

Pakistan agriculture sector challenges, policy interventions and ACIAR's policy research

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A photograph of four farmers working in a rice paddy field. They are wearing traditional conical hats and are bent over, planting rice seedlings in the water. The field is muddy and filled with young rice plants. In the background, there are green rice plants and a blue sky with some clouds.

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AUSTRALIAN CENTRE FOR INTERNATIONAL AGRICULTURAL RESEARCH

Outline

- Overview of ACIAR
- Global challenges and ACIAR's contribution
- Importance of the agriculture sector in Pakistan and the issues and challenges the sector faces
- Desired policy interventions and management options
- Research focus of ADP program and research activities including in Pakistan
- Lessons and recommendations

The ACIAR logo is displayed in a large, light green, sans-serif font at the bottom right of the slide. It consists of the letters 'ACIAR' in all caps. The background of the slide features a green geometric pattern of overlapping triangles and lines in the bottom left corner.

What is ACIAR?

- A statutory authority within the Australian Government's Foreign Affairs and Trade portfolio
- Part of Australia's Aid Program, with the objectives of advancing Australia's national interest through poverty reduction and sustainable development
- A research funder and manager

The logo for ACIAR (Australian Centre for International Agricultural Research) is located in the bottom left corner. It consists of a green square containing a stylized, abstract pattern of white and green geometric shapes, possibly representing agricultural fields or a molecular structure.

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Pressing global challenges

- Developing more sustainable food systems
- Using less land, water, nutrients & energy per unit output
 - increasing productivity
- Conserving biodiversity and improving livelihoods
- Decoupling economic growth from carbon emissions
- Adapting to an increasingly difficult climate
- Shifting from fossil fuels to renewable energy
- Doing all of this simultaneously

OUT OF A WORLD POPULATION OF **7 BILLION**



About **2 billion** people suffer from micronutrient malnutrition



Nearly **800 million** people suffer from calorie deficiency

OUT OF **5 BILLION** ADULTS WORLDWIDE



Nearly **2 billion** are overweight or obese



One in 12 has type 2 diabetes

OUT OF **667 MILLION** CHILDREN UNDER AGE 5 WORLDWIDE



159 million under age 5 are too short for their age (stunted)

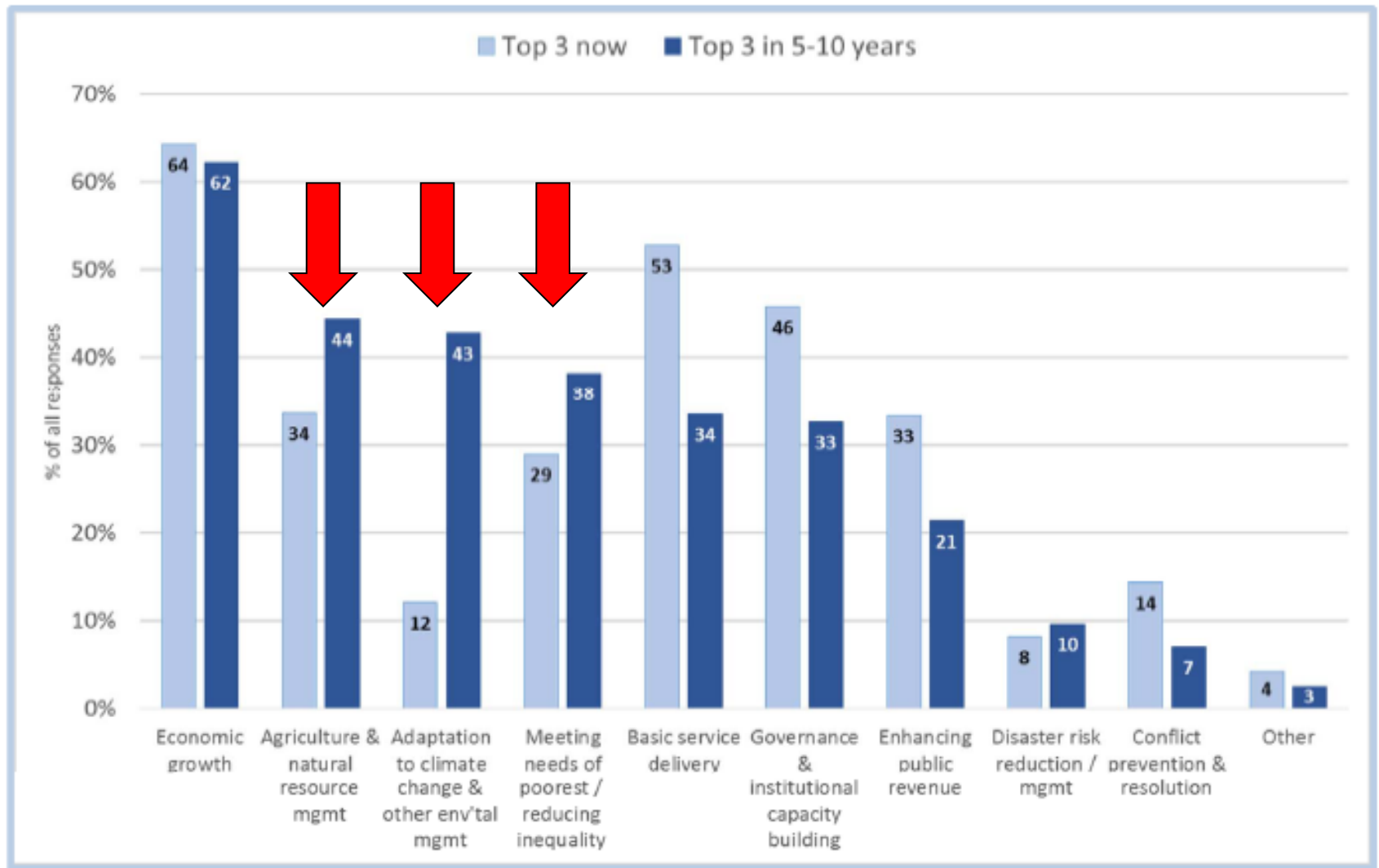


50 million do not weigh enough for their height (wasted)

