

Future Challenges for Crop and Horti sector

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Climate change led to migration of Indus valley people towards Ganga basin

Source: [Akshit Sangomla](https://www.downtoearth.org.in/news), <https://www.downtoearth.org.in/news>



Challenges to agriculture (crops and horticulture) are as old as civilization

Challenge to agriculture may be different for different people, but they all are interlinked

Farmer
“Profit,
livelihood....
”

**Common
man**
“Cheap and
quality food;
always at the
door..”

There are about 100 million smallholder farmers in the country. They provide up to 80 per cent of the food supply.

Scientist
“Theme focused
- breeding/
agronomy/
Environment..”

**Policy
maker**
“National
priority,
.....
”

Understanding trends is necessary

General

- Population growth, urbanization and ageing
- Global economic growth, investment, trade and food prices
- Conflicts, crises and natural disasters

Crop/system

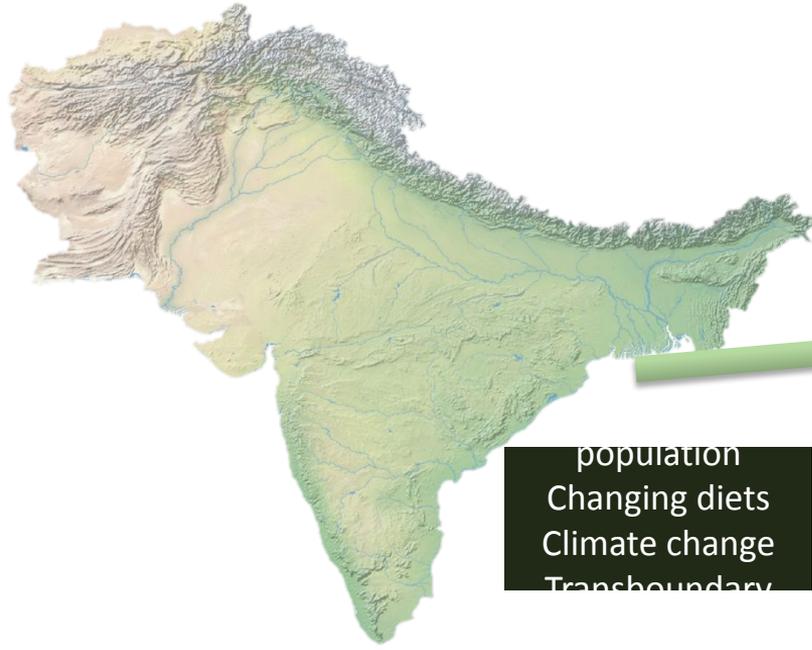
- Climate change
- Competition for natural resources
- Agricultural productivity and innovation
- Transboundary pests and diseases
- Changing food systems

Society

- Poverty, inequality and food insecurity
- Nutrition and health
- Food losses and waste

Policy/eco

- Structural change and employment
- Migration and agriculture
- Governance for food and nutrition security
- Development finance



