hackathon. The event aimed to address challenges in the agricultural sector and find innovative solutions.

The hackathon featured workshops, mentoring sessions, and a pitching event to showcase the best ideas. Participants worked in teams to develop solutions using data analytics, artificial intelligence, and other technologies.

Many of the ideas addressed issues such as crop yield prediction, soil health monitoring, and pest management. These solutions can help farmers make better decisions and improve their yields, leading to more stable food supplies.

Malawi Seed Revolving Fund model wins accolades

The Seed Revolving Fund model developed by ICRAI and supported by the Bill & Melinda Gates Foundation has been recognized with several awards. The model aims to increase local seed production and improve access to high-quality seed.

The Seed Revolving Fund is a financial mechanism that provides loans to small-scale farmers to purchase seed, which they then use to grow crops for sale. The money generated from the sale of the crops is then used to pay back the original loan and provide seed for additional farmers.

The model has been successful in several countries, including Malawi, where it has helped thousands of farmers access high-quality seed and improve their livelihoods.
Posters

ICRISAT Bilateral and CSR Donors

Bilateral Donors

CSR Donors

* Investing directly in ICRISAT
  Current donors as of June 2016

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CGIAR Fund Donors

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CGIAR Fund Donors

Abu Dhabi
Australia
Austria
Belgium
Bill & Melinda Gates Foundation
Canada
China
Denmark
European Commission
Finland
France
Germany
IDRC
IFAD
India
Ireland
Italy
Japan
Luxembourg
Mexico
Netherlands
New Zealand
Nigeria
Norway
Philippines
Portugal
Russia
South Africa
South Korea
South Sudan
Spain
Sweden
Switzerland
Thailand
Turkey
United Kingdom
USA
World Bank

* Investing directly in the CGIAR Fund
  * Credit: Donors on file and 5
The greatest need is to deliver targeted and timely information to farmers based on their needs. The empowerment that comes from providing farmers with informed options is transformational, especially for women and youth.
Posters

ICRISAT Locations

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Impact

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Integrating Gender

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Integrating gender

Innovation Platforms in Zimbabwe
- Established functional goat markets
- Fodder, animal housing, veterinary challenges addressed
- Goat mortality fell, women sold their goats for a lucrative price.

Market-savvy seed producers in Niger
- Women access better varieties, trained in seed production
- Women association tie-ups aided by seed company
- Became major groundnut producers, processors, and marketers.

Game for innovation
- Training in sorghum use for household purposes
- Built the capacity of 1,200 rural women from 60 groups in Nigeria
- Sorghum value chain enhanced.

Developing on-farm technologies
- Beneficial to women farmers in Vietnam, Laos, Nepal and India
- Improved productivity and sustainability of rainfed agriculture.

Geeta Bai empowered
- Joined the watershed committee
- Responsibly completed water storage structures in her village in Madhya Pradesh
- Overcame male dominance and caste dynamics.

Eco-friendly is Sheila Sikandar’s way
- Adopted an integrated farming approach and diversified multiple cropping
- Her barren field turned into a profitable business model
- Annual earnings: ₹120,000 (US$1,880).

Pratula Women’s Group in Malawi
- 1,000 women seed producers engaged
- Seed bought back using Good Revolving Fund
- Led to increase in certified legume seed supply

Nutri cereals for her
- Developed biofortified high iron and zinc pearl millet
- Combats anemia in women and children
- Adopted by Indian farmers.

Multi-cropping works for Sarda Bai
- Multi-cropping helped her buy two mills
- Income from crop sales from her vegetable patch: ₹20,800 (US$31) a kilo
- Income from crop bartered for wheat.
HPRC as a Platform for Improving Productivity of Dryland Hybrid Crops – Pearl Millet, Sorghum and Pigeonpea

Target traits/Adaptations in different crops

**Sorghum**
- Rainy season: Dual-purpose types with short fly and grain mold resistance; high W/MB
- Post-rainy sorghum: Dual-purpose types with large white, minute grains and high C/H/MB; sheet fly, clavate rot resistance and drought tolerance
- Sweet/high biomass sorghum: Higher stalk yield, juice yield and biofuel yield in sweet sorghum and higher biomass yield, lower yield in HDN
- Forage sorghum: High flowering, thin stalks, leaf disease resistance, fibrous weight, higher W/MB