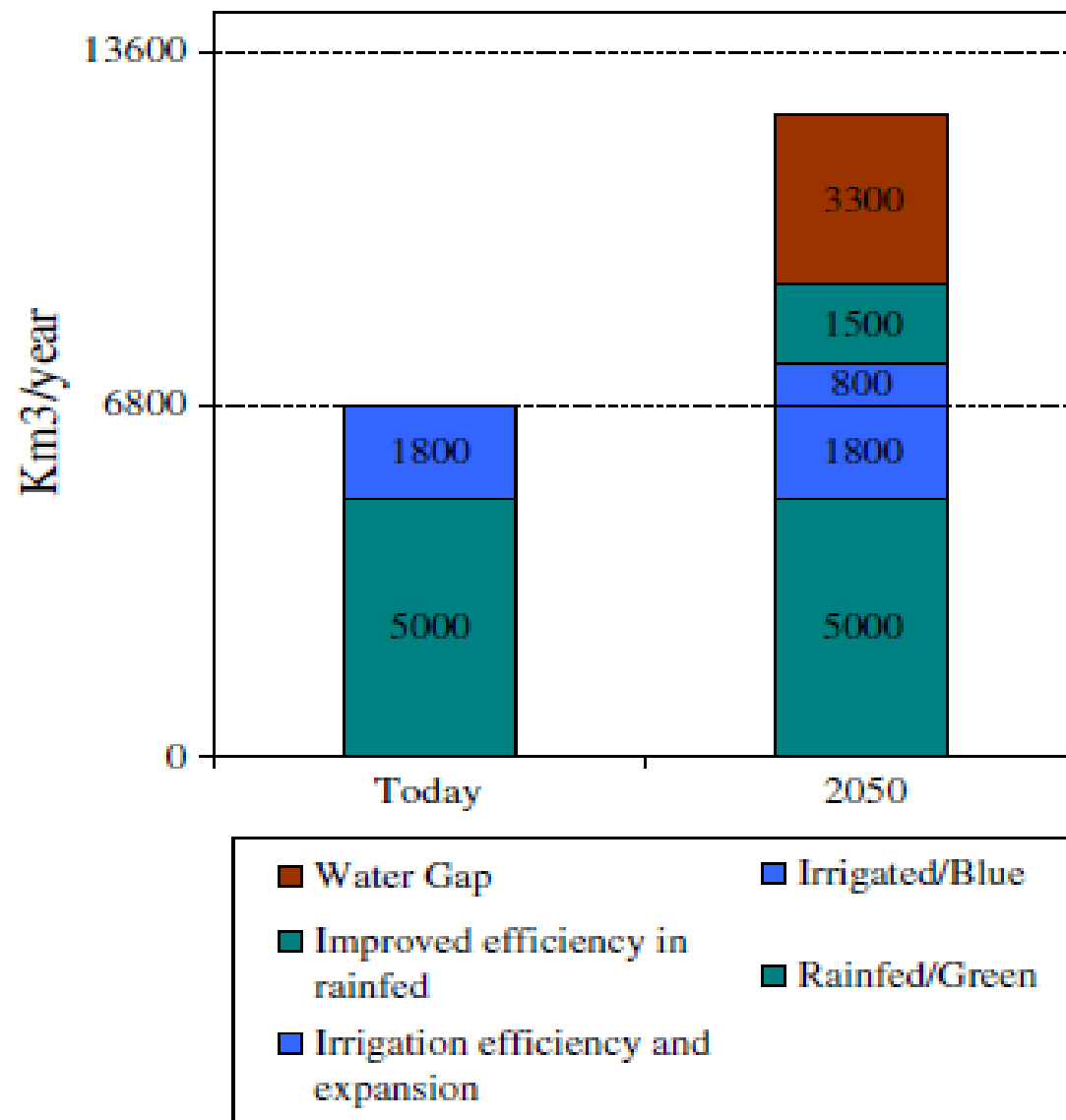


41 million are overweight

3 main development challenges now and in 5-10 years



From Davies, R. and J. Pickering (2015), "Making Development Cooperation Fit for the Future: A Survey of Partner Countries", *OECD Development Cooperation Working Papers*, No. 20, OECD Publishing.

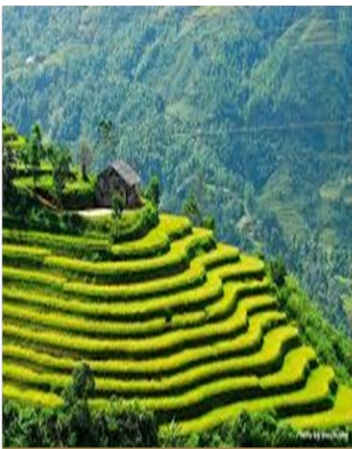


Referred in Hanjra and Qureshi (2010), Global water crisis and future food security in an era of climate change, *Food Policy*, 35(5): 365-377.

ACIAR is responding...

A new Strategic Plan 2017-2027 being prepared that will include:

1. Research portfolio is mostly sectoral, but grand challenges are cross-sectoral. So we are considering new programs on cross-cutting issues (e.g. climate, gender, value chains, human health and nutrition)
2. Capacity building – a wider range of approaches; increased investment, alumni network
3. Evaluating impacts – to be a world leader