resources
Fragmentation
of land
holding

Supply

productiv

population
Changing diets
Climate change
Transboundary

How to balance and make an impact

Monsoon fluctuations pose greater risk with falling groundwater

Pre-Monsoon groundwater levels
2012 relative to 2002-11 average

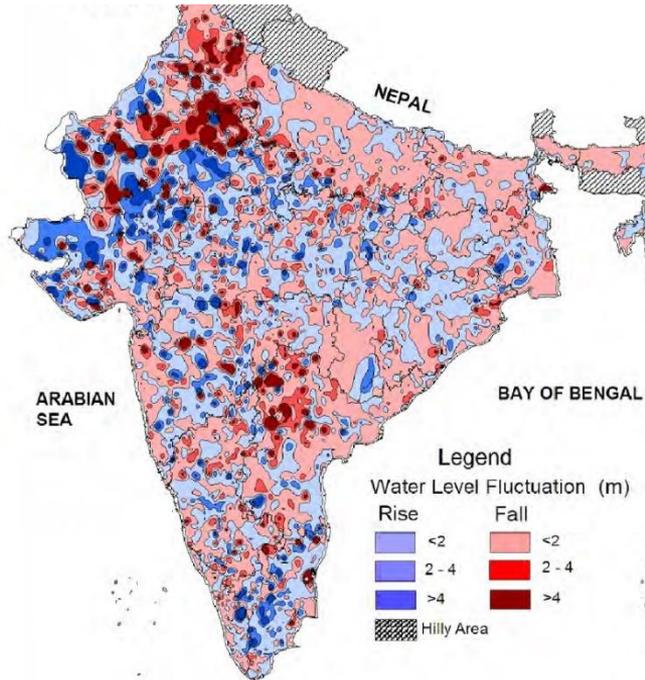
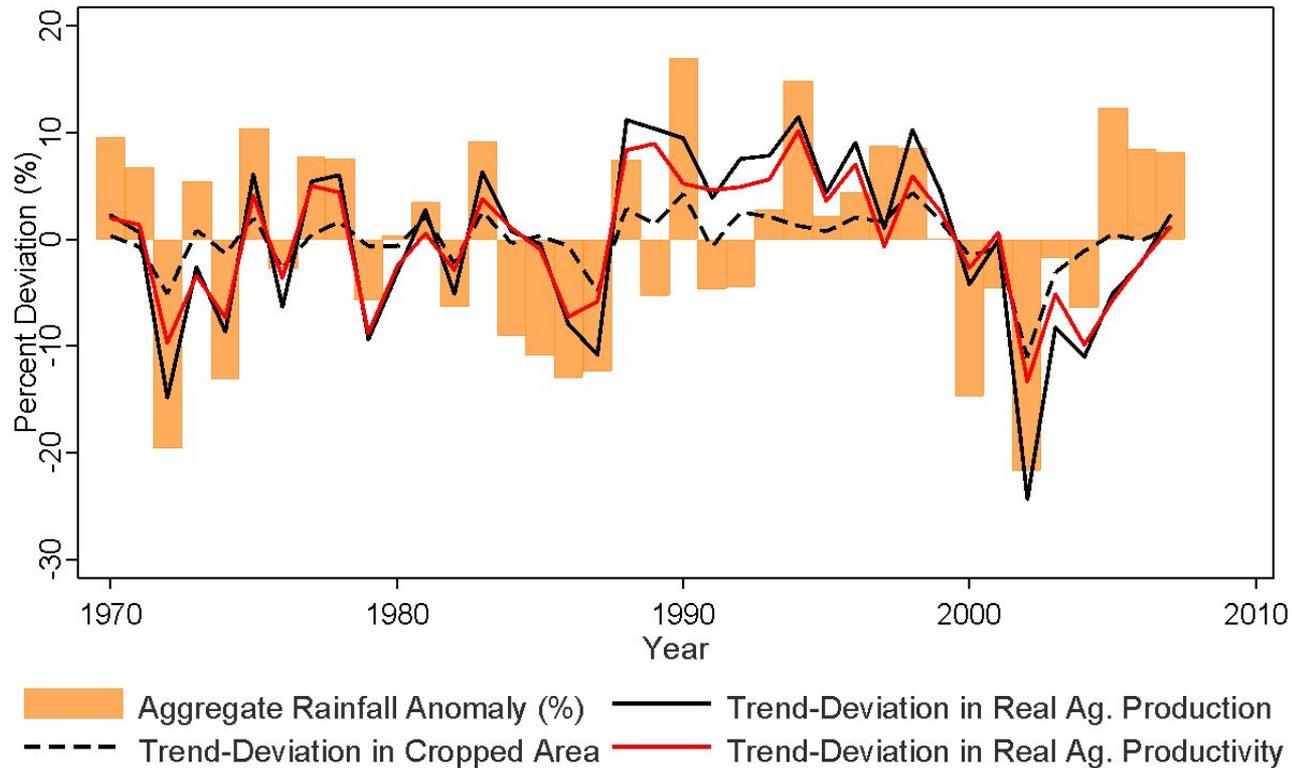


