Message from the Board Chair

ICRISAT has tied its work to the SDGs and we have been able to use our research to help achieve the pathways towards lifting people out of poverty, aiming towards zero hunger, dealing with climate change and improving resilience in the dryland communities.

Chandra Madramootoo

Watch the video: annualreport2016.icrisat.org

Message from the Director General

The report connects you to stories of lives that have been changed through innovation; partnerships that have enabled us to scale impact; and how we have been engaging with policy makers to bring about equitable and sustainable solutions for smallholder farmers across sub-Saharan Africa and India.

David Bergvinson

Watch the video: annualreport2016.icrisat.org

Research Highlights

Impacts in Mission Areas

- Overcoming poverty and hunger
  - USD2679 net returns per ha from dry season groundnut production in Nigeria
  - Yields in Tanzania
    - Sorghum: Increased from 380 to 1200 kg/ha
    - Pearl millet: Increased from 500 to 1350 kg/ha
    - Pigeonpea: Increased from 500 to 1400 kg/ha
    - Groundnut: Increased from 650 to 1750 kg/ha
  - > USD150 million annual social benefits due to pearl millet hybrids in India
  - 10-50% increase in crop yields and incomes on 6 million ha in two Indian states through integrated farm practices
  - Cereal-legume intercropping systems introduced in Vietnam, Laos, Myanmar, Nepal and India result in increased incomes

- Reducing malnutrition
  - Nutritious complementary food package tested on children in Malawi and Tanzania with positive results
  - Smart Food campaign - Kenya
    - 1700 trained
    - >8000 households reached
    - 5400 children under 5 years reached
  - Nutritionally dense cultivars
    - 2 high-Fe pearl millet cultivars identified for West and Central Africa (WCA)
    - 15 high-Fe and -Zn sorghum varieties identified for adaptation in Nigeria
    - 100 promising finger millet varieties profiled for nutrient content
    - Nutritionally dense groundnut genotypes identified in WCA

Impacts in Crosscutting Areas

- Empowerment of women
  - 10,770 women gained access to land and increased their income when 241 ha of degraded land was converted into productive land in Niger

- Digital Agriculture
  - 30% more income for farmers who followed sowing app advisories
  - App for pest and disease recognition
  - ICT-based agri-startups incubated by ICRISAT have initiated software development to support FPOs nationwide with their operations and management

Our work contributes towards the following SDGs

1. No Poverty
2. Zero Hunger
3. Good Health and Well-Being
4. Gender Equality
5. Clean Water and Sanitation
6. Decent Work and Economic Growth

Read the full report: annualreport2016.icrisat.org
Preventing environmental degradation

Watersheds

70,000 ha and 50,000 families covered in 15 pilot watersheds in India

Impact:
- 50-100% increase in groundwater recharge
- 30-60% increase in cropping intensity
- 2x increase in crop yield

8000 ha of land at Yewol watershed became a learning site visited by Government and community leaders from 23 districts

Impact:
- Increase in irrigable area: From 240 to 970 ha
- Increase in crop yield: From 1.2 to 1.9 t/ha
- New crops introduced: 5
- Increase in area under chickpea cultivation: 100%

35 ha of abandoned land was rehabilitated benefitting 360 members of 52 households in Chifra, Ethiopia

Wastewater treatment

27 locations piloted in 5 Indian states

30-92% reduction in pollutants

Coping with climate change

Climate mapping of Telangana state completed

Modeling tools: New improved modeling tools for dryland crops leading to robust global foresight predictions

Upgraded CRAFT (CCAFS Regional Agricultural Forecasting Toolbox)

Research outputs contributing to ICRISAT’s mission

Genetic gains

Ancestor genome of groundnut cracked:
Co-led sequencing and analysis

Draft genomes of pearl millet and finger millet assembled

Genebank

17,377 seed samples distributed in 24 countries
- 2551 unique germplasm accessions assembled from regional genebanks

Crop improvement

50 varieties released
- Groundnut 6
- Chickpea 6
- Finger millet 3
- Sorghum 28
- Pigeonpea 5
- Pearl millet 2

Seed production

23,509 tons of seed of ICRISAT mandate crops shared with farmer groups, NARS and NGOs
- Breeder: 292 tons
- Foundation: 1323 tons
- Certified: 11,807 tons
- Quality declared: 10,087 tons

Agribusiness and innovations

40 institutions mentored to support establishment of 75 farmer producer organizations (FPOs)
- 16 FPOs
- 27 agribusiness incubators

Cost-effective groundnut sheller developed

Our work is accomplished with the support of our funders and the collaboration of smallholder farmers, national governments, international bodies, the national agricultural research system, advanced research institutes and universities and private sector.
Variety/hybrid releases (as of 2016)
(from breeding material supplied by ICRISAT)

India
- 160 chickpea varieties in 26 countries
- 91 pigeonpea varieties/hybrids in 19 countries