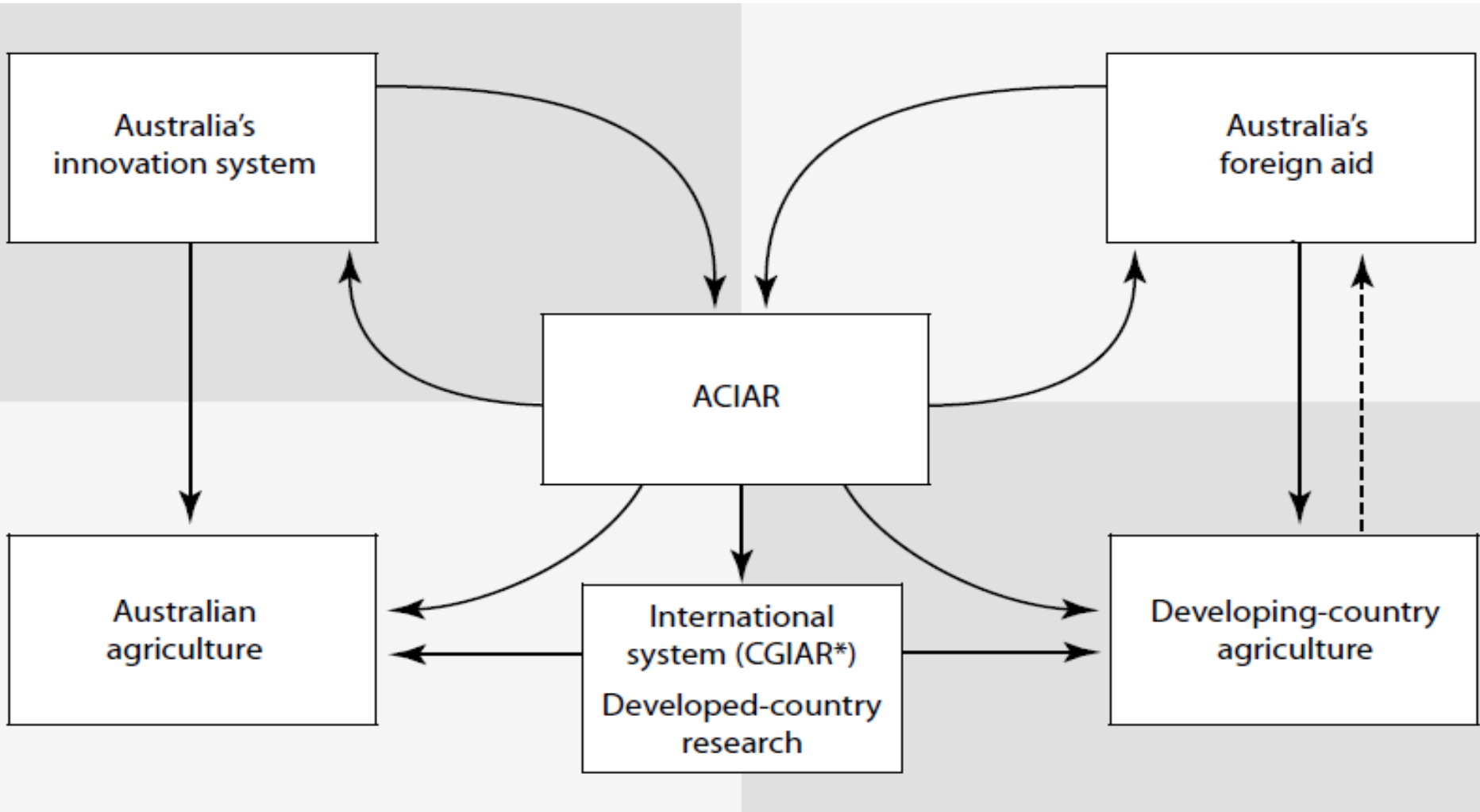


What we do?

- Commission research into improving sustainable agricultural production in developing countries – bilateral and multilateral projects
- Pilot development activities related to research
- Fund project related capacity building
- Conduct impact assessments
- Communicate the results of research
- Administer Australia's contribution to the International Agricultural Research Centres



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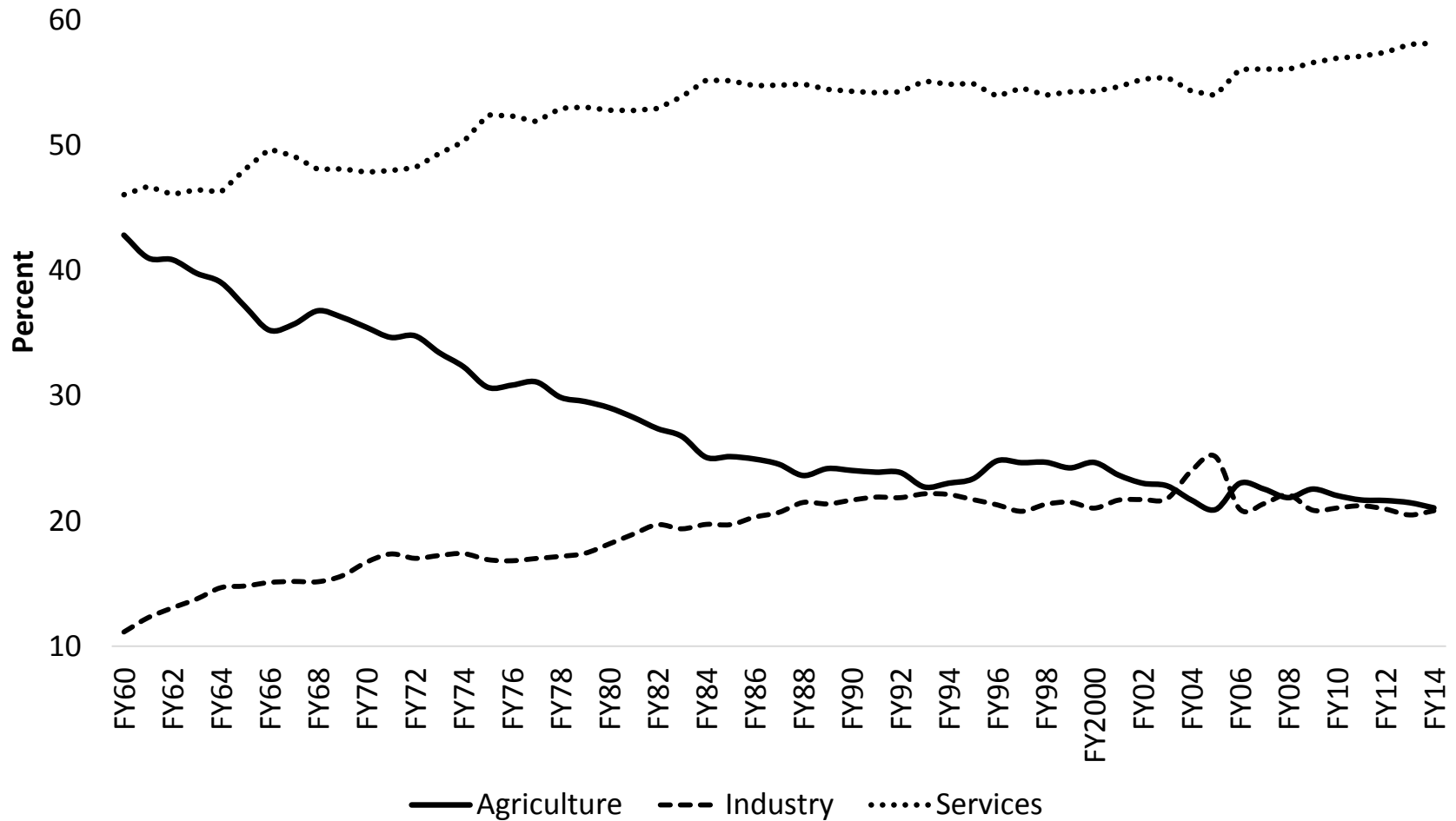