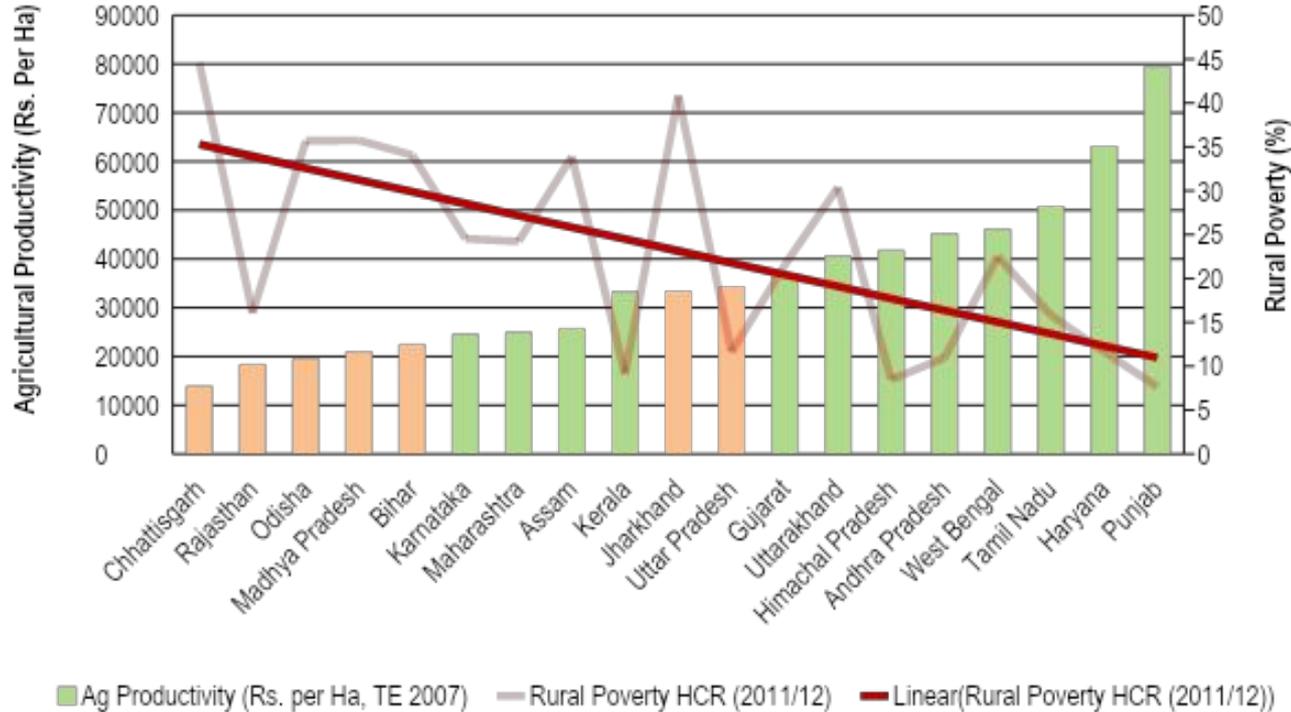
Photo by: Prasun
Gangopadhyay, BISA

Agricultural productivity in India must be more climate-smart



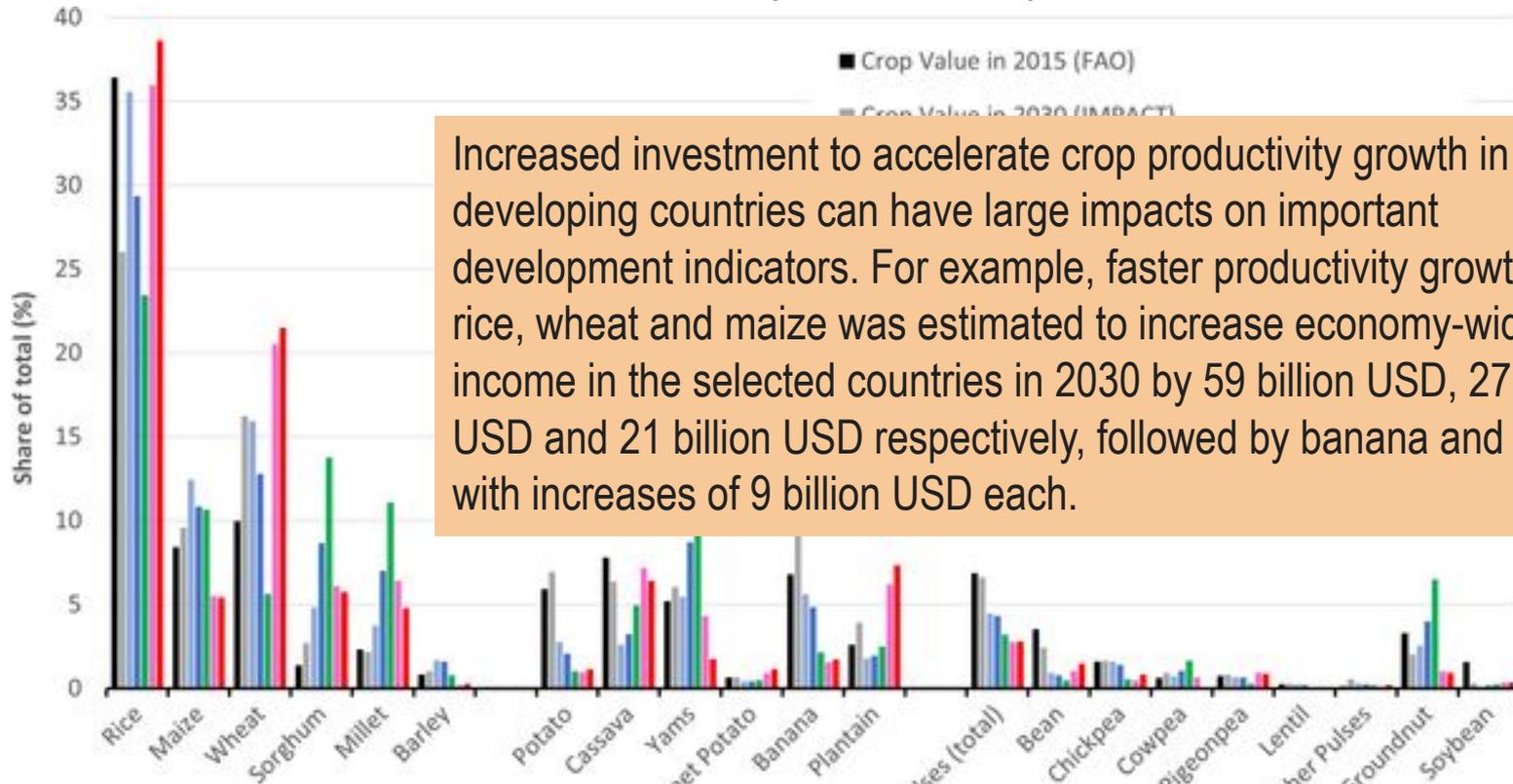
Source: World Bank (2014) India: Accelerating Agricultural Productivity Growth

Higher agricultural productivity is good for poverty reduction



Source: World Bank estimates using ICRISAT district level database, and NSSO poverty estimates 2011-12