Africa
- 41 chickpea varieties in 4 countries
- 32 pigeonpea varieties/hybrids in 8 countries

Accessions shared (as of 2016)
- 16,996 chickpea accessions and
- 12,596 pigeonpea accessions were deposited at the Svalbard Global Seed Vault over the last 8 years

Genomic resources
- Genome sequences
  Published in Nature Biotechnology

- Resequencing of 3000 chickpea lines

Accessions deposited at Svalbard Global Seed Vault

Machine-harvestable variety

NBег 47 is the first machine-harvestable chickpea variety released in Andhra Pradesh, India, suitable for the state's variable climate

Impact
- India:
  - Chickpea: Accounts for 48% of the demand for breeder seed
  - Pigeonpea: Accounts for 37% of the pigeonpea area

- Myanmar:
  - ICRISAT-origin varieties cover 96% of chickpea area

Read the full report: annualreport2016.icrisat.org
Genebank established at ICRISAT-India

1972: Our journey begins

1979

World’s shortest duration chickpea ICCV 2 (85-90 days)

1989

Genebank established at ICRISAT-India

1979

World’s first pigeonpea hybrid ICPH8

1991

Start of core and mini core germplasm collection

1991

Crop improvement (as of 2016)

Chickpea
Yield potential: 2.5-3.0 t/ha (120 varieties)
Short-duration: <100 days to maturity
Varieties developed:
40: Drought tolerance
10: Heat tolerance
100: Fusarium wilt
60: Ascochyta blight

Pigeonpea
2-2.5 t/ha (varieties)
3-3.5 t/ha (hybrids)
<100 days to maturity
Disease resistant:
>20 varieties/hybrids developed for Fusarium wilt and Sterility mosaic disease

Subsets collection (as of 2016)

Chickpea
3000 Composite
1956 Core
211 Mini core
300 Reference sets

Pigeonpea
1000 Composite
1290 Core
146 Mini core
300 Reference sets

Seed Systems

Africa
Chickpea
Certified seed production: 125,640 t
Coverage: 1.25 million ha
Additional benefits: USD300 million

Pigeonpea
4250 t
> 0.5 million ha
USD130 million

Linking farmers to markets

Africa
Chickpea
Producer price: 30-50%
Annual exports: USD46.6 million

Pigeonpea
25-40%
Annual exports: USD203 million

Seed samples distributed (as of 2016)

Chickpea
153,193 samples to 88 countries

Pigeonpea
75,335 samples to 113 countries

Genetic resources

Germplasm collection (as of 2016)

India
20,602 chickpea accessions from 59 countries
13,778 pigeonpea accessions from 74 countries

Africa
1200 chickpea accessions from 6 countries
1500 pigeonpea accessions from 14 countries

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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**.

Smart Food is food that **fulfills all the criteria** of being:

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

Know more about Smart Food [www.smartfood.org](http://www.smartfood.org)

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**PULSES**

**for you**

**NUTRI-DENSE**
- High protein
- High fiber
- Zero cholesterol
- Rich in vitamins and minerals

**HEALTHY CHOICE**

Helps manage
- Obesity
- Diabetes
- Celiac disease
- Gluten sensitivity

**BALANCED DIET**

The UN World Food Programme includes 60gm of pulses in its typical food basket
PULSES ARE GOOD...

for the **planet**

- Low water footprint
  - 4055 liters for 1 kg pulses
  - 15,415 liters for 1 kg beef
- Low carbon footprint
- Improves soil health
  - Aids microbial diversity
  - Breaks pest cycles
  - Reduces nitrogen fertilizer use

for the **farmer**

- Multiple uses
  - Food
  - Fodder
  - Fuel
  - Green manure
  - Fences/baskets
  - On-farm diversity
- Yield potential
  - New varieties and hybrids have 3 times more yield potential
  - Added traits:
    - Early maturity
    - Tolerance to biotic and abiotic stresses
    - Climate smart
- Market potential
  - Developing value chain creates marketing options for farmers leading to higher incomes

Developing value chain creates marketing options for farmers leading to higher incomes
Communication initiatives

Modernized ICRISAT logo

Our journey of change: The logo was modernized in 2016 to reflect the new and dynamic phase of ICRISAT

The stylized leaves represent the leaves of sorghum and millets, which primarily grow in the drylands and are our mandate crops.

The half circle represents the seed of pulses – our mandate crops.

The circle and curve represent (a) drop of water and soil or (b) a farmer’s head and arms and carrying food on her head.

The stylized “I” represents the farmer who is at the center of our research in the drylands.

Keeping the previous logo font and color provides a visual recognition for the organization as well as its own uniqueness.

The curve represents the globe reflecting our international work.

A new font has been chosen to represent the new and dynamic phase of ICRISAT.