**Pearl millet**
- Rainy season: Dual-purpose types, Downy mildew and Blastosporium tolerance, high Fe and Zn
- Drought prone areas in monsoon season: Dual-purpose with drought tolerance, Downy mildew and Blastosporium tolerance
- Summer season: Dual-purpose, high heat stress tolerance during flowering period, Downy mildew and Blastosporium tolerance
- Forage pearl millet: Multi-cut/Single cut, leaf disease resistance, high green/leaves biomass with better forage quality (protein and W/C/D), Zn type

**Pigeonpea**
- Medium duration: Fusarium wilt, septoria mosaic disease and phytophthora blight resistance, water-lagging tolerance, high protein content and market preferred traits like seed size and high oil recovery
- Mid-early duration: Fusarium wilt, septoria mosaic disease and phytophthora blight resistance, water-lagging tolerance, high protein content and market preferred traits like seed size and high oil recovery
- Short duration: Fusarium wilt and phytophthora blight resistance, water-lagging tolerance and market preferred traits like seed size and high oil recovery

In case more information is required, please contact Dr. P.M. Gaur, p.m.gaur@cgiar.org
For Pearl millet: Dr. Al K. Meena, a.meena@cgiar.org, 9999035324
For Sorghum: Dr. K.R. Upadhyaya, k.upadhyaya@cgiar.org, 9999431242
For Pigeonpea: Dr. Annapurna Hingane, a.hingane@cgiar.org, 7674030007

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Global distribution of ICRISAT Germplasm
Crop Improvement Research at ICRISAT

Table 1: Genetic resources for crop improvement in ICRISAT Genesbank

<table>
<thead>
<tr>
<th>Crop</th>
<th>Genotypes Generated</th>
<th>Genotypes Distributed</th>
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<tbody>
<tr>
<td>Sorghum</td>
<td>42,036</td>
<td>93</td>
</tr>
<tr>
<td>Pearl millet</td>
<td>24,572</td>
<td>52</td>
</tr>
<tr>
<td>Okra</td>
<td>30,706</td>
<td>61</td>
</tr>
<tr>
<td>Finger millet</td>
<td>7,319</td>
<td>29</td>
</tr>
<tr>
<td>Small millet</td>
<td>4,270</td>
<td>29</td>
</tr>
<tr>
<td>Total</td>
<td>128,155</td>
<td>144</td>
</tr>
</tbody>
</table>

Table 2: Varieties/hybrids based on CRISAT bred materials released by ICAR in different countries

<table>
<thead>
<tr>
<th>Crop</th>
<th>No. of varieties/hybrids released</th>
<th>No. of countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sorghum</td>
<td>92</td>
<td>41</td>
</tr>
<tr>
<td>Pearl millet</td>
<td>201</td>
<td>26</td>
</tr>
<tr>
<td>Okra</td>
<td>175</td>
<td>19</td>
</tr>
<tr>
<td>Finger millet</td>
<td>225</td>
<td>29</td>
</tr>
<tr>
<td>Small millet</td>
<td>225</td>
<td>34</td>
</tr>
<tr>
<td>Total</td>
<td>1,363</td>
<td>101</td>
</tr>
</tbody>
</table>

Figure 1: Snap-shot of global germplasm diversity

Figure 2: ICRISAT's mandate crops - Climate smart and nutritious dryland crops

Figure 3: Controlled disease screening facility

Figure 4: Cost-effective SNP for early generation selections (left) and genomic prediction using different models (right)

Figure 5: High-throughput phenotyping platforms

Figure 6: NIR & MRI: For cost-effective, non-destructive quality analysis
Experimental games to support water management transformations

T Falik1, J Linteris1, J Agraewal2, S Kumar3, S Limberger4, and V Dache5

1 International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru 502324, India
2 University of Marburg, Germany
3 Foundation of Ecological Security
4 University of Giessen, Germany
5 Corresponding author email: T.Falik@cgiar.org

Introduction
Over the last few decades, water management in India has been in small reserves which allow storage groundwater aquifers. These structures have the potential to achieve a wide range of societal goals. Nevertheless, many communities fail to manage their aquifers due to a lack of understanding and mismanagement of the water resources. Many small water management structures are therefore, more likely to remain unmanaged or to be managed poorly. However, the water infrastructure is already exposed to extreme conditions, such as dry seasons and heavy rainfall, which can cause water loss or damage to the infrastructure. The lack of proper management can lead to the failure of the water management structures, which can have serious consequences for the communities that depend on them.