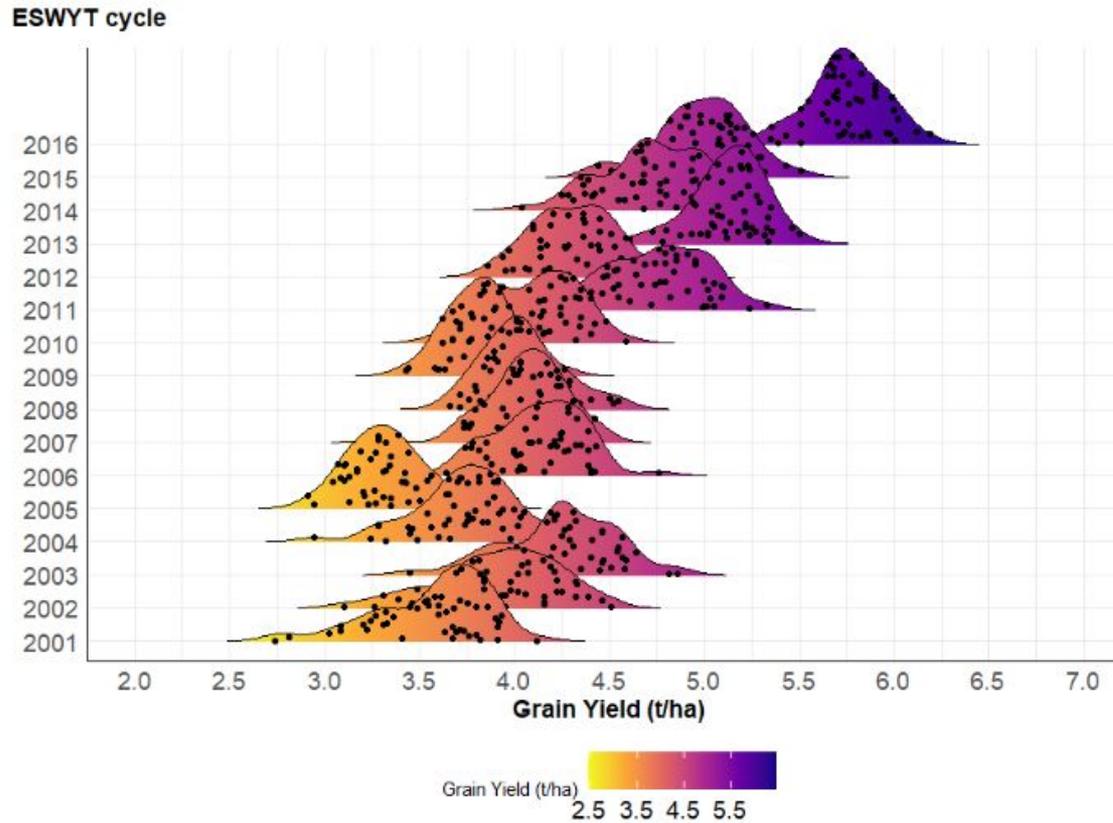
Relative impacts of faster productivity growth on income, poverty and food security indicators (106 countries).



Increased investment to accelerate crop productivity growth in developing countries can have large impacts on important development indicators. For example, faster productivity growth in rice, wheat and maize was estimated to increase economy-wide income in the selected countries in 2030 by 59 billion USD, 27 billion USD and 21 billion USD respectively, followed by banana and yams with increases of 9 billion USD each.

Wiebe K, Sulser TB, Dunston S, Rosegrant MW, Fuglie K, et al. (2021) Modeling impacts of faster productivity growth to inform the CGIAR initiative on Crops to End Hunger. PLOS ONE 16(4): e0249994. <https://doi.org/10.1371/journal.pone.0249994>
<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0249994>

Progress in grain yield in wheat from 2001–2016 across India

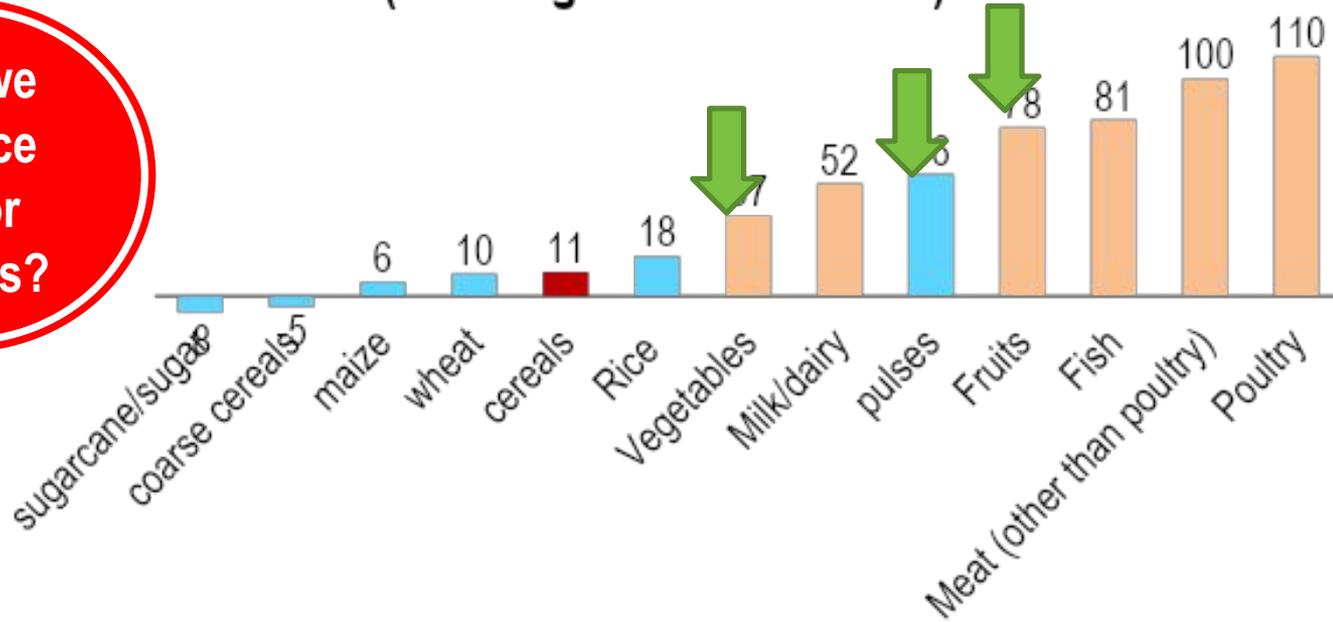


Crespo-Herrera *et al.* (2021) Target population of environments for wheat breeding in India: definition, prediction and indirect genetic gains. *Frontiers in Plant Science* <https://doi.org/10.3389/fpls.2021.638520>