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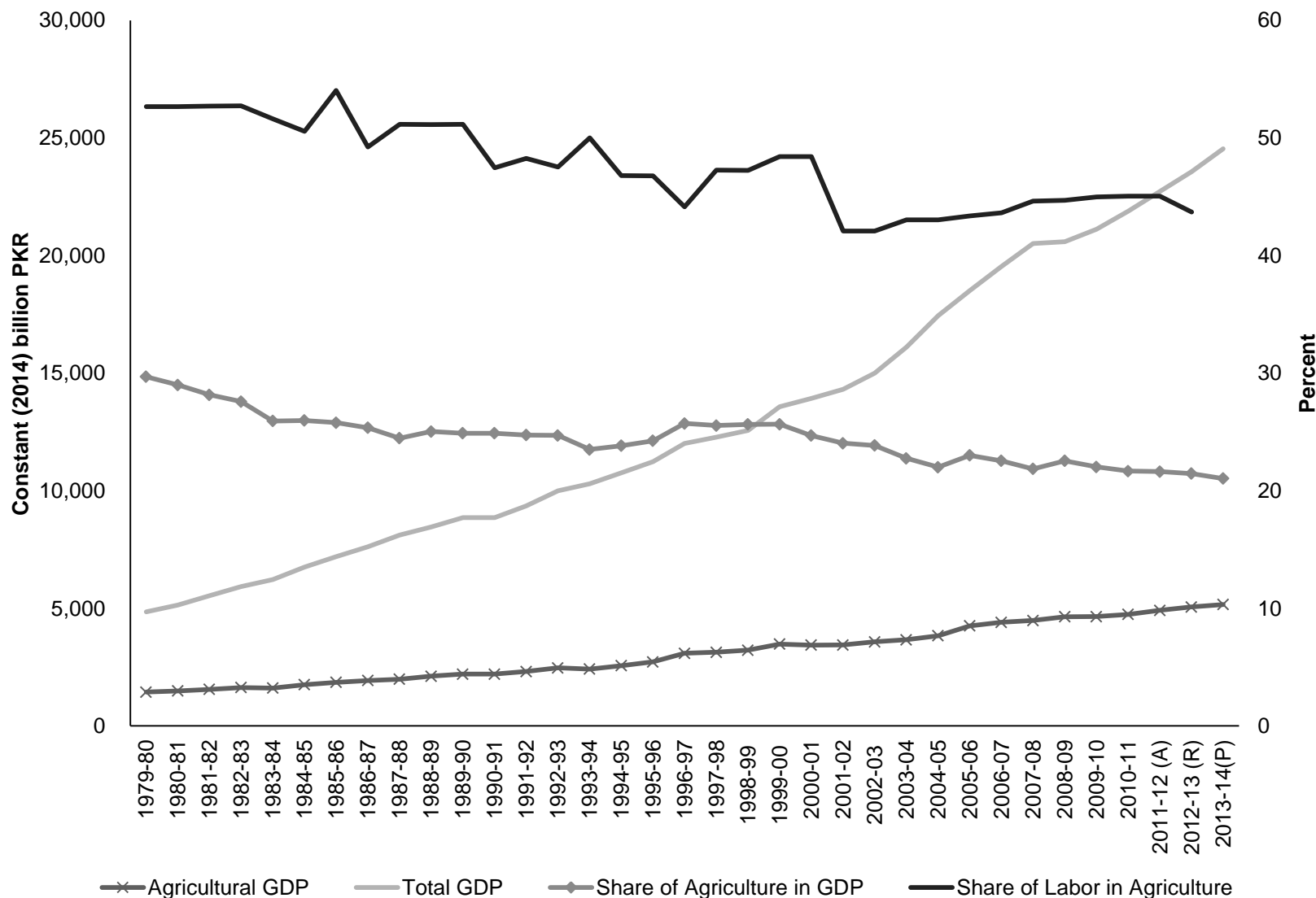
Importance of agriculture sector in Pakistan - facts

- Share of agriculture in GDP is about 20% (since 2010) from about 40% (in early 60s)
- Combined share of industrial and services sectors is more than 80%
- Livelihoods of about half of the country's population, employing approximately 24 million people
- Foreign earnings (cotton, rice and leather plus cotton textiles and ready made garments) 38% of the total export earnings
- Rural non farm income (from early to mid 2000s) contributed between 40 and 57% to the total rural household income