Other notable initiatives

- Celebrating the International Year of Pulses (IYP)  
  http://www.icrisat.org/iyp/

- Launched Agri-buzz blog  
  http://www.icrisat.org/agribuzz/

- Positioning ICRISAT in key research areas
  - Climate-Smart Villages  
    http://annualreport2015.icrisat.org/
  - Digital Agriculture  
    http://www.icrisat.org/digital-agriculture/
  - Empowering Women  
    http://www.icrisat.org/empowering-women/

- New timelines
  - Combating Aflatoxin  
    http://www.icrisat.org/aflatoxin-timeline/
  - Fertilizer Microdosing  
    http://www.icrisat.org/Timelines/microdosing/

New 100 Voices series

Three new series with a total of 33 videos were launched as part of the 100 Voices series.
- Youth in Agriculture
- Women in Agriculture
- Public-Private Partnerships

Social media

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<th>Likes</th>
<th>Reactions, Comments &amp; Shares</th>
<th>Followers</th>
<th>Page views</th>
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Media coverage

- 851 national/regional news posts
- 15 global news placements

Read the full report: annualreport2016.icrisat.org
Our people

Diversity

29 Nationalities

7 USA, Europe and Australia
4 Asia and Southeast Asia
11 West and Central Africa
7 Eastern and Southern Africa

Knowledge sharing

316 Training courses and scientific visits conducted

Female

Male

20%

80%

Age

upto 30 years
31-40 years
36%
41-50 years
19%
51+ years
28%

No. of trainees

Female

Male

145
171

Contribution to grant revenue by project size

Large (>500K)
76%
Medium (100-500K)
19%
Small (<100K)
5%

Research publications

568

237 Papers in ISI/Thomson Reuters listed journals
39 Books and journal volumes
30 Monographs
12 Policy briefs

46% Scholars
44% Interns
10% Fellows

53 Papers in other peer reviewed journals
9 Articles in international newsletters
64 Book chapters
124 Conference proceedings
ICRISAT Governing Board

Chandra A Madramootoo, Canada
Chair, ICRISAT GB

S Ayyappan, India
Vice Chair, ICRISAT GB
(till Feb 2016)

Trilochan Mohapatra, India
Vice Chair, ICRISAT GB
(from Feb 2016)

Oluwande Muoyo
Nigeria

Rachel K Chikwamba
South Africa

Sissel Rogne
Norway

Wendy Umberger
Australia

David Bergvinson, Canada
Director General, ICRISAT

Nigel Wells Kerby
Britain

Paco Sereme
Burkina Faso

Paul C Anderson
USA

Pradeep Chandra
India (from Dec 2016)

Rajiv Sharma
India (till Nov 2016)

Shobhana Pattanayak
India (from Feb 2016)

Siraj Hussain
India (till Feb 2016)

Financial summary

Top Ten Donors for 2016
(in US$ thousands)

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<th>Donor</th>
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ICRISAT
Governing Board

Read the full report: annualreport2016.icrisat.org
Realigned research program structure

In 2016 the ICRISAT Research Program structure was realigned to facilitate greater agility and faster response to national needs and priorities (see below).

**West & Central Africa**
- Country Representatives: Niger, Nigeria, Mali

**Eastern & Southern Africa**
- Country Representatives: Malawi, Ethiopia, Zimbabwe, Kenya

**Asia**
- Crop Improvement
- Integrated Crop Management
- Policy and Impact
- Plant Quarantine Unit
- Farm and Engineering Services
- ICRISAT Development Center

**Innovation Systems for the Drylands**
- Agribusiness and Innovation Platform
- System Analysis for Climate Smart Agriculture
- Monitoring, Evaluation, Impact & Learning
- Digital Agriculture & Youth
- Markets, Institutions, Nutrition & Diversity

**Genetic Gains**
- Genebank
- Pre-breeding
- Cell, Molecular Biology & Genetic Engineering
- Genomics & Trait Discovery
- Forward Breeding
- Seed Systems

Photo credits: Front cover: ICRISAT; Page 6: Alina Paul-Bossuet; Page 7: L Vidyasagar and ICRISAT


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Proofing: Rajani Kumar and Sangeetha Parthasarathi

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Meeravali SK

Distribution
Prasad Rao SV
Ramesh MNR
Vinay Kumar R

Web Edition
Tinku Ray
Smitha Sitaraman
Fareeduddin M
ICRISAT locations

ICRISAT works in agricultural research for development across the drylands of Africa and Asia, making farming profitable for smallholder farmers while reducing malnutrition and environmental degradation.

We work across the entire value chain from developing new varieties to agribusiness and linking farmers to markets.

ICRISAT appreciates the support of CGIAR investors to help overcome poverty, malnutrition and environmental degradation in the harshest dryland regions of the world. See http://www.icrisat.org/icrisat-donors.htm for full list of donors.

We believe all people have a right to nutritious food and a better livelihood.