A shift is predicted in composition of food demand in India by 2030

Projected Increase in Food Demand in India by 2030
(% change relative to 2011)

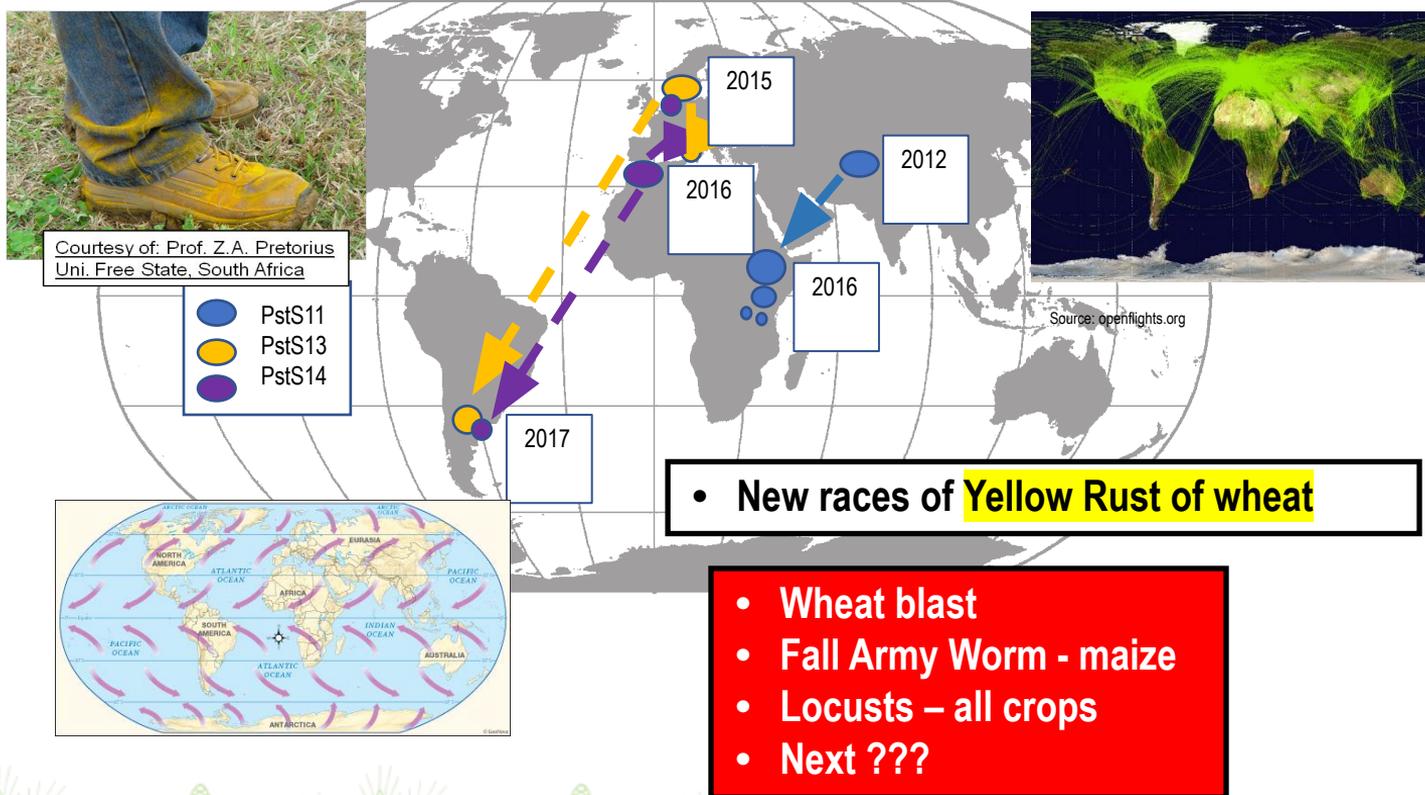
Can we
replace
major
cereals?