Project objectives
Based on these observations, we conducted a study exploring how changes in water management of communities can be triggered. Specifically, we studied the potential of using experimental games for facilitating social learning and innovation. We then focused on two water management challenges commonly faced by water managers in the study area: (i) the maintenance of small water harvesting infrastructure; and (ii) the allocation of water among farmers.

Benefits & location
The approach was tested in 12 communities in the study area. The results of the game were used to reflect on the potential of the interventions. The main goal was to improve the water management infrastructure, as they are expected to realize the greatest benefits from it. A total of 200 farmers participated in the workshops.

Method
The game is based on a common post-rescue game with sequential access framework according to the water management challenge observed in the study area. The training was developed in close collaboration with the East West partner Foundation for Ecological Security (FES). The detailed game design can be found at:

Results
The results of the games show that farmers act less efficiently than theory predicts. Nevertheless, even in the presence of transient spillovers and repeated opportunities to choose, groups managed to produce enough water for everyone to gain profits only if approximately 50% of the participants clearly identified the game dynamic. They negotiated agreed actions and discussed the consequences of non-compliance with group decisions. The discussion revealed that groups here instrumental in the process of social learning by adjusting their actions based on the feedback from their peers. This adjustment was a fine-tuning of movements, but further evolution from cycle events, as evidenced in different communities had different perceptions. Cooperation was also observed in a few cases in which the benefits of cooperation were not straightforward. Despite these limitations, the game had very positive effects. Other groups believed that changing behavior is a feasible approach.
GIRI POSHANA – An Innovative Approach for Improved Nutrition Among Tribals in Telangana
What is GLDC and why it is crucial

The CGIAR Research Program on Grain Legumes and Dryland Crops (GLDC) is a global partnership that tackles the grand global challenges.

It tackles the grand global challenges:
- Malnutrition
- Food security
- Climate change
- Water scarcity
- Land degradation
- Agro-ecological zones

GLDC priority crops and countries:
- 9 crops
- 13 countries

Projected outcomes (2022-30):
- Increased yields
- Reduced costs
- Improved soil health
- Increased access to markets
- Increased income
- Reduced poverty
- Improved nutrition
- Increased biodiversity

Partnerships are key.

http://gldc.cgiar.org
@gldc_cgiar

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Flyers
ICRISAT’s message for the International Year of Pulses

Doubling incomes through post-harvest interventions
Flyers

Smart food - India

We can have a big impact if we diversity staples. But we can’t do this with just any food, it needs to be with a **Smart Food** i.e. food that fulfills all criteria of being Good for you Good for the planet Good for the farmer

This requires dedicated effort on just a couple of Smart Foods initially to build the value chains for mainstreaming. **Millets & Sorghum are selected** as the first Smart Foods to bring back as staples and have a major impact on nutrition, environment and rural livelihoods.

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Smart food - Kenya

**Smart Food**

**GOOD FOR YOU - THE PLANET - THE FARMER**

Smart Food helps solve a number of our biggest issues in linking rural poverty, malnutrition and adaptation to climate change and environmental degradation.

A major impact can be made if we not only popularize but also mainstream Smart Food – bringing diversity in diets and on the farm.

This must be understood, ensuring rural communities benefit through better health and livelihood improvements. Other global benefits will be new market development and growth and more sustainable diets.

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Smart food - Global

We can have a big impact if we diversity staples. But we can’t do this with just any food, it needs to be with a **Smart Food** i.e. food that fulfills all criteria of being

Good for you Good for the planet Good for the farmer

This requires dedicated effort on just a couple of Smart Foods initially to build the value chains for mainstreaming. **Millets & Sorghum are selected** as the first Smart Foods to bring back as staples and have a major impact on nutrition, environment and rural livelihoods.

