

Why investing in research is necessary to feed the growing world

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Can the world feed an ever-growing population?



Rev. Thomas Robert MALTHUS
(1766-1834)

An Essay on the Principle of Population (1798)

1. Population growth is unbounded.
2. Agricultural land is limited.
3. Eventually, the size of the population must be checked by famine, war or epidemics

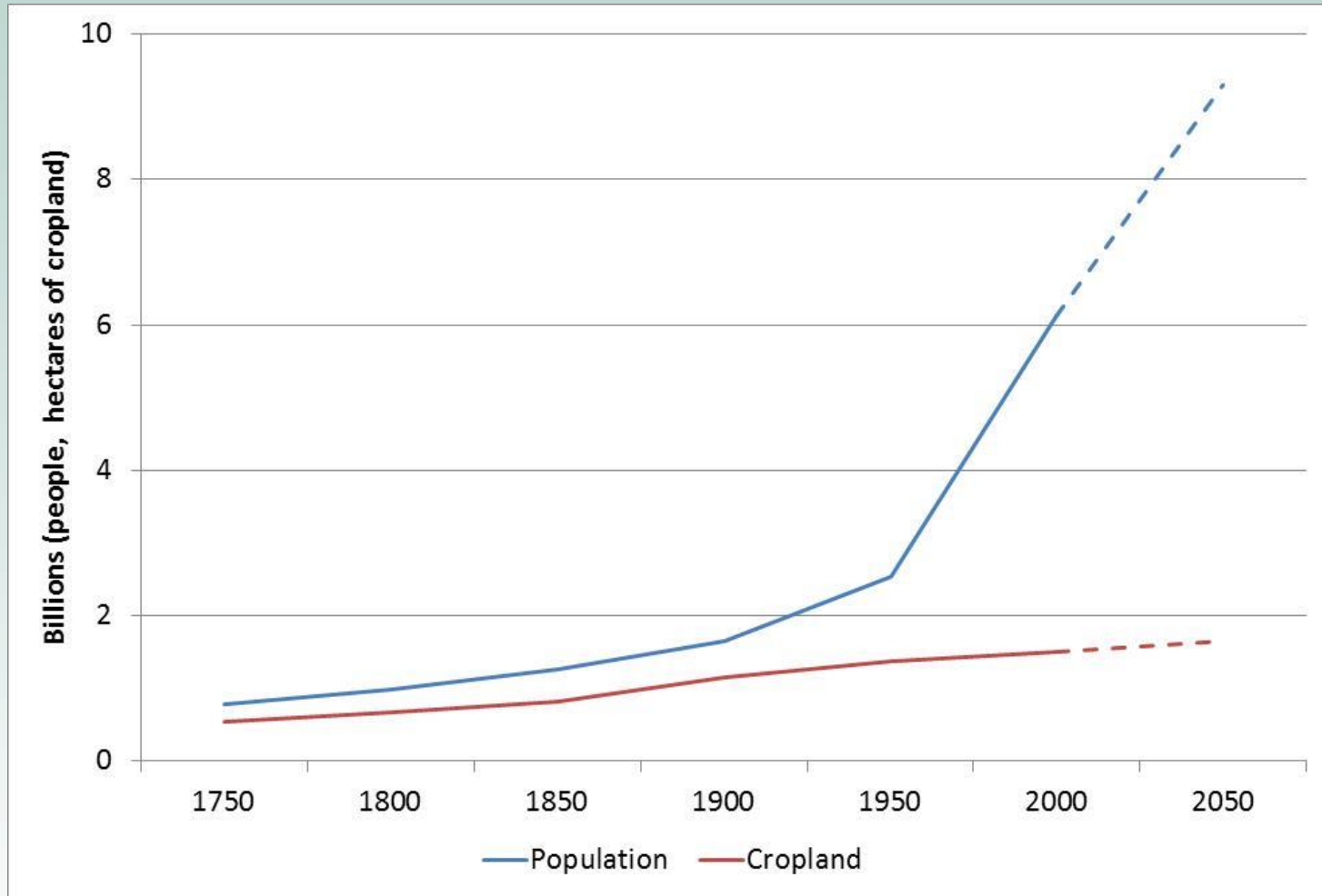


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Is Malthus Right?

World population and cropland, 1750-2050



Source: United Nations



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Counterweight to Malthus: Can new technology feed the world?