Requires some form of post-harvest processing/management

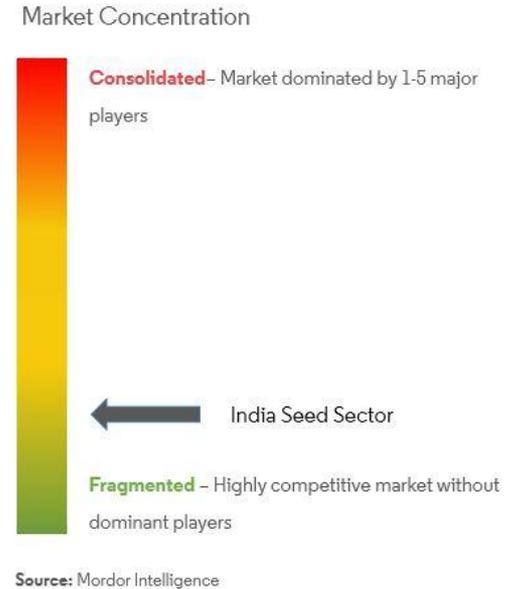
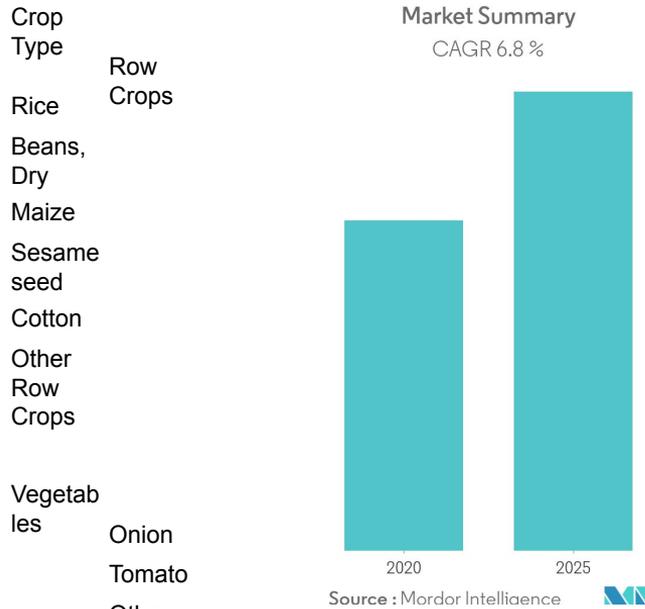
Source: World Bank

Transboundary pathogens are a big risk

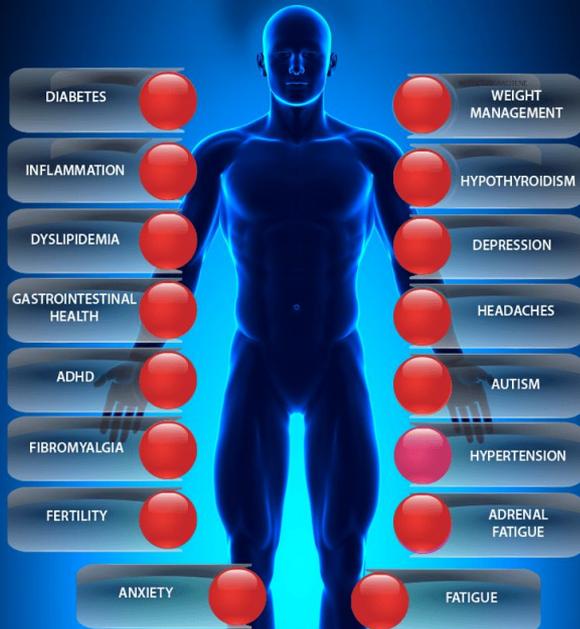


Quality seed must grow faster

The Indian seed sector is highly fragmented, and the top nine companies accounted for just 38.7% share of the market, while the rest is accounted for by various other small domestic companies, in 2019.