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Niger and ICRISAT
Mitigating poverty, enhancing prosperity

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Mali and ICRISAT
Harnessing, improving, sustaining and catalyzing for sustainable growth

F15
Senegal and ICRISAT
Creating a brighter tomorrow for smallholder farmers

F16
Nigeria and ICRISAT
Creating wealth through agricultural value chains

F17
Zimbabwe and ICRISAT
Innovation Platforms improve livelihoods

F18
Malawi and ICRISAT
Enhancing seed production for improved resilience

F19
Kenya and ICRISAT
Improving lives with drought tolerant crops

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Ethiopia and ICRISAT
Working with partners for prosperous semi-arid tropics

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Recent donor and partners flyers

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Sustainability transitions for smallholder farmers
(in English)

Executive summary

The livestock sector provides huge opportunities for reducing rural poverty levels, improving food security and contributing to the national economy. Nicaragua has a huge demand for meat and products. Large and medium-size buyers fail to source enough goats of the right quality and supply consistently to meet the growing demand in urban markets. Despite its potential, the goat sector is not fully developed. Improved goat production can provide an additional annual income of US$35 million at the national level. In the short term, farmers can double their income from goats. Though farmers realize the critical role of goats as a source of saving and investment, they lack the technical skills and knowledge to improve productivity and are not able to make an adequate profit from these animal sales. Sensitivity analysis of around 10%, poor quality of goats being sold to markets, and restricted feed are key factors to lower productivity. There are many causes for low productivity: the primary cause being lack of a market structure through which farmers and the private sector can interact, lack of a guiding system that rewards

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Feeding degraded soils in Ethiopia to feed the people and the environment

The benefits
- Increased yields
- Targeted fertilizer use with right timing and products
- Reduced costs
- Fertilizer savings of 20-30%
- Improved crop response to fertilizers
- Reduced incidence of pest and disease
- Increased crop yield
- Application of fertilizer and input requirements for yields of 25-35% increase
- Improved quality
- Soil and water conservation
- Improved soil health
- Soil and water conservation
- Improved soil health
- Reduced costs
- Fertilizer savings of 20-30%
- Increased crop yield
- Application of fertilizer and input requirements for yields of 25-35% increase
- Improved quality
- Soil and water conservation
- Reduced costs

The challenge
- Centuries of nutrient mining on farms in the undulating landscape of Ethiopia has resulted in severely eroded and degraded soils that produce 60% less than the global average.
- The potential yield gap in horticulture
- The potential yield gap in horticulture
- The potential yield gap in horticulture

The solution
- Research organizations and development NGOs were consulted to address the issue.
- Two studies in wheat-based farming systems
- Key findings of the studies:
  - Site-specific nutrient management can double yields and reduce costs.

Implementing a Tablet-Based Baseline Survey for Nutritional Assessment and Intervention

Goal
- To translate trial households and other relevant districts to diverse nutritional needs

Location
- Villages in districts of Adbal and Kemulte
- Villages in districts of Adbal and Kemulte
- Villages in districts of Adbal and Kemulte

Target beneficiaries
- Pregnant women
- Unemployed mothers
- Schoolchildren

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Delivering NUTRITION to the drylands

ICRISAT’s Approach

To tackle malnutrition — which includes undernutrition as well as overnutrition — ICRISAT employs a multi-pronged approach involving stakeholders throughout the agriculture value chain. Starting from land and water management; climate change adaptation technologies; science-based innovations for higher yields, more nutritious crops and safer foods; behavior change programs for increasing diet diversity for balanced nutrition; market-oriented development for farmer prosperity; and more.

Healthy soils, healthy crops, healthy people

- Using breeders’ varieties, farmers can grow crops all year through.
- Brighter futures with better nutrition.
- Schoolchildren in Mahanlobis, India, eating high-fibre oat rolls baked as part of their midday meal.
- Driving diet diversity from home to home.
- Ms. Elizabeth Kasaroro feeds her 17 month-old daughter sprouted wheat rolls prepared in Kenya.
- Sunflower crops for urban markets.
- Groundnut varieties and brinjal or other vegetables on display during a field day in Malawi.