Dr. Norman BORLAUG
(1914-2009)

Father of the *Green Revolution*
Nobel Peace Prize 1970

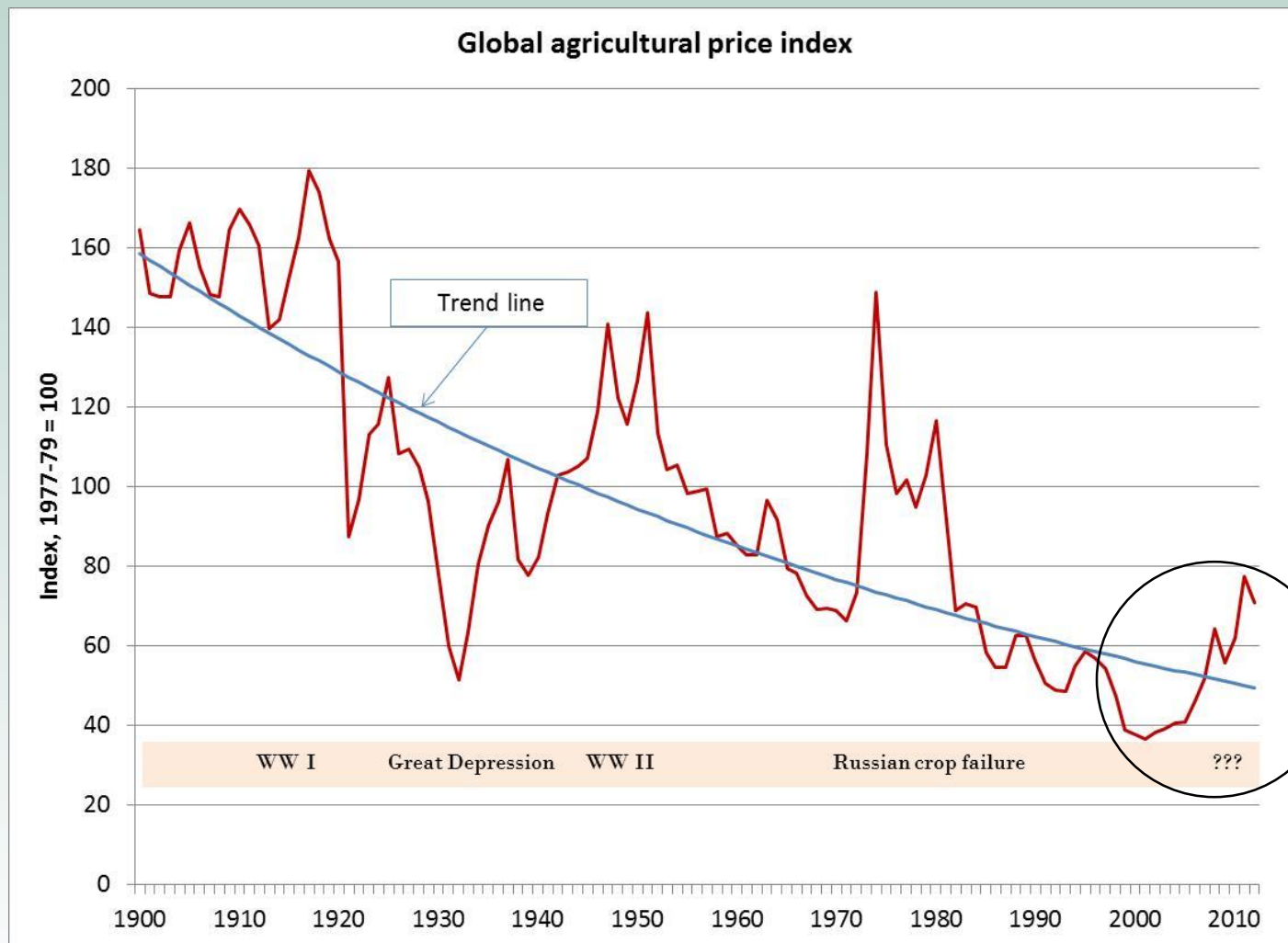
1. Developed high-yielding wheat for developing countries
2. Doubled wheat yields in India and Pakistan, averting famine
3. Methods also raised yields of rice and other crops



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In fact, food has become *less scarce* (cheaper) over the last 100 years



New period of scarcity?

