

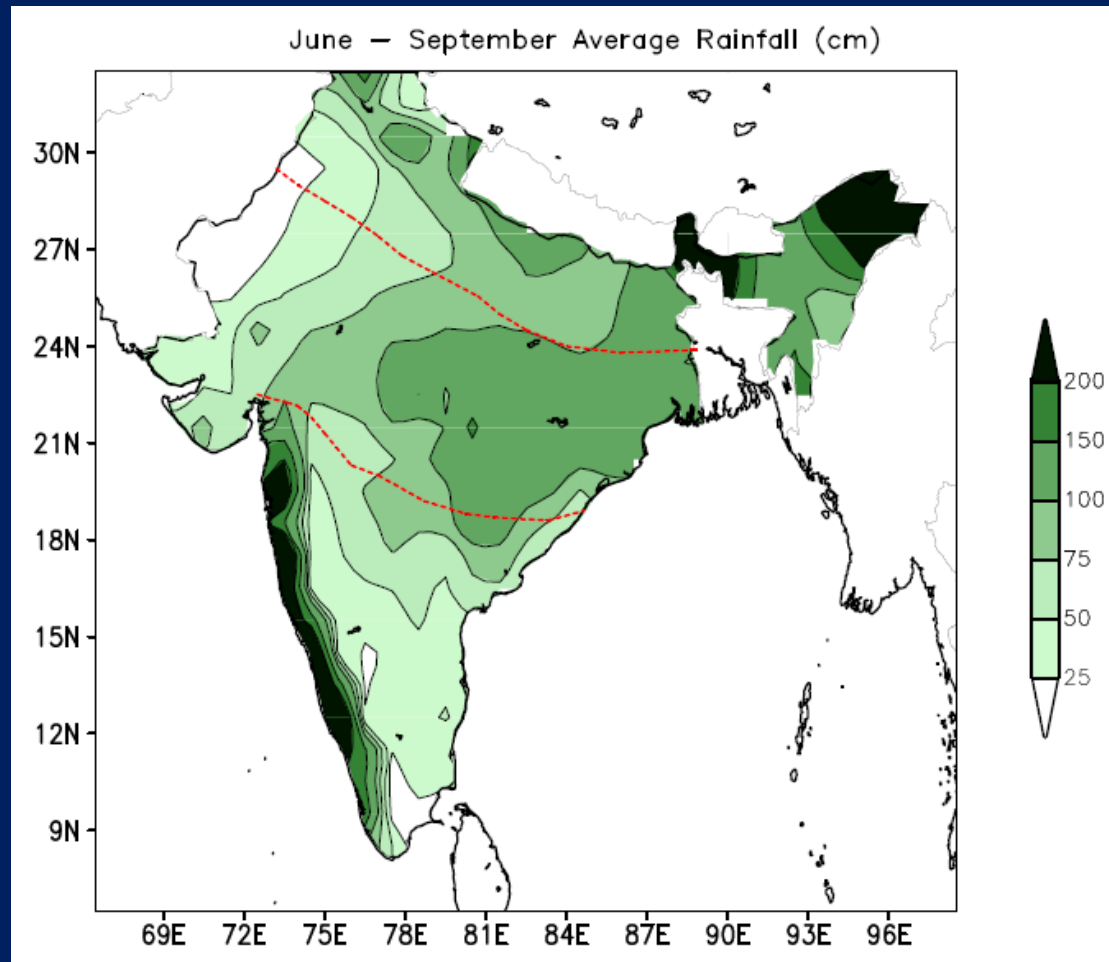
# **“Economic and societal impacts of the monsoon**