Fall Armyworm: Combating the latest threat to standing crops

What is it?
- Fall Armyworm (FAW), or Spodoptera frugiperda, is an insect (moth) belonging to order Lepidoptera and family Noctuidae.
- It lays its eggs on plants, from which larvae (caterpillars) hatch and start feeding on the leaves and stems, destroying them in the process.
- It is highly destructive to about 85 crop species, including maize, rice, sorghum, sugarcane and other millets.

Where is it?
- A native to tropical and subtropical regions of North and South America, FAW invaded the maize crop in Western and Central Africa in early 2016, beginning with Nigeria and spreading to almost all countries in Sub-Saharan Africa by 2017.
- The female moth is a strong flyer and can cover over 100 km during one night. Thus, it can lay its eggs in far-flung places within a short time.
- In India, FAW infestation was first reported on maize in Karnataka in July 2018, followed by Telangana. It is now reported in Tamil Nadu, Telangana, Andhra Pradesh, Maharashtra, Odisha, Uttar Pradesh, and parts of West Bengal.

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Plant Quarantine Guidelines and Procedures for Germplasm Exchange of ICRISAT Mandate Crops

The potential of systems modeling to inform farm decisions for higher resilience and profit

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FeFA Girls Iron for adolescents project

Background:
Iron deficiency anemia is a condition in which the body fails to produce healthy red blood cells (RBCs) which carry oxygen to the body’s tissues. It affects more women than men and is common during adolescence and pregnancy. It leads to several health problems. Anemia in adolescent girls is an important component of the continuum of malnutrition.

The human gut harbors trillions of microorganisms that help in efficient absorption of nutrients from food. Absence of these beneficial microbes can severely affect iron absorption in humans, even in the presence of adequate iron intake. Administration of iron tablets leave excessive amounts of unabsorbed iron in the gut which cause unsightly and side effects.

Our Approach:
To use probiotic-based solution using deidentified crops rich in iron and dietary fibers that have been shown to improve gut microbiome composition, to achieve sustained hematocrit in adolescent girls with mild to moderate iron deficiency.

Project Goals:
- To determine the effect of national iron supplementation programme on hemoglobin improvement and gut microbial modulation in anemic adolescent girls.
- Effect of peanut-pearl millet (deidentified for iron) fortification on iron supplementation efficacy in increasing hemoglobin, health and iron status among anemic adolescent girls.

Sorghum & Millet Compact - Food security for the Sahel

The Sorghum & Millet compact is one of the nine value chains of the African Development Bank (AfDB)-funded Technologies for African Agricultural Transformation Initiative (TaAT) initiative. TaAT includes sorghum & millet, maize, cassava, rice, beans, wheat, Orange Fleshed Sweet Potato (OFSP), aquaculture, and livestock and six Enabler Compacts, namely Youth, Value Management, Soil Fertility, Policy, Capacity Development and Fall Army Worm (FAW) control.
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Nudging sustainability transitions in Central Mozambique

Using flock simulations for modern goat market systems in Central Mozambique

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Better management of common watershed infrastructure: Experimental games help communities explore solutions

Background
Recognizing the close links between poverty and natural resource degradation, India invested more than USD 500 million during the 1990s (Perrington et al., 1999) and more than USD 1 billion the following decade (Deshingkar and Harrington, 2006) in participatory watershed development. There is strong evidence that various interventions have the potential to achieve a wide range of societal goals such as food security, soil protection and efficient water use (More et al., 2008; Reddy et al. 2003; Verma et al. 2001; Singh et al. 2009; Singh et al. 2014; Raisingh et al. 2019). However, despite the obvious potential, many communities fail to sustain the benefits over time as they struggle to cooperate in the joint effort to run and maintain the structures (More et al. 2008; Joshi et al. 2001). Even though watershed projects use participatory approaches, 80% of the attention is paid to the capacities of communities to design or change rules or to-learn and enforce them to ensure sustainability of infrastructure investments. Once projects are completed it is very common that infrastructure quickly renders losing its capacity to consistently generate benefits.