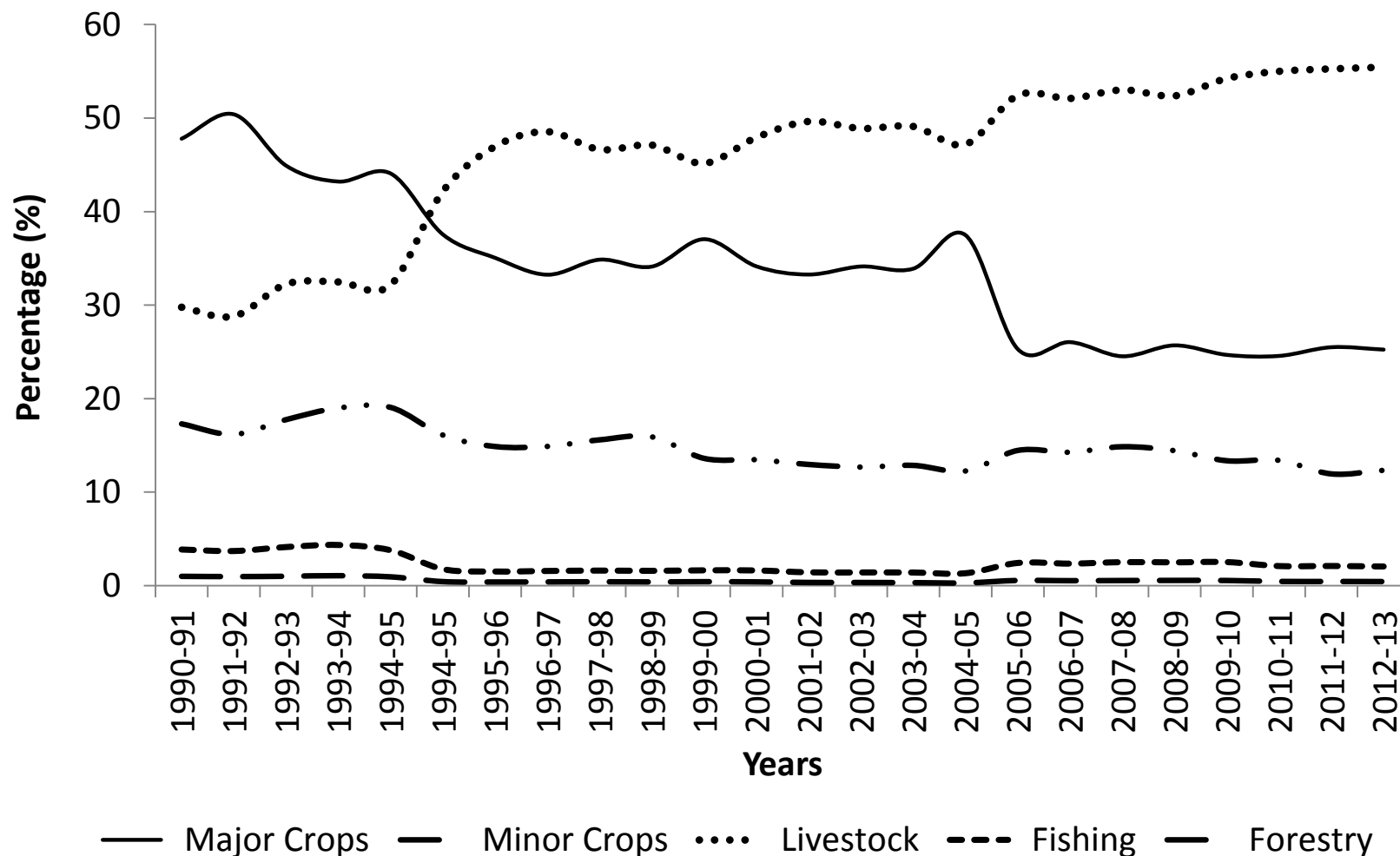
Sector-wise share in national GDP at factor cost



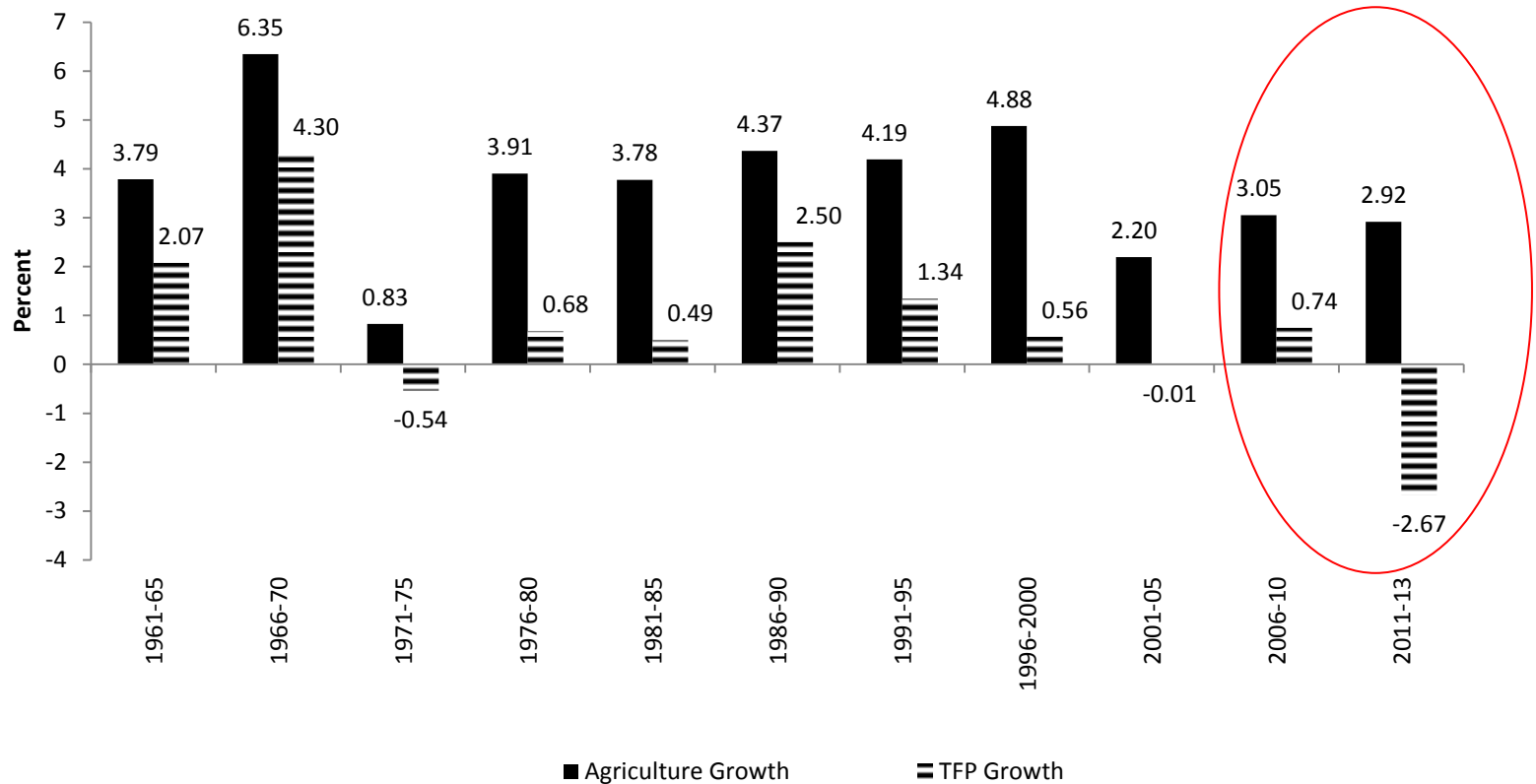
GDP, agricultural GDP, and share of labor in agriculture in Pakistan, FY 1980–2014