MICRONUTRIENT DEFICIENCIES



DRJOCKERS.COM
SUPERCHARGE YOUR HEALTH

17 Biofortified Crop Varieties Dedicated to Nation by Hon'ble Prime Minister on World Food Day



Rice: CR Dhan 315



Wheat: HI 1633



Wheat: HD 3298



Wheat: DBW 303



Wheat: DDW 48



Wheat: MACS 4058



Maize: LQMH-1



Maize: LQMH-2



Maize: LQMH-3



Finger Millet: CFMV-1



Finger Millet: CFMV-2



Little Millet: CLMV-1



Mustard: PM-32



Ground nut: Gimar-4



Ground nut: Gimar-5



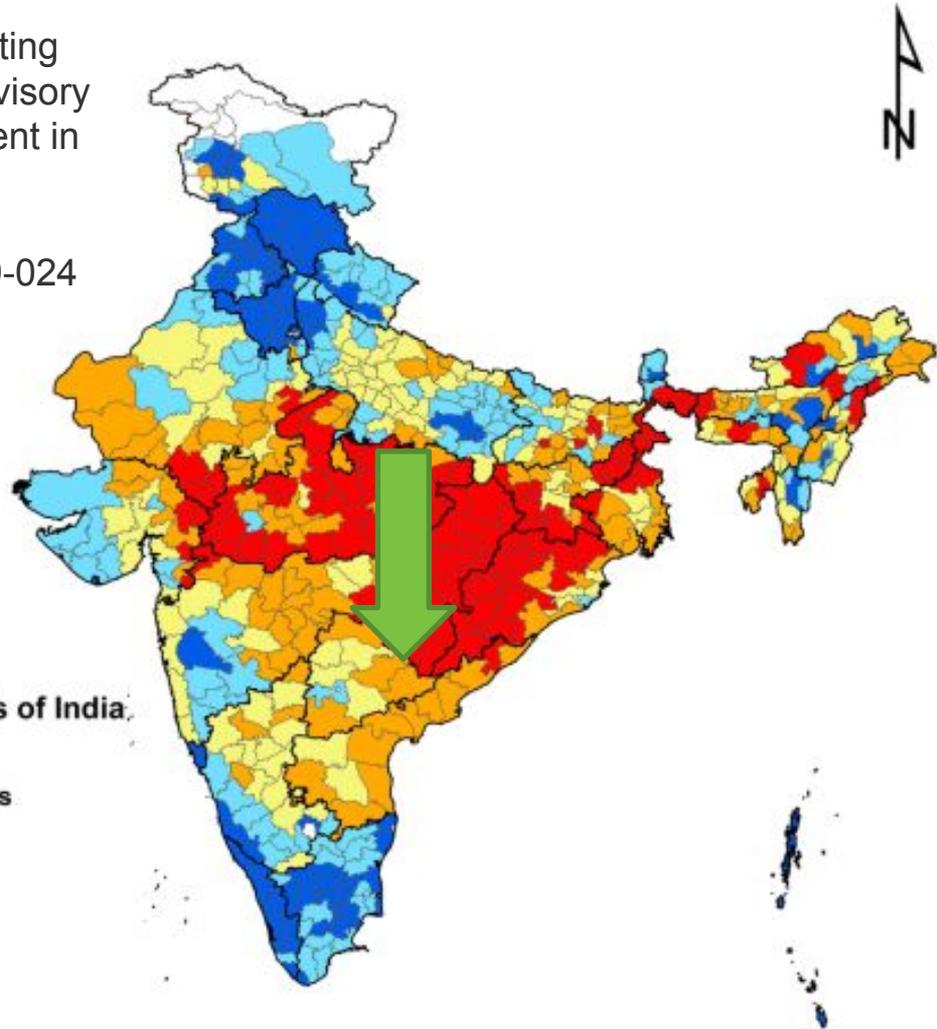
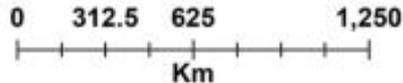
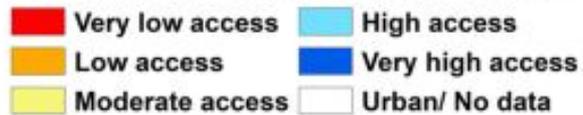
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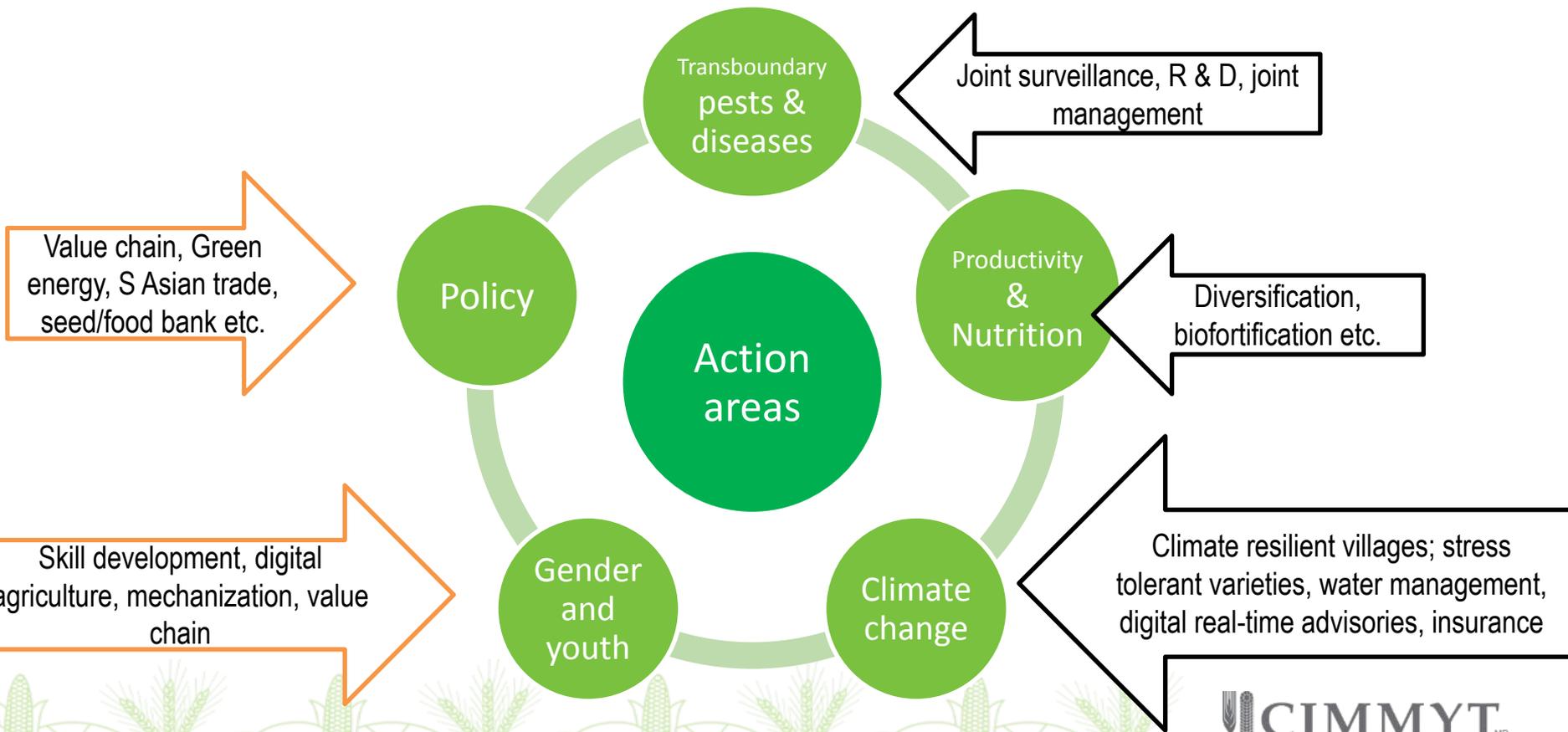
#SahiPoshanDeshRoshan

Gangopadhyay et al., Spatial targeting of ICT-based weather and agro-advisory services for climate risk management in agriculture. *Climatic Change* **154**, 241–256 (2019).
<https://doi.org/10.1007/s10584-019-02426-5>

Access to ICT Services: Rural Districts of India.



