



# **7<sup>th</sup> Indian Youth Science Congress Young Scientists and UN Sustainable Development Goals**

**Goal 13  
Take urgent action to  
combat climate change and its impacts**

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# SUSTAINABLE DEVELOPMENT GOALS\*

17 GOALS TO TRANSFORM OUR WORLD



**Goal 13 is linked with Goals 14 & 15, and determines fate of Goal 2**

\*Adopted by countries on Sep 25, '15, to end poverty, protect the planet and ensure prosperity.  
<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

# Goal 13: Take urgent action to combat climate change and its impacts

## Key indicators of climate change

- Global warming: Rise in temperature by 0.85°C between 1880 & 2012
  - Significant yield reductions occurred in maize and other crops due to a warmer climate between 1981 & 2002.
- Sea levels have risen as large amounts of snow & ice have diminished
  - Increased inundation of coastal farmlands.
- With continuing greenhouse gas emissions, temperature increase is likely to exceed 1.5°C, as compared to the period from 1850 to 1900.
- Global CO<sub>2</sub> emissions have increased by almost 50% since 1990
  - Faster between 2000 and 2010 than in previous 3 decades;
  - Today's crop varieties may not be able to cope with increased CO<sub>2</sub>.

***Yet, there are technological options for limiting mean temperature increase to 2°C above pre-industrial levels.***

## Smallest Indian wheat crop in six years set to spur more imports

Wheat production is set to decline 5% to 84.5 million tonnes in the year through June from a year earlier



Photo: Bloomberg

New Delhi: India may harvest its smallest wheat crop in six years after two successive years of below-average monsoon rainfall stricken crops, potentially opening its doors to more imports.

Production is set to decline 5% to 84.5 million tonnes in the year through June from a year earlier, according to the median of estimates from seven analysts, traders and four millers compiled by Bloomberg. That's the lowest since the 80.8 million tonnes in 2009-10, farm ministry data show. The government's target is set at 84.8 million tonnes.

The prospects of a smaller crop and dwindling state stockpiles are already prompting calls from flour mills to scrap the tax on imports to avoid a surge in domestic prices. That may help boost futures in Chicago, which capped the third straight annual decline in 2015, the longest streak since 1999, amid rising global inventories.

"The overall demand and supply situation is getting tight and that will lead to imports of all kinds of wheat not only for blending," said Prerana Desai, vice president for research at Edelweiss Integrated Commodity Management Ltd in Mumbai. "Though the weather improved in the last few weeks, the fact that most of the time the temperatures were high could result in early maturing of the crop, and that in turn will reduce the yields."

### Dry winter

Indian farmers faced an almost dry winter after the first back-to-back shortfall in June-September monsoon rain in three decades, which cut output of rice, corn, cotton and sugar cane. The area under wheat fell to 28.8 million hectares (72.4 million acres) as of 28 January, from 30.8 million hectares a year earlier, the agriculture ministry estimates.

Northwest India received 29% less rain than normal between October and December, while in central parts the deficiency was 63% , according to the India Meteorological Department (IMD). The two regions account for the bulk of the country's wheat production.

"The weather has not been as cold as it should be which is not good for the crop," said Muni Devi, 41, a second-generation wheat grower in Uttar Pradesh, the nation's biggest producer. "It's warm and there was no rainfall when we needed."

### Duty regional

A second straight year of decline in output will be the first time in four decades and may spur imports by bread and biscuit makers. Mills in southern parts of the country may import about 800,000 tonnes in the year but India still has a surplus of about 800,000 tonnes, the ministry says.

Plus there will be effects of *El Niño*

abolished."

India first imposed a 10% duty on imports in August and increased it to 25% in October, citing a decline in global prices and adverse impact on domestic growers. Overseas purchases are seen at 500,000 tonnes in 2015-16, compared with 62,000 tonnes a year earlier, according to the US department of agriculture.

# Business Standard

## India's foodgrain production estimated to decline by 4.6 percent

IANS | New Delhi August 17, 2015 Last Updated at 21:50 IST

The Indian foodgrain production is projected to decline by 4.66 percent to 252.68 million tonnes in 2014-15 due to "setbacks" in kharif and rabi seasons, the agriculture ministry said on Monday.

"Production of kharif crops during 2014-15 suffered due to bad monsoon. Unseasonal rains/hailstorm during Feb-March 2015 had significant impact on production of rabi crops. As a result of setback in kharif as well as rabi seasons, the production of most of the crops in the country has declined during 2014-15," according to the fourth advance estimates of production of major crops released by the ministry on Monday.

The foodgrain production during the previous year was 265.04 million tonnes.

The ministry's fourth Advance Estimates for 2014-15 said the total production of rice was estimated at 104.80 million tonnes which is lower by 1.85 million tonnes than last year's 106.65 million tonnes.

The ministry's release said that production of wheat was likely to be 88.94 million tonnes, a dip of 6.91 million tonnes over output of 95.85 million tonnes in the previous year.

Total production of coarse cereals is pegged at 41.75 million tonnes, a fall of 1.54 million tonnes over 2013-14. The output of cereals is expected to plunge by 2.05 million tonnes to 17.20 million tonnes.

Production of jute and mesta is estimated at 11.45 million bales which is marginally lower than the production during the last year.

Total production of oilseeds in the country is estimated at 26.68 million tonnes, which is a decline of 6.07 million tonnes over the last year.

## ..and uncertainties of the monsoons

Production of cotton is estimated to dip marginally and is estimated at 35.48 million bales.

The government releases four advance estimates in an agriculture year (July-June) and this is followed by final estimates of production of major agricultural crops.

# Some of these early trends – match with projections made by a study\*



## *Projected scenarios*

- ✓ Climate change to pose new challenges → yields will decline, unless neutralized by science-based interventions.
- ✓ Increased economic growth will lead to increase in per capita demand for food
  - Lesser total cereals, more of fruits, vegetables, dairy, fish and meat products;
  - More wheat, less rice;
  - Foodgrain imports will rise to support economy-wide growth.

\*Transforming Indian Agriculture: India 2040: Productivity, Markets and Institutions'  
Ed. Marco Ferroni, Sage Publications 2012.

# Science-based approach for meeting challenges of climate change

## *Rice and wheat – key crops assuring India's food security*

### Rice

- Largely rain-fed, often subjected to vagaries of monsoons
  - Need more varieties like Swarna *Sub-1* for growing under flood-prone situations;
- Reasonably tolerant to rising temperature;
- Adaptation of varieties under high CO<sub>2</sub> needs to be assessed.

### Wheat

- Need more to meet increasing demands as the economy grows;
- Key crop of India's grain bowl of India is vulnerable to terminal heat, and untimely rains
  - Immediate initiatives needed for evolving more heat tolerant varieties;
  - Alternative crop choices to be provided to farmers opting out of wheat.

***For long-term research, young scientists of today need to engage in a mission mode.***