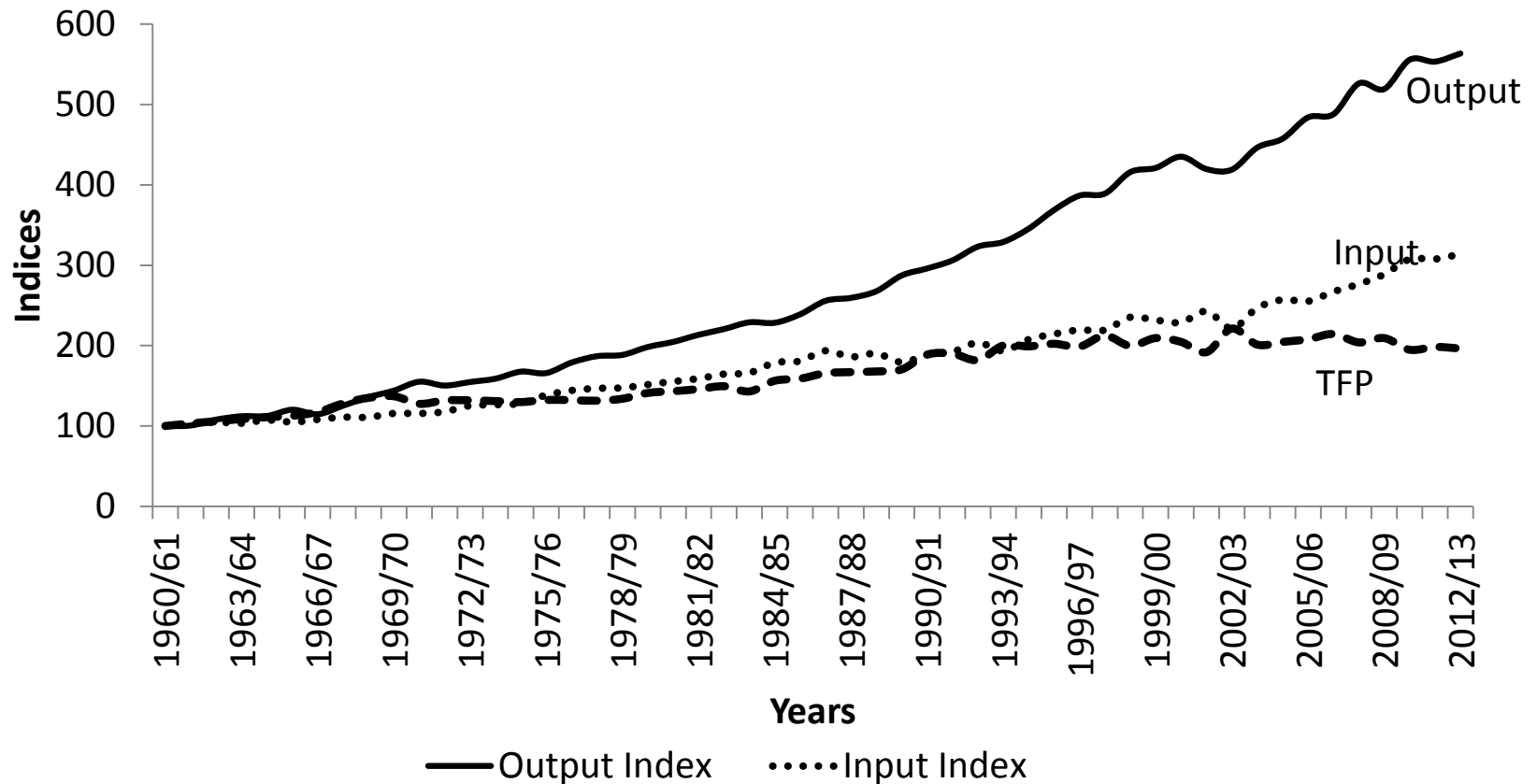
Sub-sectoral shares in agricultural GDP, 1990–2013



Agricultural and TFP growth rates, Pakistan, 1961–1965 to 2011–2013



Agricultural input, output and total factor productivity growth, Pakistan, 1960/61–2012/13