**Sulochana Gadgil**

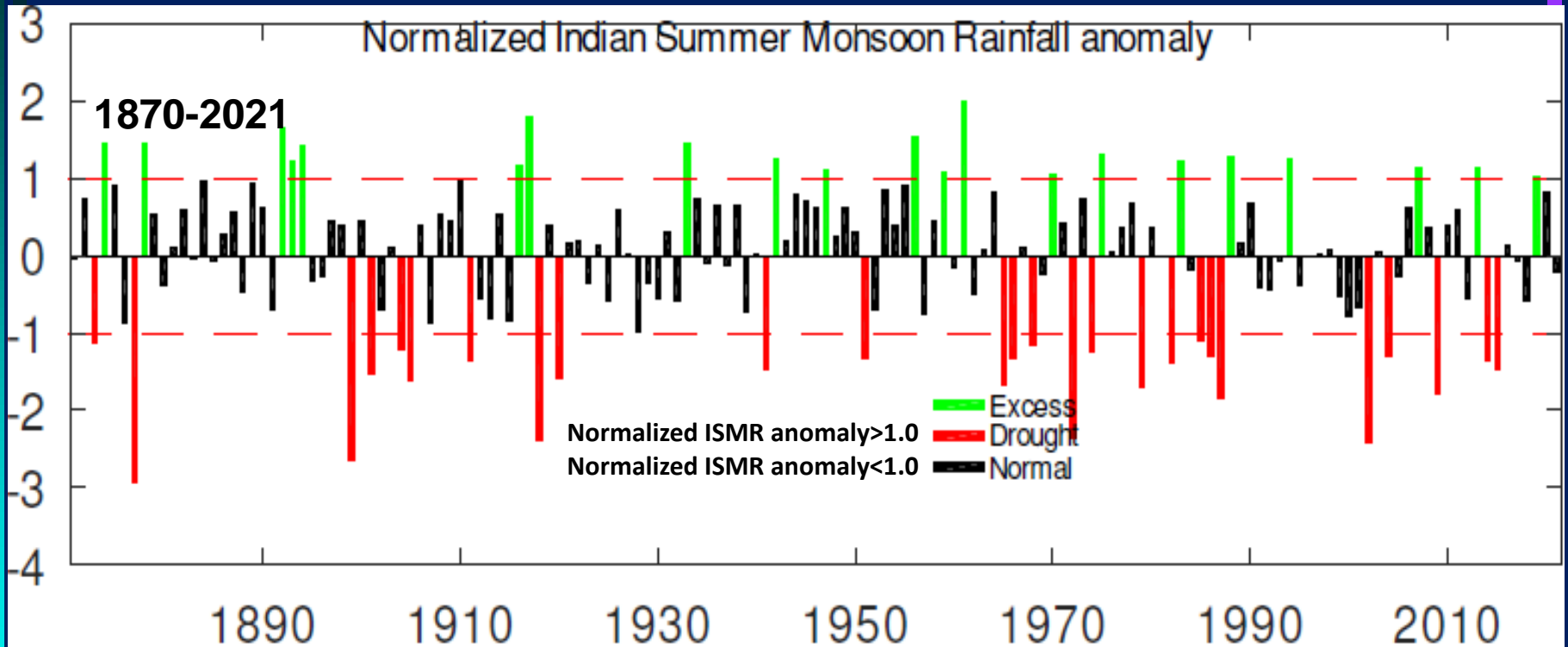
**IWM-7**

**26 March 2022**

# Mean rainfall during the summer monsoon



# The interannual variation of the Indian Summer Monsoon rainfall (ISMR)



Impact of the monsoon on production of the food grains is the primary cause of the economic and societal impacts on the country.

**What is the overall impact of the monsoon variability on food grain production (FGP) and GDP of the country?**

### **Expectations**

- **Deficit monsoon/drought will decrease the FGP**
- **Above normal or good monsoon or excess will lead to an increase in the FGP.**
- **Soon after independence contribution of agriculture to GDP WAS 50% whereas by the end of the century the contribution was only about 23%.**
- **It was expected that because of this and the overall development since independence , the economy would become 'drought proof'.**