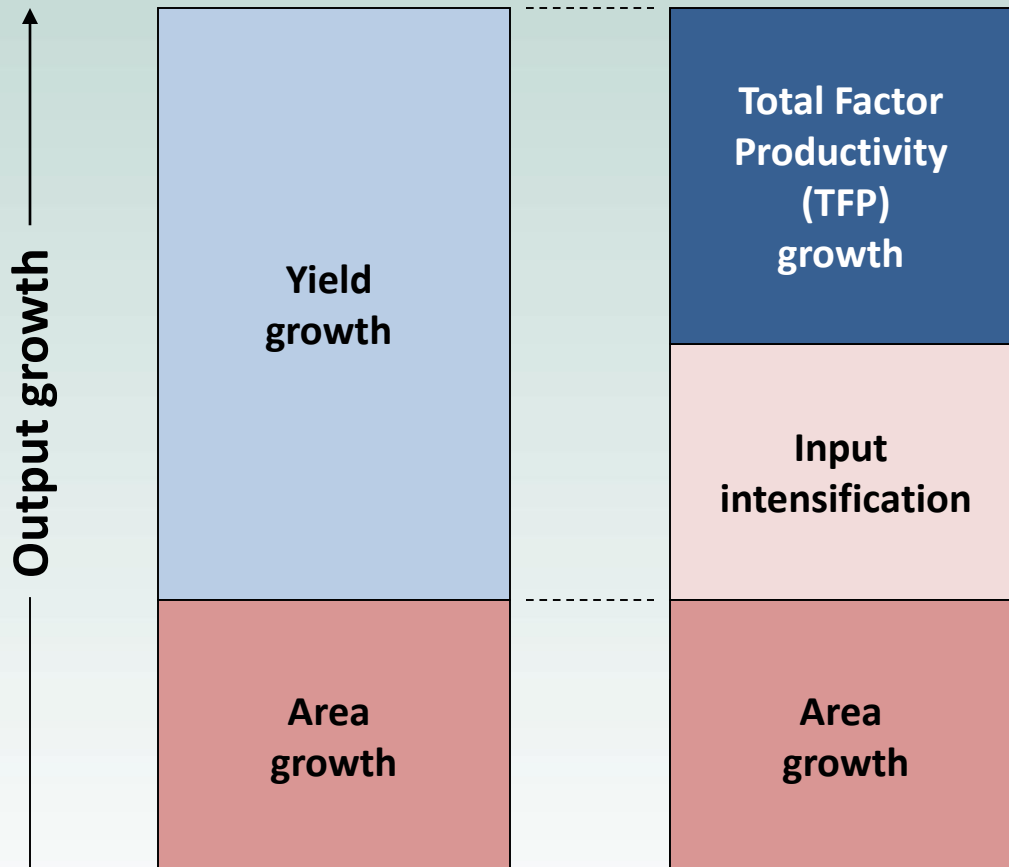
Source: Fuglie and Wang (2012)