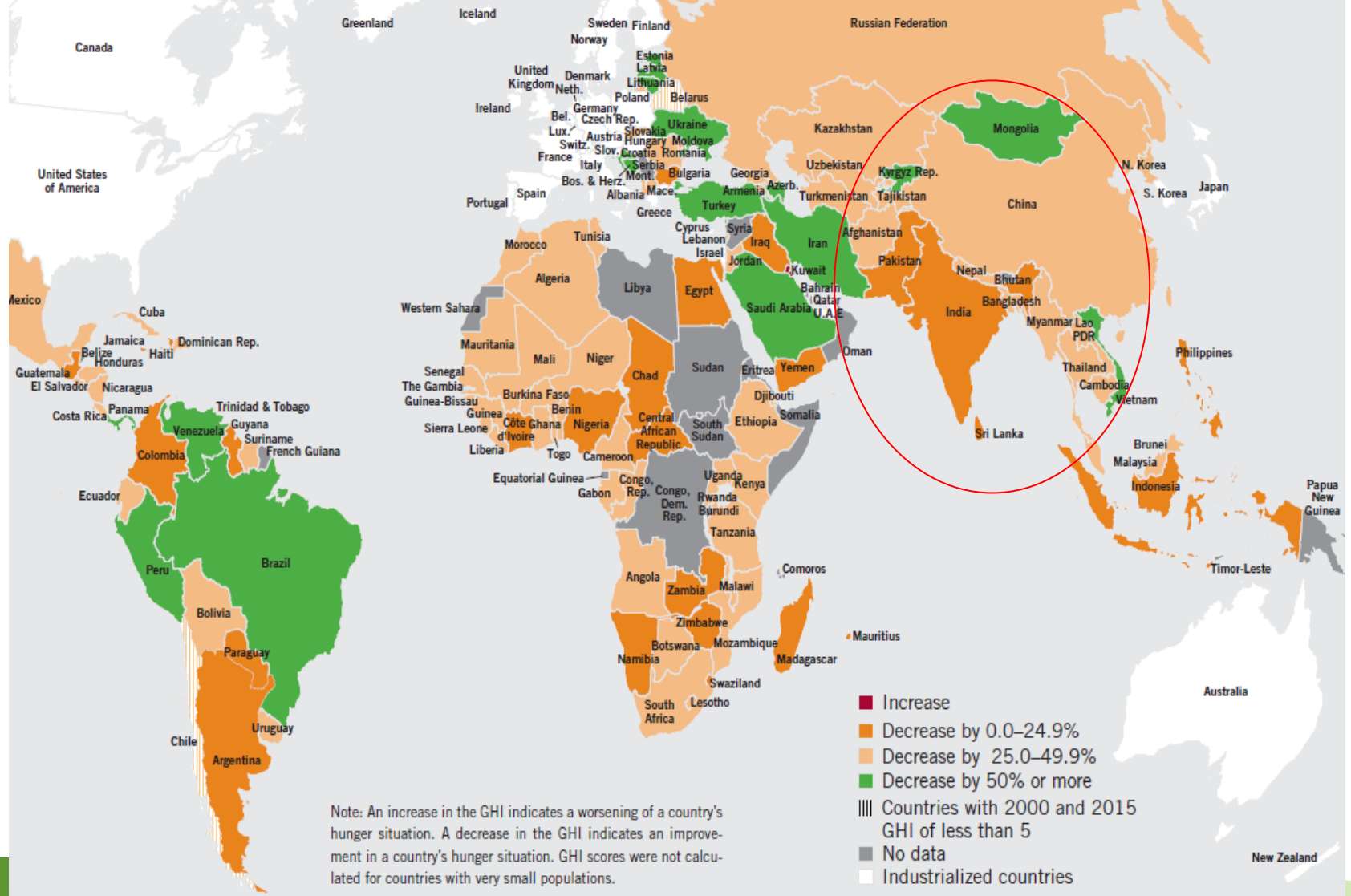


Agriculture sector development issues

- Agri sector growth-rate in 90s at 4.4% but slowed to just 2.6% of GDP in 2000-2012
- There is not great welfare improvement and poverty remains high in the agriculture sector/rural economy (close to 30%)
- Food security is becoming a major issue
- Some 30% of the population is undernourished
- The livelihood of about 50% of the population still depends on agriculture