# Outline

## Economic impact

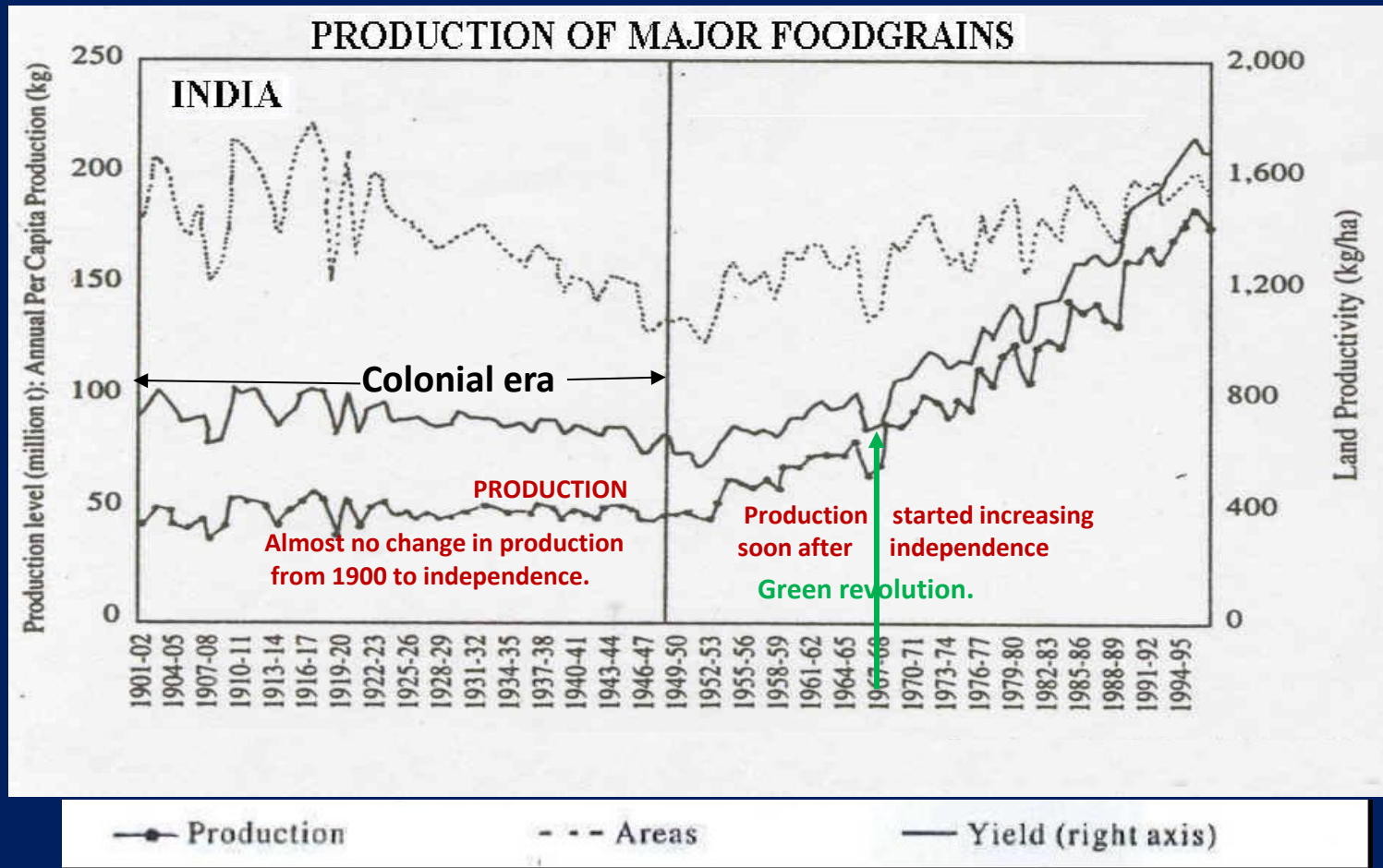
- Observed variation in food grain production (FGP) and GDP.
- Monsoon rainfall and FGP
- Major features of the impact of the monsoon on FGP, GDP

Will not be able discuss strategies for minimizing adverse impact or enhancing positive impact because of time limitations

## Social impact

- Famines due to droughts

# Variation of the Indian food-grains : 1901-1994



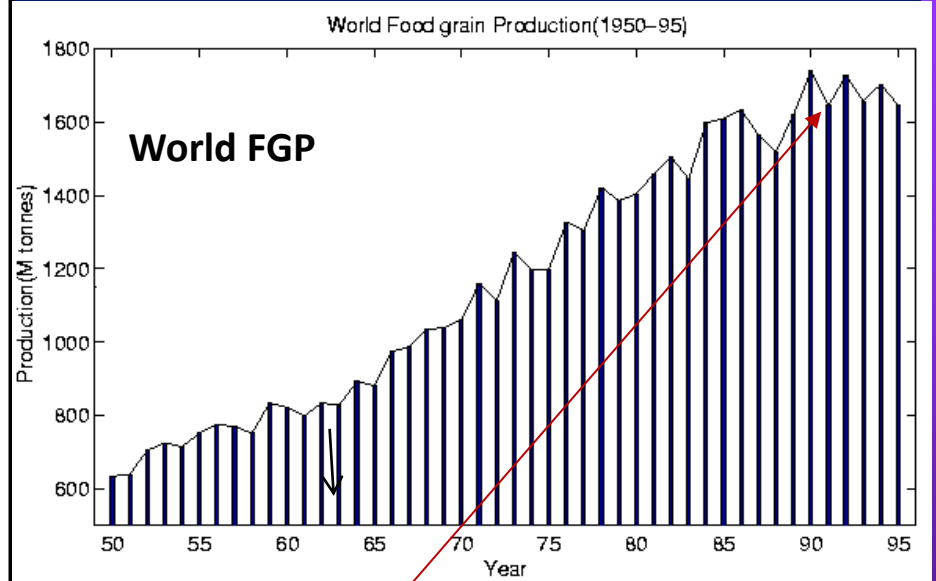
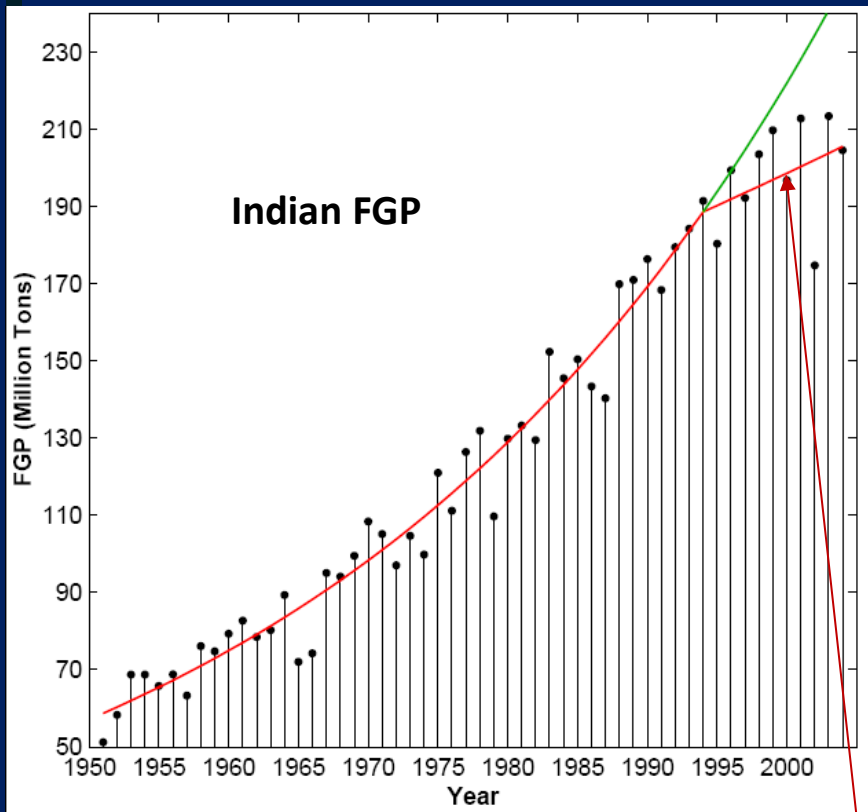
Kurosaki, T (1999): 'Agriculture in India and Pakistan, 1900-1995', *Economic and Political Weekly*, December 25, pp A160-68.