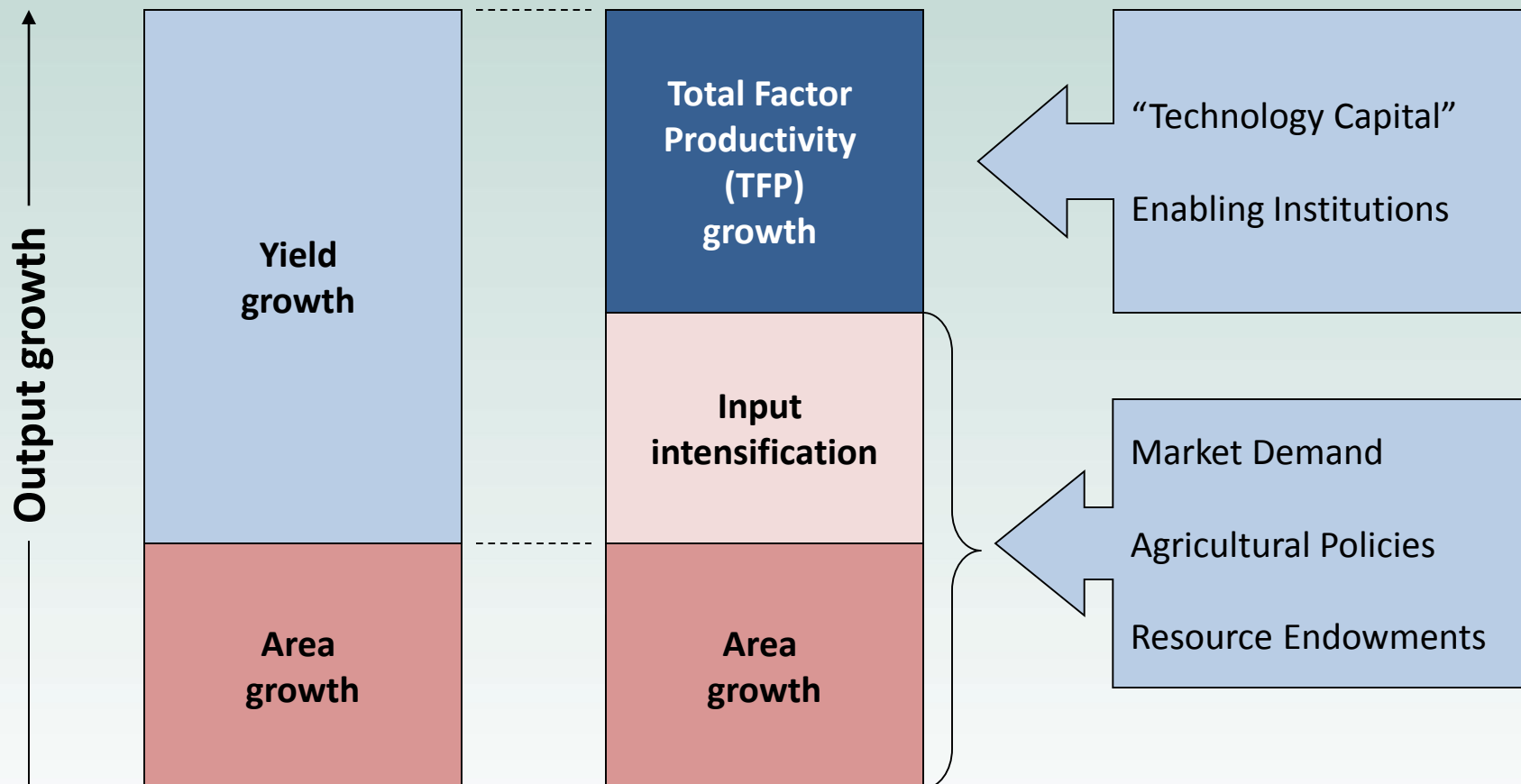
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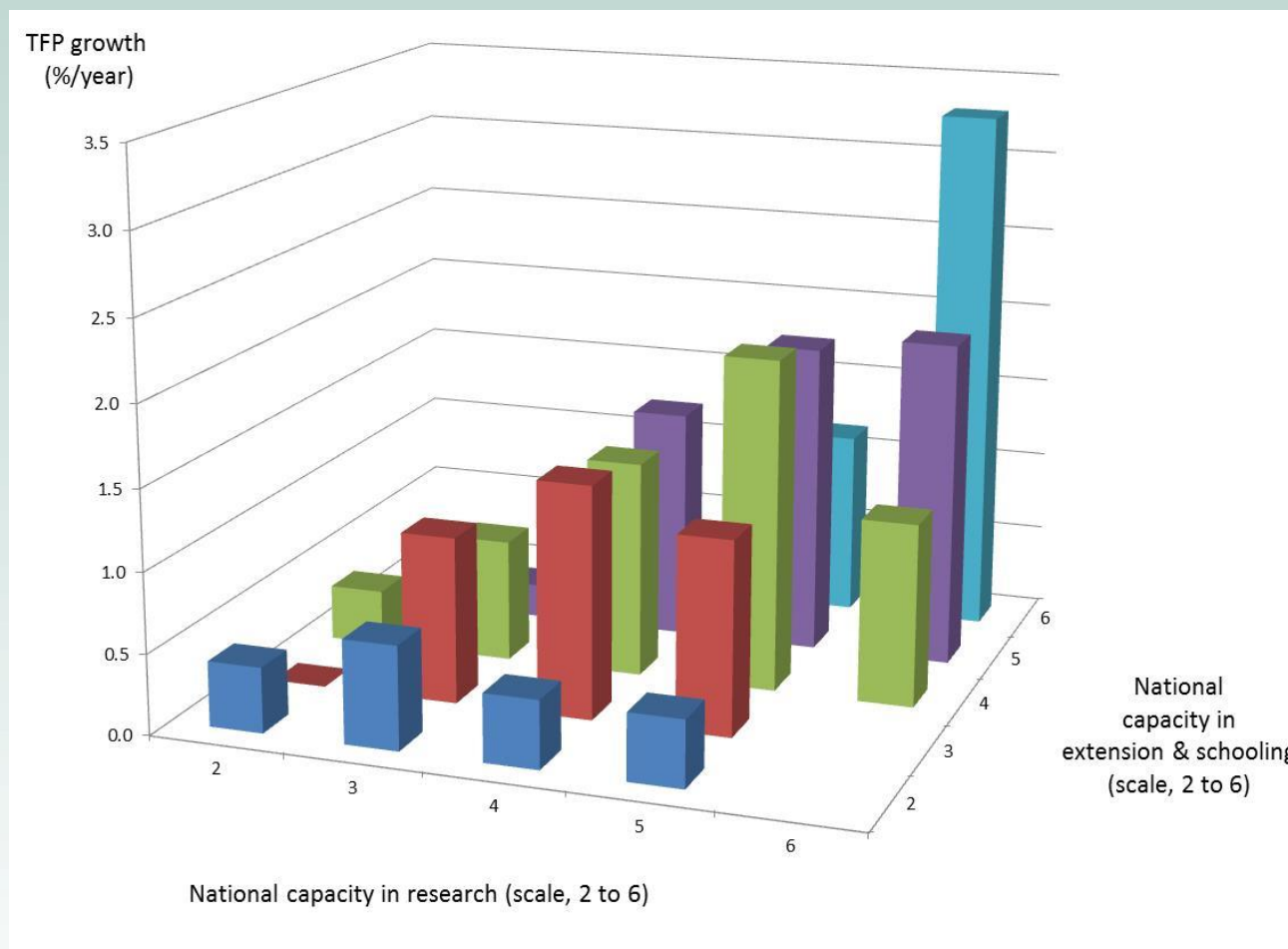
Understanding contribution of technological change (total factor productivity) to agricultural growth