A survey to assess the general state of water infrastructure and community attitudes towards their maintenance was conducted between April to June 2017 in 90 communities in Mandla district in Madhya Pradesh. The results confirm that most communities cannot report A game session in one of the communities.

Who pays the price for water use in agriculture?

Background
A majority of Indian rural households depend on the profitability of farming systems for their livelihood. Almost universally, the yield gap between potential and achieved productivity is large, water and nutrient use efficiency is low and land degradation can be widely observed (Zilahi et al. 2006; Conrad and Ileric 2007). This applies also to the Indian state of Maharashtra. In Maharashtra, approximately two thirds of the rural population depends on agriculture and related activities for their livelihood (Uttam et al. 2014; Agarwal et al. 2017). A large share of them are smallholder farmers with often low and unstable crop and livestock productivity. At the same time, there has been a steady increase in the area under water-intensive crops such as sugarcane and cotton in the recent decades (Golig 2018).

Water use efficiency has national and global relevance given that India is one of the world’s most intense water users. Surface water over-abstraction is projected for large parts of India for the coming decades (Helina and Bertram 2014). No country is abstraction more non-renewable water than India (Wada et al. 2014). Irrigation is by far the largest consumer of freshwater in India. Close to 90% of all groundwater abstraction in 2012 was used for irrigation (Wada and Bertram 2014). Water over-abstraction with high likelihood leads to water scarcity across many parts of India and affect most directly those depending on agriculture. Reduced food production, more infeasible access to water, increase in water-borne disease, environmental degradation, as well as growing competition and social tensions over water use will most likely affect the Indian population (Pande and Gupta 2010, Magal 2012).
When wastewater ceased to be “waste”

After the wastewater treatment units construction in 2017 as part of a watershed project by RECC Limited, a Government of India enterprise, Mr. Sager’s farm produced less than half the fruit it now yields. Low yields brought inadequate income at an already higher cost, compounded by use of chemical fertilizers. The farmer was quick to realize the profit potential a constructed wetland (CW) kind for his farm, wastewater rich water and fences could potentially double his yield and income.

Domestic wastewater treatment plant

Farmers in rainfed ecotones often use untreated wastewater to cultivate crops, vegetables and fruit to lower fertilizer spend on wastewater rich CH.

Wastewater treatment units are wetlands constructed with a filter bed made of sand/gravel. They are vegetated with wetland plants like Canna indica and Typha angustifolia. The plants remove pollutants in the water through their roots.

Managing acid soils for reclaiming livelihoods in Ethiopia

Managing acid soils for reclaiming livelihoods in Ethiopia

What are the benefits

- Increased yield
- 30-40% increase in output
- 50-100% increase when combined with compost
- Healthy soils and crops
  - Improved yield
  - Improved health
  - Improved soil structure

How it can be addressed

1. Acidic soil amendments are often applied in the management of acid soils.
2. liming – application of calcium and magnesium-rich materials from local sources
3. Soil fertility management
4. Acid tolerant crops and varieties

The approach is described by rainfall patterns, soil properties as well as economic considerations.

Flooding events turned into farming opportunities

Inspiration from Yewol For All of Us

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Enhancing nutrition and Dietary Diversity through Value Added Products - Anantha Samruddhi

Iron-rich Peanut Chikki

Nutritional Information (Per 100 gm)

<table>
<thead>
<tr>
<th>Nutritional Parameters</th>
<th>Energy (kcal)</th>
<th>Protein (grams)</th>
<th>Carbohydrates (grams)</th>
<th>Fat (grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanuts, Sesame, Jaggery, Jaggery Liquid (Glucose, Sucrose, Fructose - 80% - 90%):</td>
<td>466.64</td>
<td>21.8</td>
<td>41.8</td>
<td>26.1</td>
</tr>
</tbody>
</table>

Ingredients:
- Peanuts
- Sesame
- Jaggery
- Jaggery Liquid

Target group and benefits:
- Children, adolescent girls and women of child-bearing age including pregnant and lactating women
- Contains a healthy combination of peanut, sesame and jaggery
- It is targeted towards the populations that are vulnerable to developing anemia due to their dietary or physiological status
- It is fortified with iron and ascorbic acid and hence, can be easily absorbed