# Green Revolution

- Rapid increase in the Indian food-grain production over **irrigated areas** associated with a rapid increase in yields due to
  - (i) the adoption of new dwarf, high yielding and fertilizer-responsive varieties (of rice and wheat, in particular),
  - (II) and a substantial increase in fertilizer application, and pesticide application.

It led to a phenomenal increase in the FGP.

- However, now we are witnessing a fatigue of the green revolution



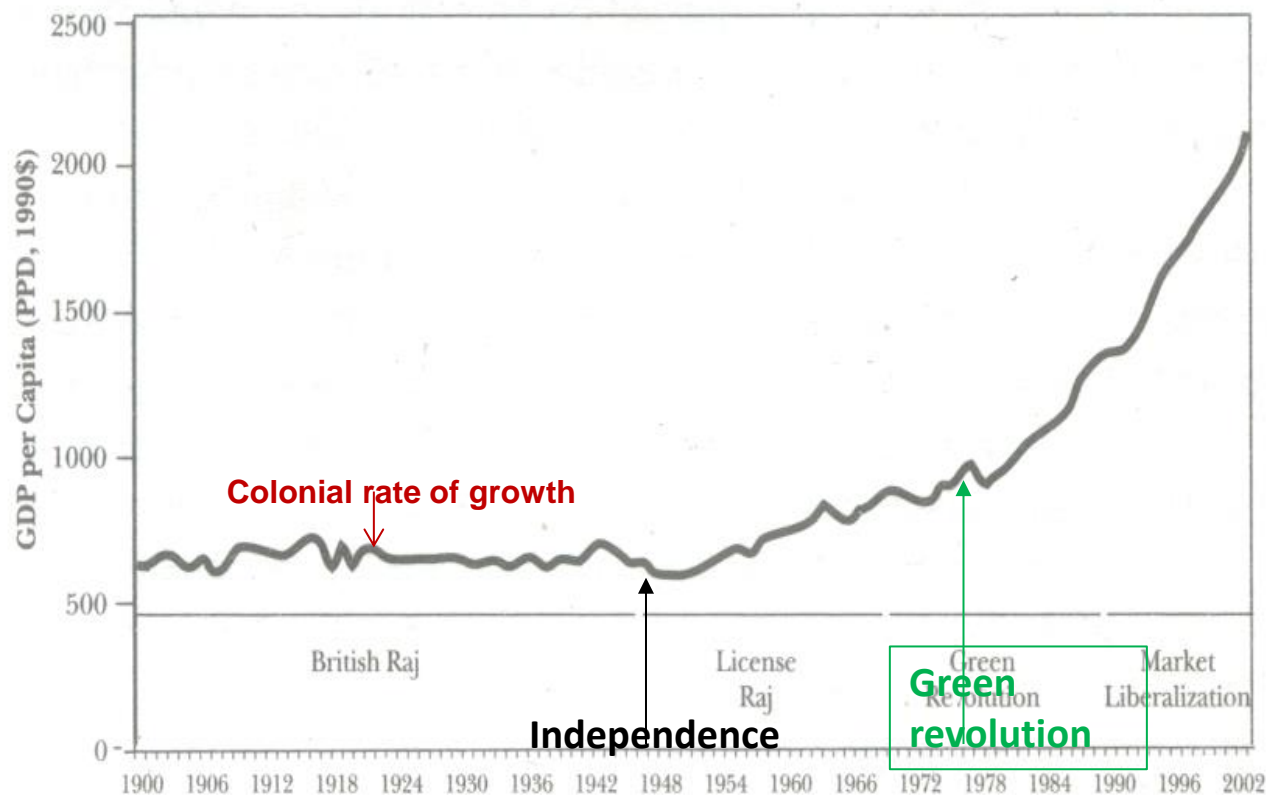
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**Fatigue of the green revolution**