Raising TFP depends on long-term investments in “technology capital” and enabling institutions



National capacities in research, extension and education strongly associated with rate of agricultural TFP growth



Comparison among 90 developing countries, 1970-2010

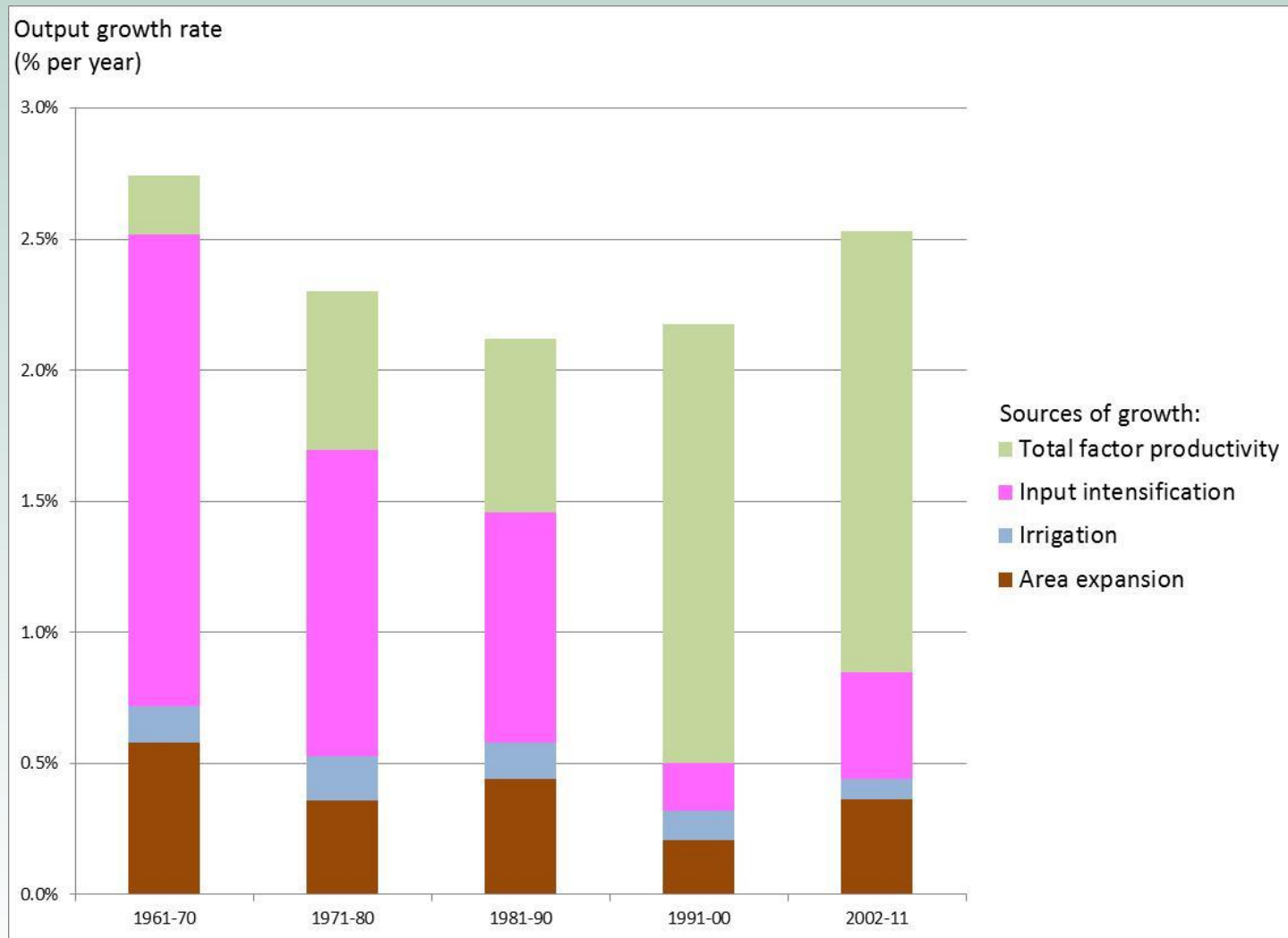
Source: Fuglie (2012)