Action Areas are full of challenges



We need Integrated approach – quite challenging?



Genetic diversity

- Conserve and use diverse wheat collections
- Unlock genetic potential



Develop and improve access to varieties

- Stress resilience
- Molecular tools
- Seed sectors
- Quality



Farming systems

- Crop management
- Mechanization
- Participatory research



Increasing impact

- Big data, AI
- Gender and youth
- Foresight and impact assessments

CROSS CUTTING

Capacity development – Partnership

The Hunger Pandemic

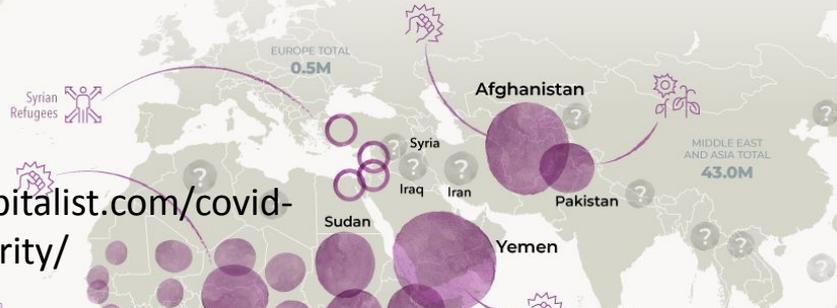
Globally, COVID-19 could double the number of people on the brink of starvation



While COVID-19 is dominating headlines, another kind of emergency is threatening the lives of millions of people around the world—**food insecurity**.

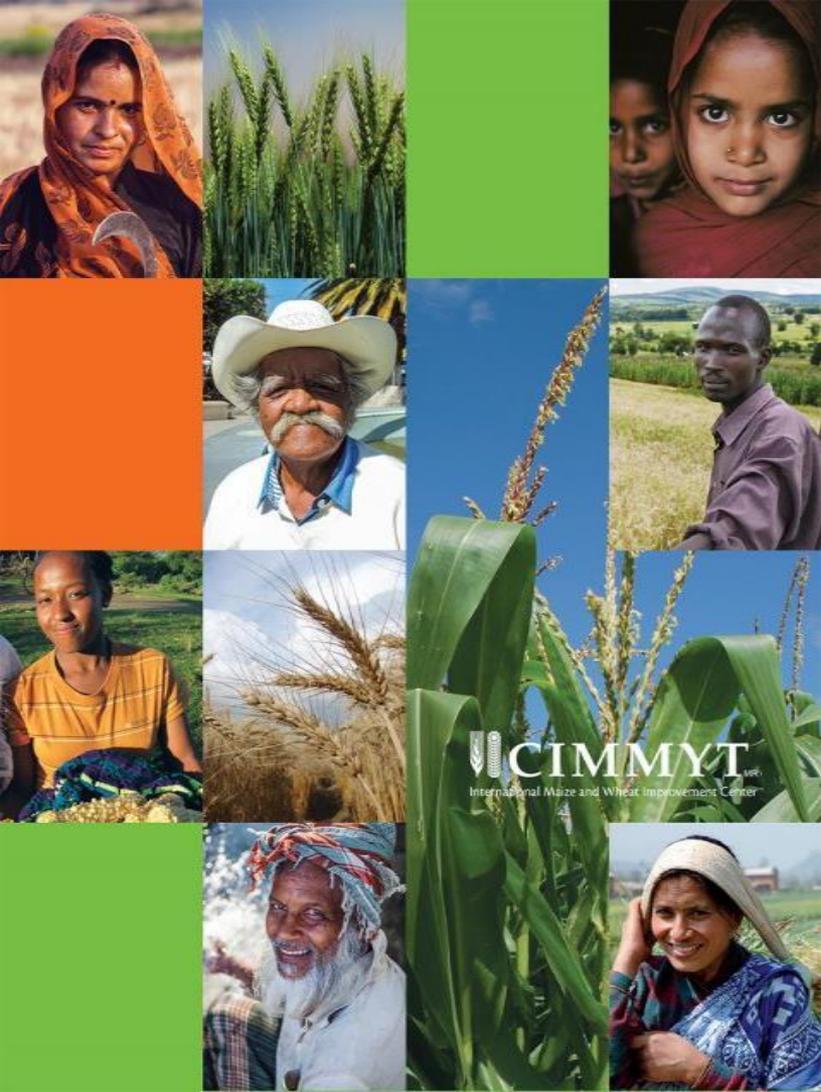
By the end of 2020, 265 million people could be in crisis level situations.

Here's the situation around the world:



We must be ready for new challenges all the time

<https://www.visualcapitalist.com/covid-19-global-food-insecurity/>



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