**GDP  
per  
Capita**

Figure 1: Economic Growth in India Since 1900

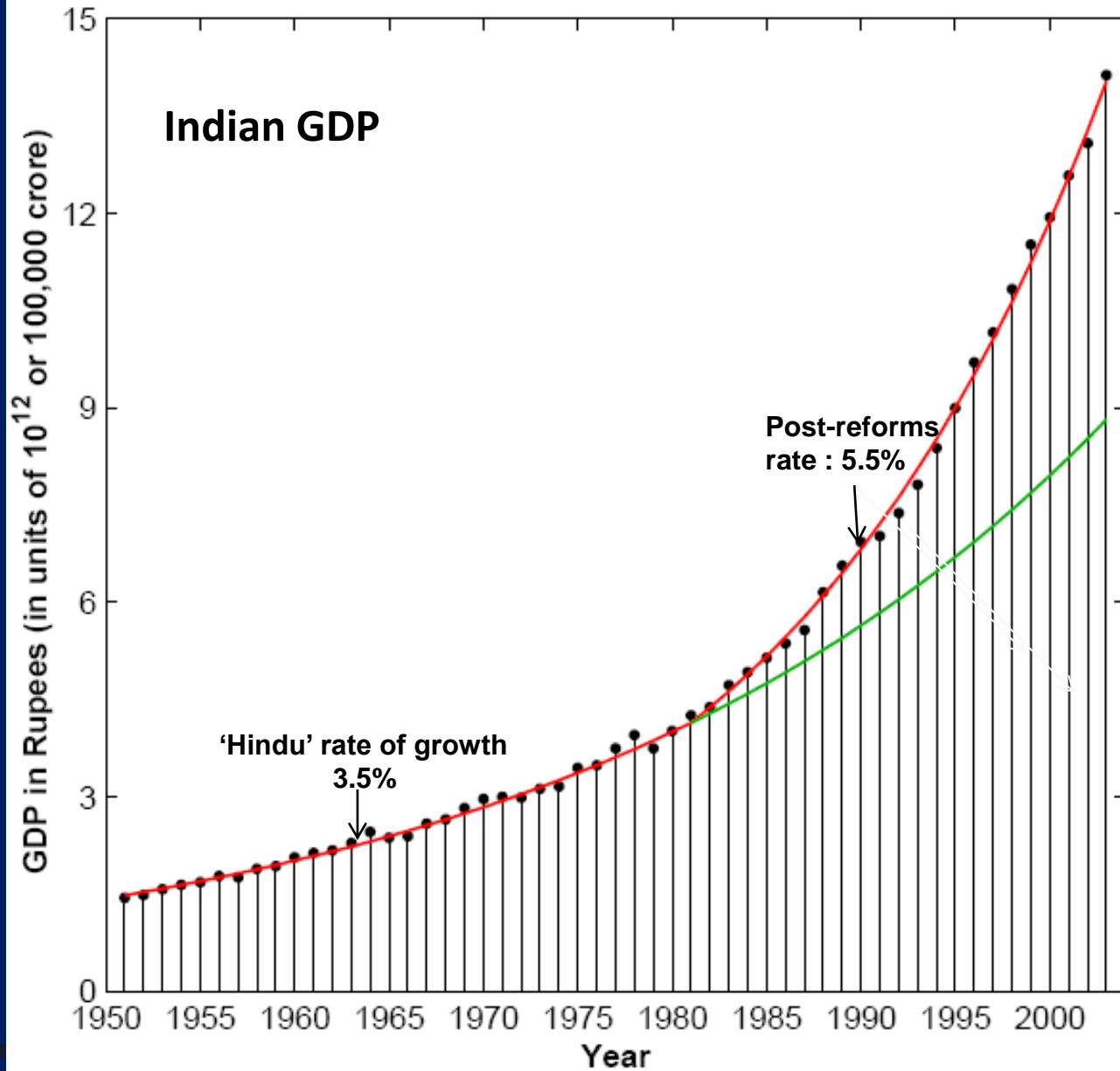


Source: Data from Maddison (1995).