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Improvements in TFP accounts for a rising share of global agricultural growth

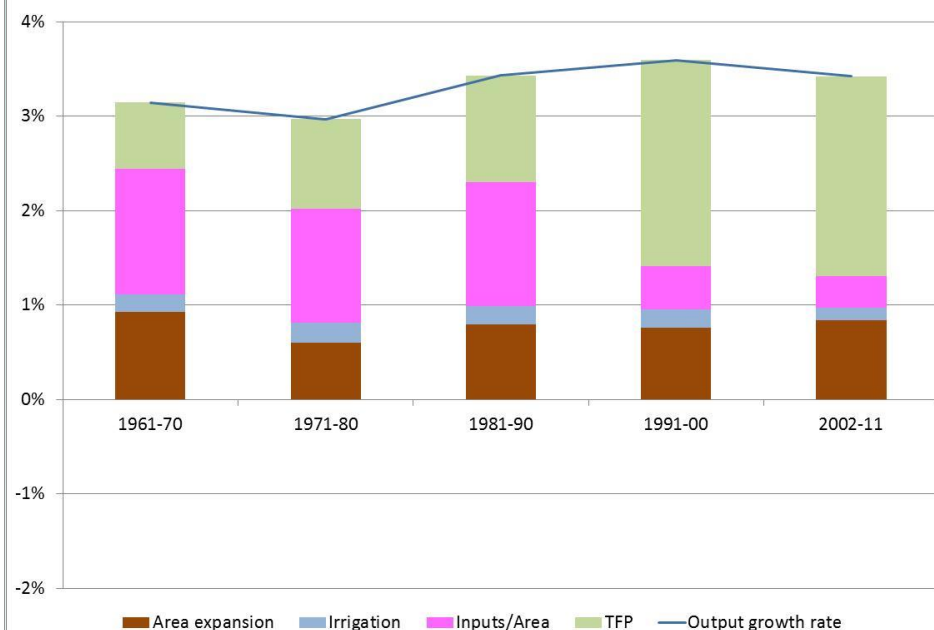


Patterns of agricultural growth vary widely across the global economy

Industrialized Countries



Developing Countries



TFP enables output to grow even as resources leave sector

TFP is becoming an important source of growth

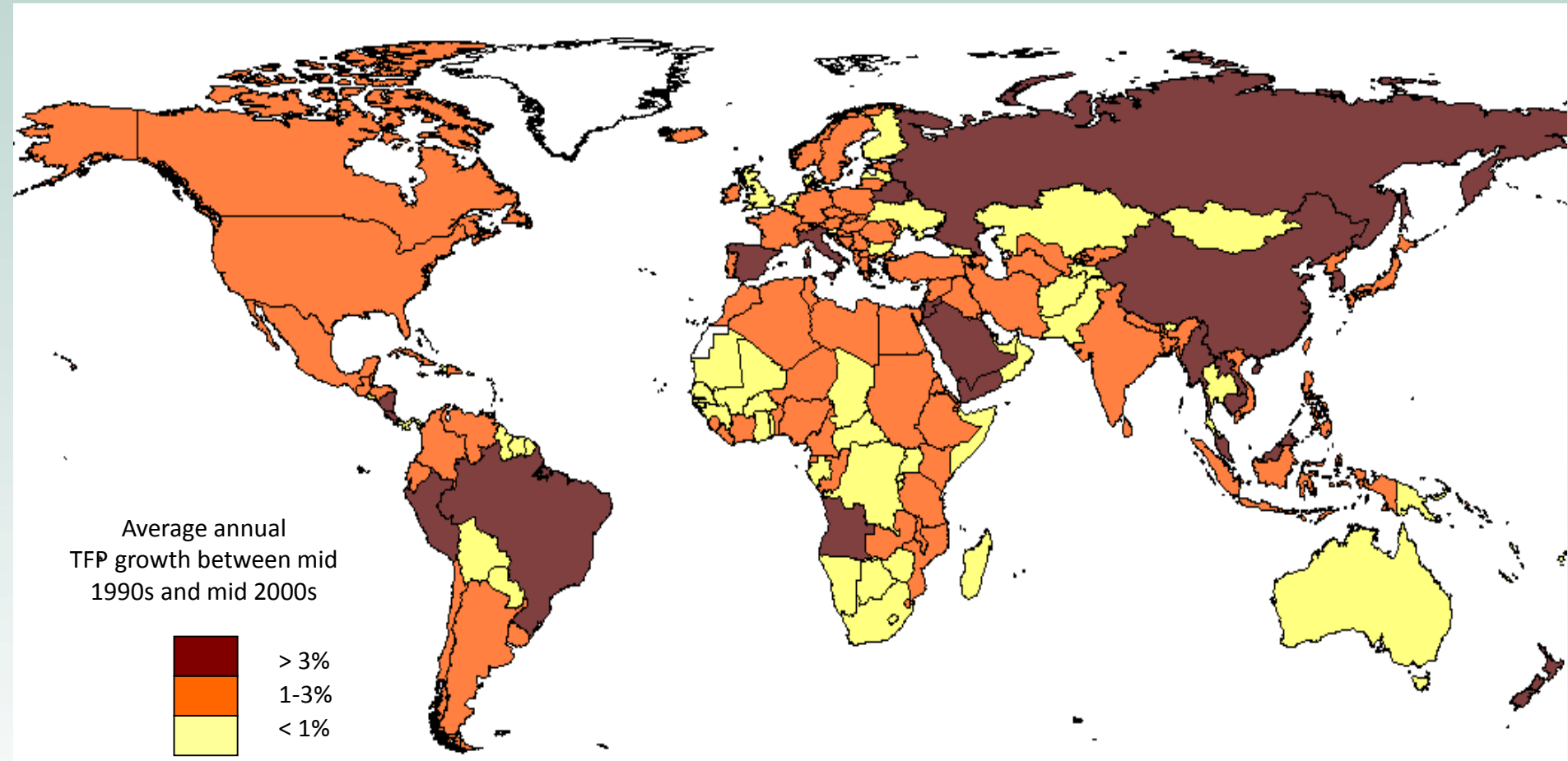
Source: Economic Research Service



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Through robust overall, agricultural TFP growth is uneven across countries



Source: Fuglie and Wang (2012)