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DST-ICRISAT Center of Excellence on Climate Change Research for Plant Protection (CoE-CCRPP)

Pigeonpea Pre-breeding: From Discovery to Delivery

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ICRISAT au Niger

Ensemble aux côtés des nigériens et des nigériennes depuis plusieurs décennies

Commencer la participação e la faim
Éduquer la population
Améliorer la durabilité de l'environnement
Soutenir l'innovation

L'institut international de recherche sur les cultures des terres humides (ICRISAT) a ouvert son bureau au Niger depuis des décennies. Le Centre d'Excellence de ICRISAT au Niger a été inauguré en 1998. Il a pour objectif de promouvoir la recherche et le développement dans le pays. Le centre est basé à Maradi au niveau de son centre de formation (FAC) et au quartier travaillant sur le sous-région de Maradi.

ICRISAT & Partenaires

BIENVENUE !

Bienvenue dans un environnement multiculturel ouvert et collaboratif de haute qualité scientifique qui participe à relever les défis de la sécurité alimentaire, de la pauvreté et de la durabilité environnementale dans les zones semi-arides.

Nous favorisons une culture d’action et nous croyons qu’il faut donner l’exemple, c’est-à-dire être le changement que nous voulons voir. L’accent est mis sur la pensée stratégique et systémique pour changer, orienter et s’assurer que nos pensées et compétences de pointe soient partagées à une échelle internationale et régionale.

Nous nous efforçons d’être une organisation agile qui apprend continuellement pour s’assurer que notre participation au développement et la durabilité seront notre priorité.

Bienvenue et bonne visite ! Nous espérons que vous apprécierez notre environnement.
Africa RISING’s Large-scale Diffusion of Technologies for Sorghum and Millet Systems (ARDT-SMS) – English version

Scaling Up Sorghum and Millet Technologies
To increase productivity, nutrition and livelihoods

Project Name: ARDT-SMS: Large-scale Diffusion of Technologies for Sorghum and Millet Systems (ARDT-SMS)

Goal
To increase the incomes of sorghum and pearl millet producers in targeted intervention areas by raising productivity and profitability of those cereals.

Technologies
Open-pollinated varieties and hybrids of sorghum and millet, seed treatment, integrated soil fertility and pest management, and biological control of the millet head miner.

Adoption
Farmers who adopted these improved technologies for sorghum and pearl millet production in their field have increased their yield by 51 percent for sorghum and 72 percent for Pearl Millet.

Project Period
Mar. 1, 2014 – April 30, 2016
Budget
USD 16,778,783
Contact
jxzhang@cgiar.org
a.dhima@cgiar.org

Africa RISING’s Large-scale Diffusion of Technologies for Sorghum and Millet Systems (ARDT-SMS) – French version

Diffuser à grande échelle les technologies du sorgho et du mi
Avantages la productivité, améliore la nutrition, augmente les revenus des agriculteurs

Objectif
Améliorer les systèmes de production à base de sorgho et de millet dans les zones d’intervention ciblées par l’augmentation de leur productivité et leur rentabilité.

Technologies
Variétés et hybrides de sorgho et de millet, traitements de semences, gestion intégrée du sol et du blé de sorgho et lutte biologique contre la panse de blé.

Adoption
Les producteurs qui ont adopté ces technologies améliorées pour la production de sorgho et de millet ont augmenté leur rendement de 51% pour le sorgho et de 72% pour le millet.