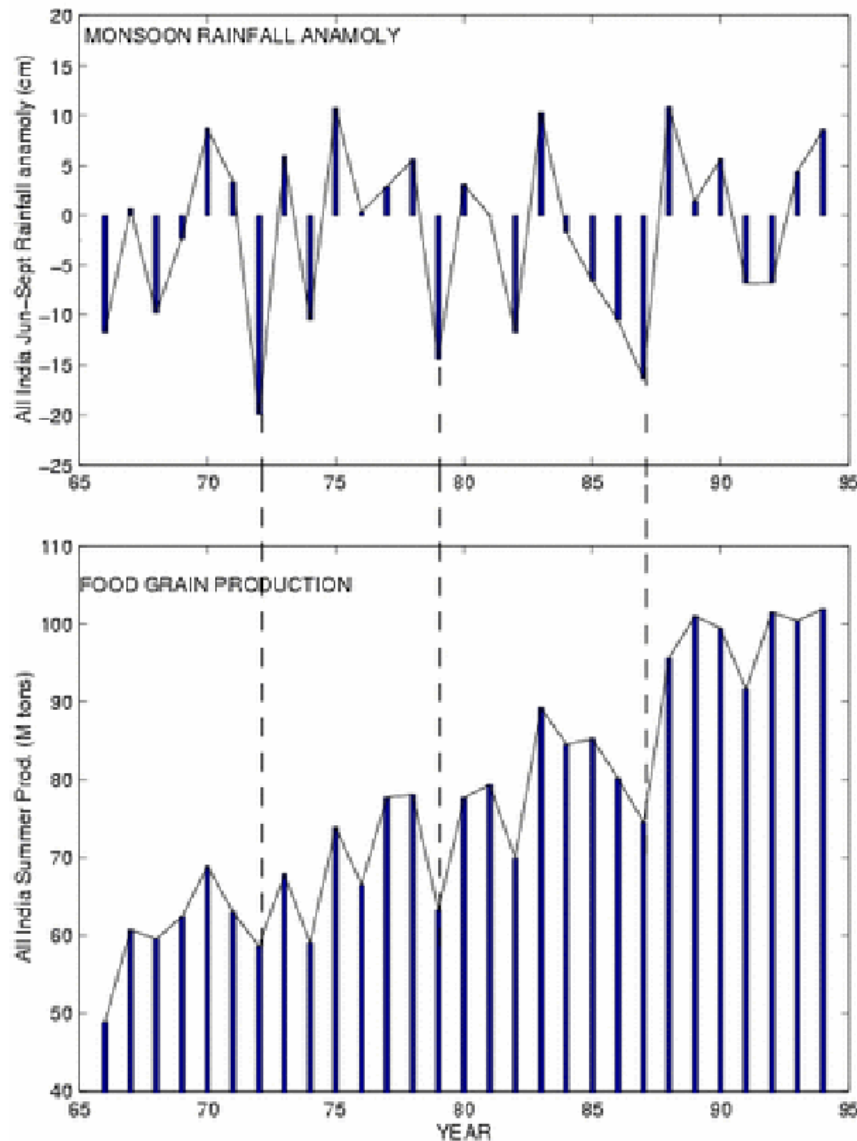
**British Raj:1900-47, License Raj:1947-70, Green revolution :1970-91; Economic reforms : 1991-present**