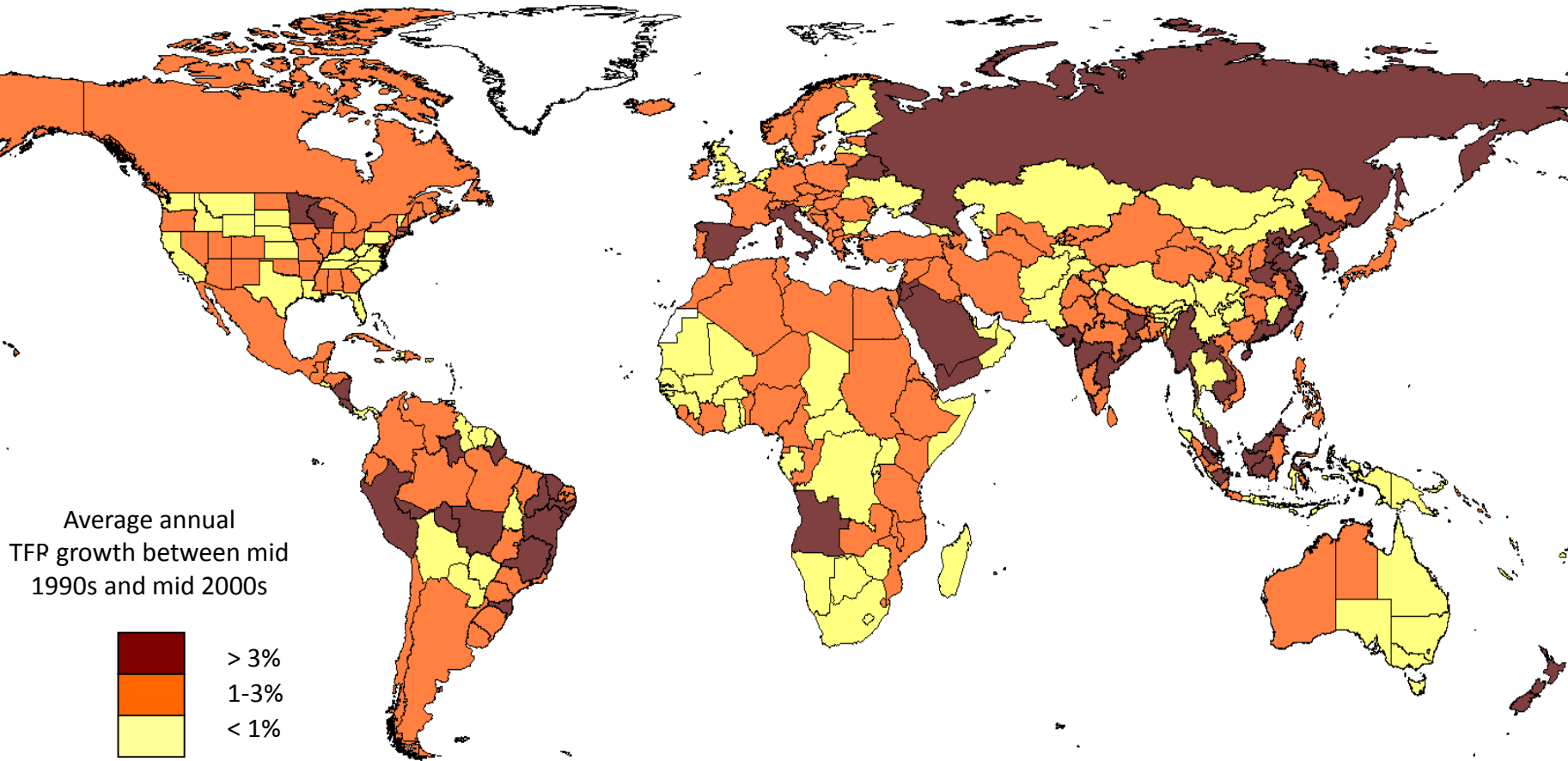


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Agricultural TFP growth varies even within countries

- Suitability of new technology, connection to markets, resource degradation



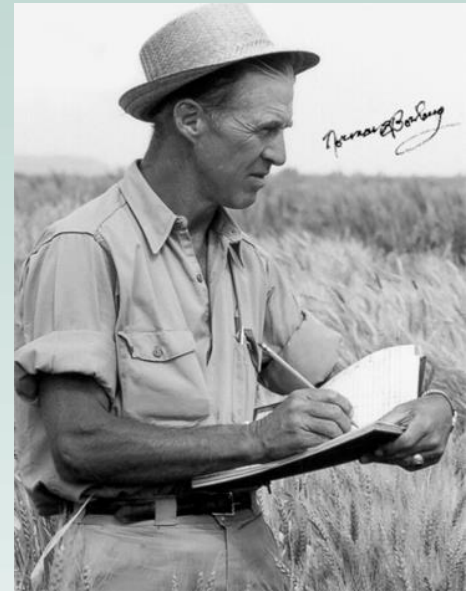
Source: Fuglie and Wang (2012)



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What does the future hold? Malthus v. Borlaug



In the 20th Century: productivity gains outpaced population growth

In the 21st Century: productivity could be reversed by climate change, while food and biofuel demand is projected to continue to grow. National capacities in agricultural research, education and extension will need to be significantly strengthened for Borlaug to stay ahead of Malthus.



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References and further reading

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