Method of Evaluation
Budget
USD 16,778,783
Contact
jxzhang@cgiar.org
a.dhima@cgiar.org

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Productivity gains under the HOPE project in Africa (2009-2016)

Harnessing Opportunities for Productivity Enhancement (HOPE) Project milestones, 2009-2016

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Combating Desertification - projects - BDL, Yewol, Chifra

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Combating Desertification-Technologies overview

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How improved chickpea varieties are changing farmers’ lives in Myanmar

NaSSARI-released sorghum varieties against their commercial counterparts

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Demand Driven Innovation – Economic empowerment for women in Nigeria

Demand Driven Innovation – Improving health with high iron sorghum

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Demand Driven Innovation – Tackling labor scarcity in Andhra Pradesh

Demand Driven Innovation – Tackling successive droughts
Celebrating Youth in Agriculture

Village-level wastewater treatment units

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Pearl Millet: A grain of the future

LAMP: Visual, faster & cheaper dry root rot diagnosis
Bhoochetana: Scaling up a holistic approach in Karnataka, India

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Boosting legume productivity in Myanmar

Biotechnology breakthrough can make groundnut immune to aflatoxin

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Challenges faced by dryland communities

Tackling malnutrition through nutri-food basket

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CSR Big Ideas For Sustainable Development

ICRISAT Big Ideas folder
(Note that this will be updated when the country strategies are further developed)
VIP Folder (used for sharing material with visitors)

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Booklets

ICRISAT Annual Report 2018

GLDC Annual Report 2018

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Useful links

All communication resources: resourcespace.icrisat.org

ICRISAT Corp websites: www.icrisat.org and exploreit.icrisat.org
ICRISAT’s scientific platform

SlideShare: www.slideshare.net/icrisatsmco

You Tube: www.youtube.com/user/icrisatco

100 Voices video series: www.icrisat.org/100-voices/

Take 2 science seminars: www.icrisat.org/take-2-highlights-of-science-seminar/

International year of pulses: www.icrisat.org/iyp/ (video blog)

Flickr: www.flickr.com/photos/icrisatimages/

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Links to key ICRISAT work


  - Holistic scaling up (Bhoochetana) [http://www.icrisat.org/a-complete-farming-model-1/](http://www.icrisat.org/a-complete-farming-model-1/) (India)
**Links to key ICRISAT work**

- **Crop breeding work**
  - Genebank work [http://www.icrisat.org/gene-bank/] (Global)
  - Hybrid Parents Research Consortium [http://www.icrisat.org/pearl-millet/] (India)
  - High-oil yielding groundnut in Nigeria [http://www.icrisat.org/high-oil-yielding-groundnut-in-nigeria/] (Nigeria)
  - Improved chickpea lines in Ethiopia [http://www.icrisat.org/improved-chickpea-lines-in-ethiopia/] (Ethiopia)
  - Chickpea in Myanmar [http://www.icrisat.org/a-complete-farming-model-2-2/] (Myanmar)
  - Sorghum in ESA: [http://www.icrisat.org/sorghum-in-eastern-and-southern-africa/] (ESA)
  - Extra early pearl millet hybrid [http://www.icrisat.org/pearl-millet-hybrid/] (India)
  - Biofortification: [http://www.icrisat.org/biofortification-icrisat/] (India)
  - HOPE successes for sorghum and millets [http://www.icrisat.org/harnessing-opportunities-for-productivity-enhancement-hope-of-sorghum-and-millets/] (Africa and India)

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Links to key ICRISAT work

- **Climate Change**: (including approaches for building climate smart villages) [http://www.icrisat.org/coping-with-climate-change/](http://www.icrisat.org/coping-with-climate-change/) (Africa and India)

- **Gender** work: (including examples across the whole value chain) [http://www.icrisat.org/empowering-women/](http://www.icrisat.org/empowering-women/) (Africa and Asia)


- **Malnutrition**: Efforts to reduce [http://www.icrisat.org/reducing-malnutrition/](http://www.icrisat.org/reducing-malnutrition/) (Africa and Asia)
  Example: see Nutrition Metrics [http://www.icrisat.org/nutritionmetrics/](http://www.icrisat.org/nutritionmetrics/) (India)

- **CSR**: Summary of our CSR [http://www.icrisat.org/csr/](http://www.icrisat.org/csr/) (Global)

- **Smart Food**: Initiative page [www.smartfood.org](http://www.smartfood.org) (full website being worked on now) (Global)

- ALSO [http://exploreit.icrisat.org/](http://exploreit.icrisat.org/) for our work by TOPIC, CROP, COUNTRY, STATES in INDIA, & SYSTEM.

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