**From 'End of Poverty" Sachs 2005, p181**

Ind



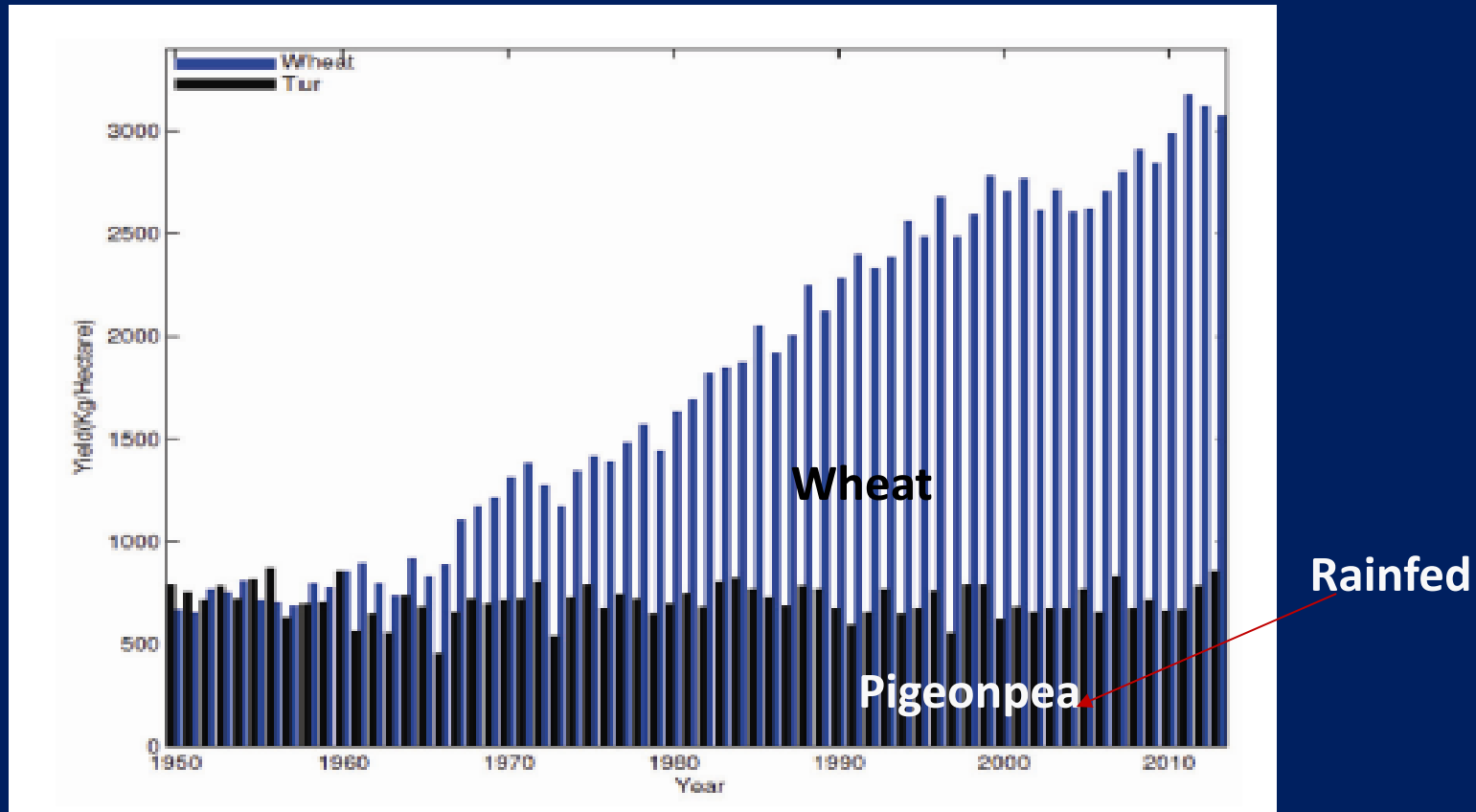
# Monsoon rainfall and food grain production



**Close correspondence  
between droughts and  
minima in FGP**

- Largest impact of monsoon variability on production of rainfed cultivated crops.
- Rainfed cultivation is over 60% of cultivated land of the country so cannot be wished away,
- Changes over rainfed regions due to the green revolution:
  - (i) adoption of new varieties and cropping patterns in particular change over to monocropping over large tracts.
  - This has led to the major pests and diseases becoming endemic.
  - But **the yields of rainfed farming have hardly increased. e.g.**

## Variation during 1950-2014 of all-India yields of wheat and Tur (Pigeonpea) based on data from Agricultural Statistics at a glance (2014)



Since the yields in rainfed cultivation fluctuate around a very low value, the economic impacts of the monsoon are very large.

- A quantitative assessment of the impact of the Indian summer monsoon rainfall on foodgrain production and GDP gave some unexpected results:
- *'The Indian Monsoon, GDP and Agriculture'* by Sulochana Gadgil and Siddhartha Gadgil, (2006), EPW XLI, 4887-95 :
- Based on analysis of the variation of
  - (i) the Indian summer monsoon rainfall (*data from [www.tropmet.res.in](http://www.tropmet.res.in)*)
  - (ii) Foodgrain production (FGP) *data from Ministry of agriculture*
  - (iii) GDP (at factor cost) *data from Central Statistical Organization, EPW foundation*



**Furthermore  
the asymmetry  
has increased  
markedly after  
the 1980s.**

**I suggest that this is because of the practice of climate-insensitive  
agriculture!**

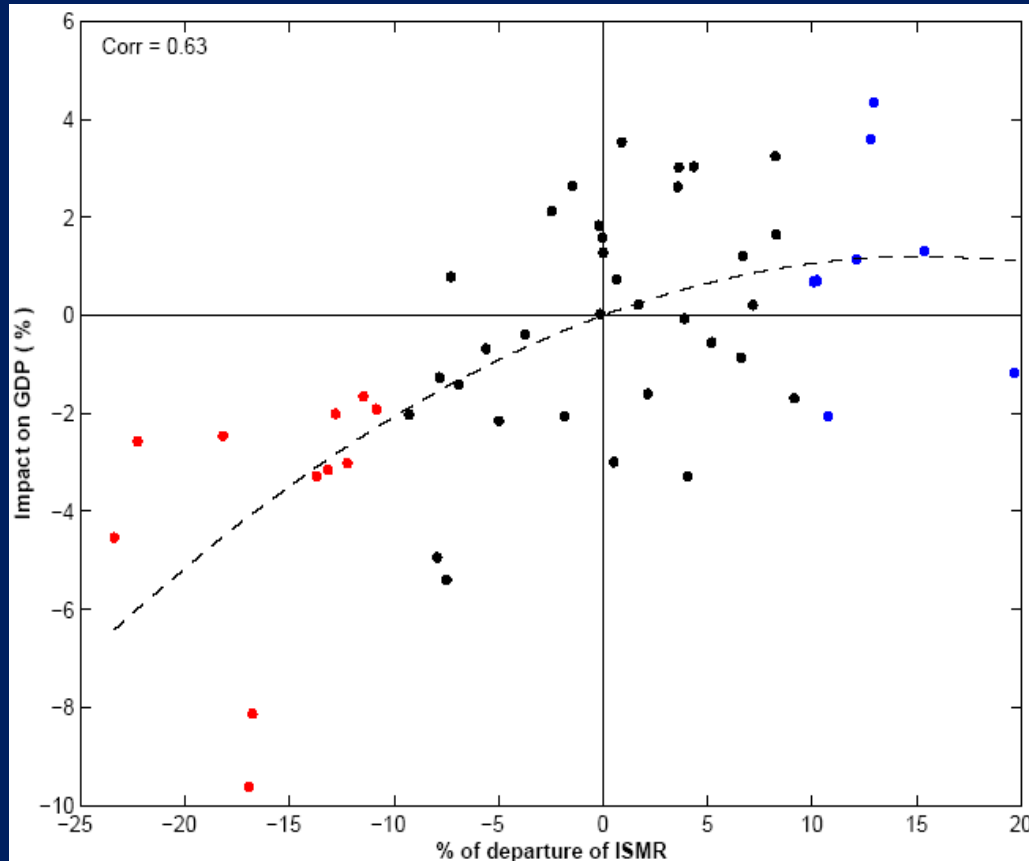


- **Why asymmetry in impact on FGP? And why more asymmetry since the 1980s .(long answer in the paper)**

## **Summary**

- **Deficit rainfall always leads to yield loss**
  - **Why does above normal rainfall not lead to good yields**
- “Harmful impact of the green revolution:**
- **Cropping patterns changed to mono- cropping over large tracks which in turn led to several pests and diseases becoming endemic. Also intense farming led to loss of fertility in farms . In this situation even if the rainfall is good, yields will not be good unless fertilizers and pesticides are applied.**
  - **Farmers do not apply them in rainfed cultivation because there is no assured yield (as in irrigated cultivation) and so they are not considered cost-effective.**

# Impact of ISMR on GDP



Note the asymmetry in the response to droughts vis a vis surpluses

**Despite the sharp, decrease in the contribution of agriculture to GDP, it is seen that the typical impact of severe droughts on GDP has remained between 2 to 5% throughout the period.**

## **NO DROUGHTPROOF ECONOMY!**

**This is because although agriculture does not contribute as much to the GDP now, because 60% of the population is still part of the agricultural work force. So the impact of drought on the purchasing power of the majority, still leads to a large impact on GDP.**

# Famines - a success story of mitigation of social impacts

- Most meteorologists believe that the major cause of famines is the food shortage due to droughts, so a famine is considered to be the most adverse impact of monsoon variability.
- To understand the relationship of famines to droughts, consider the Indian experience of famines.
- The impact of droughts prior to and early in the colonial era, was minimized by traditional social institutions and collective use of farm revenues.
- The major famines of 1876–1878, 1896–1897, 1899–1900 in which millions died in the colonial era were associated with droughts.
- **However, after independence in 1947, despite severe crop failures in association with the droughts of 1968,73,79 and 1987, there were no famines.**

- **The last famine, one of the largest was the Bengal famine of 1943 ( in which 2-3 million people died) occurred when the monsoon rainfall over Bengal as well as ISMR was above the average and hence could not be attributed to a drought!**
- **The Nobel Laureate Amartya Sen attributes the total absence of famines in India since independence to the installation of multiparty democratic system.**
- **The contrasting case is China, which has been more successful than India in economic progress, which had the largest recorded famine in history during 1958-61 in which 30 million perished.**
- **This demonstrates the role of social institutions and governance in mitigating the social impact of the monsoon.**

**Thank you**