FIGURE 2.2 COUNTRY PROGRESS IN REDUCING GHI SCORES

Percentage change in 2015 GHI compared with 2000 GHI



SOUTH, EAST, AND SOUTHEAST ASIA

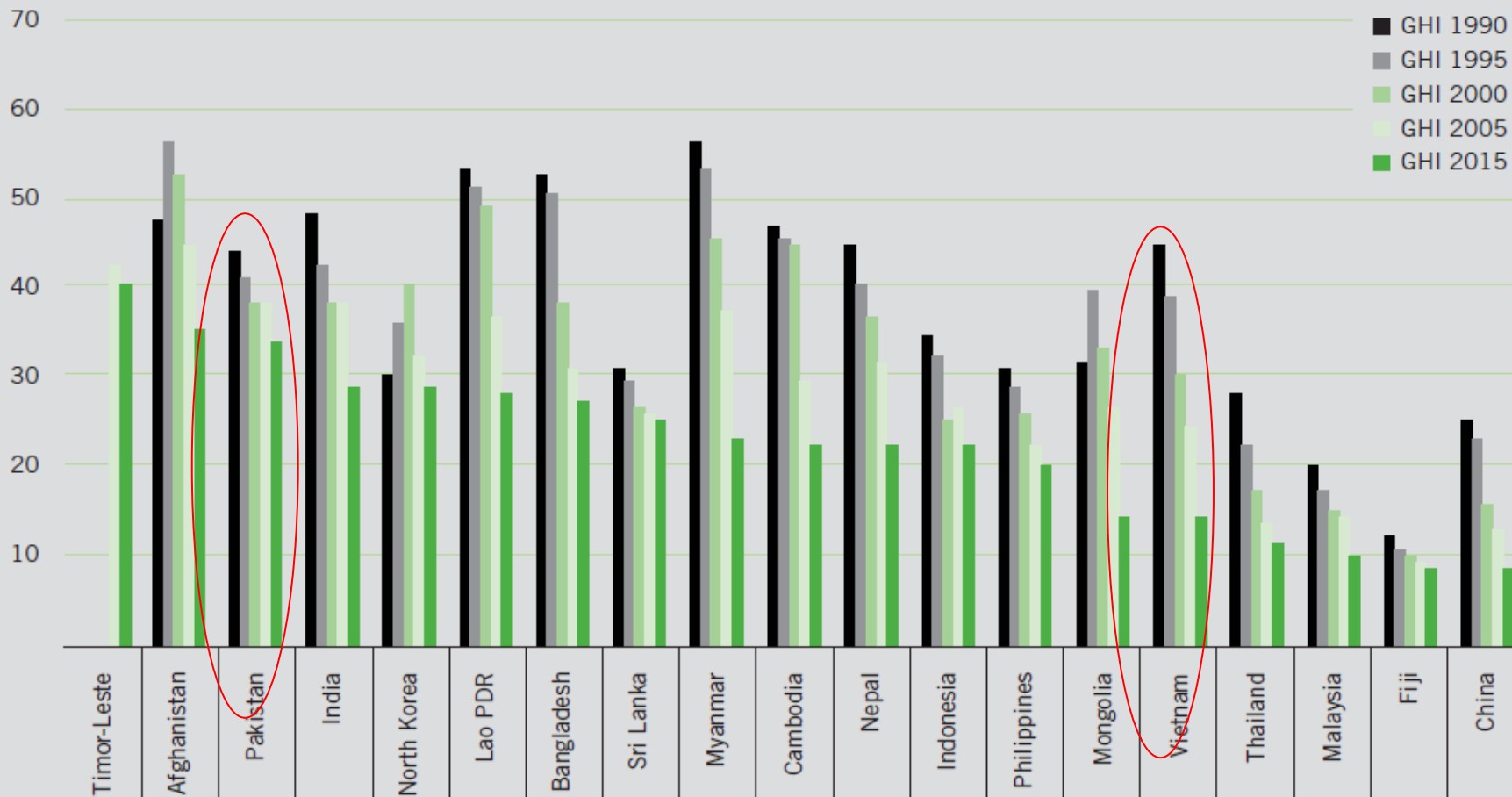


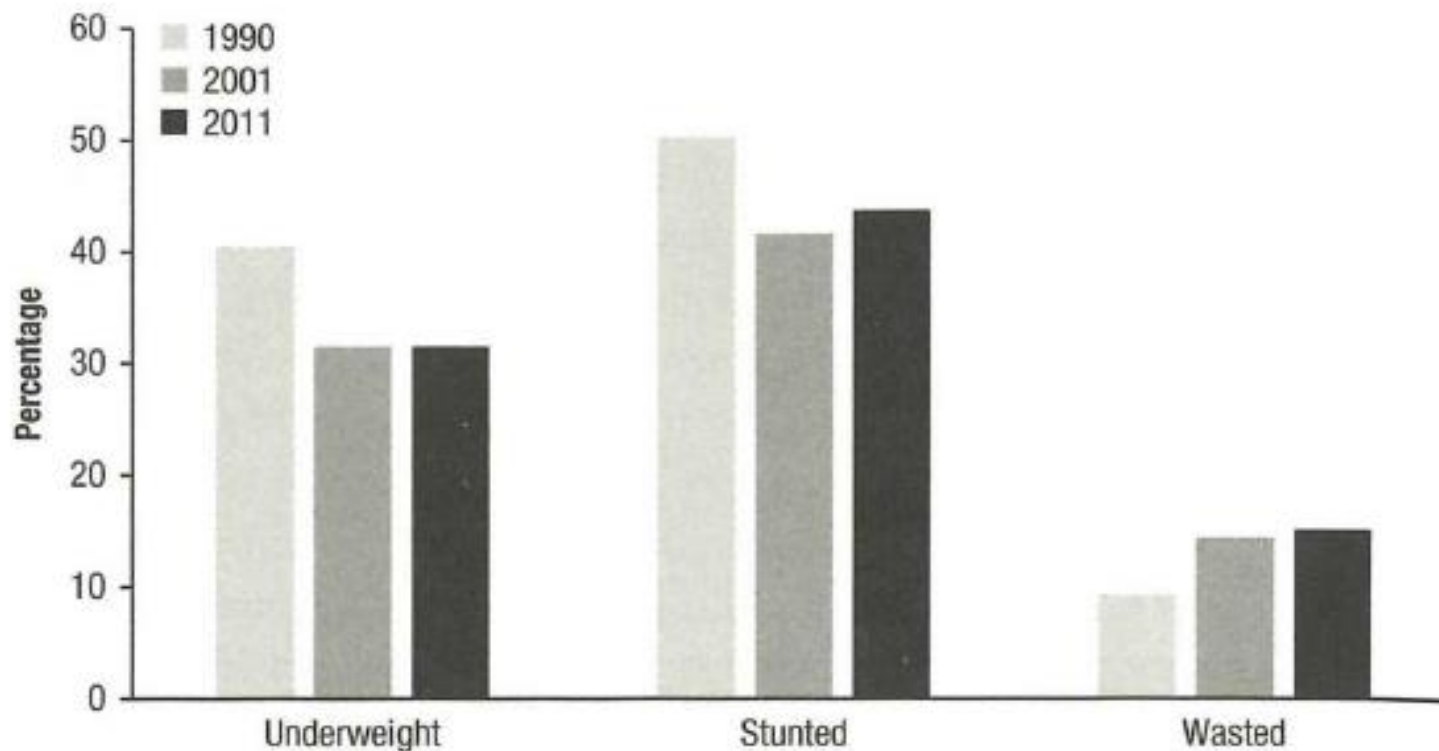
TABLE 3 Global Hunger Index scores (various years), ranked by 2016 country scores

| Rank ^a | Country | 1992 | 2000 | 2008 | 2016 |
|-------------------|------------|------|------|------|------|
| 107 | Pakistan | 43.4 | 37.8 | 35.1 | 33.4 |
| 29 | China | 26.4 | 15.9 | 11.5 | 7.7 |
| 64 | Viet Nam | 41.5 | 30.2 | 22.1 | 14.5 |
| 90 | Bangladesh | 52.4 | 38.5 | 32.4 | 27.1 |

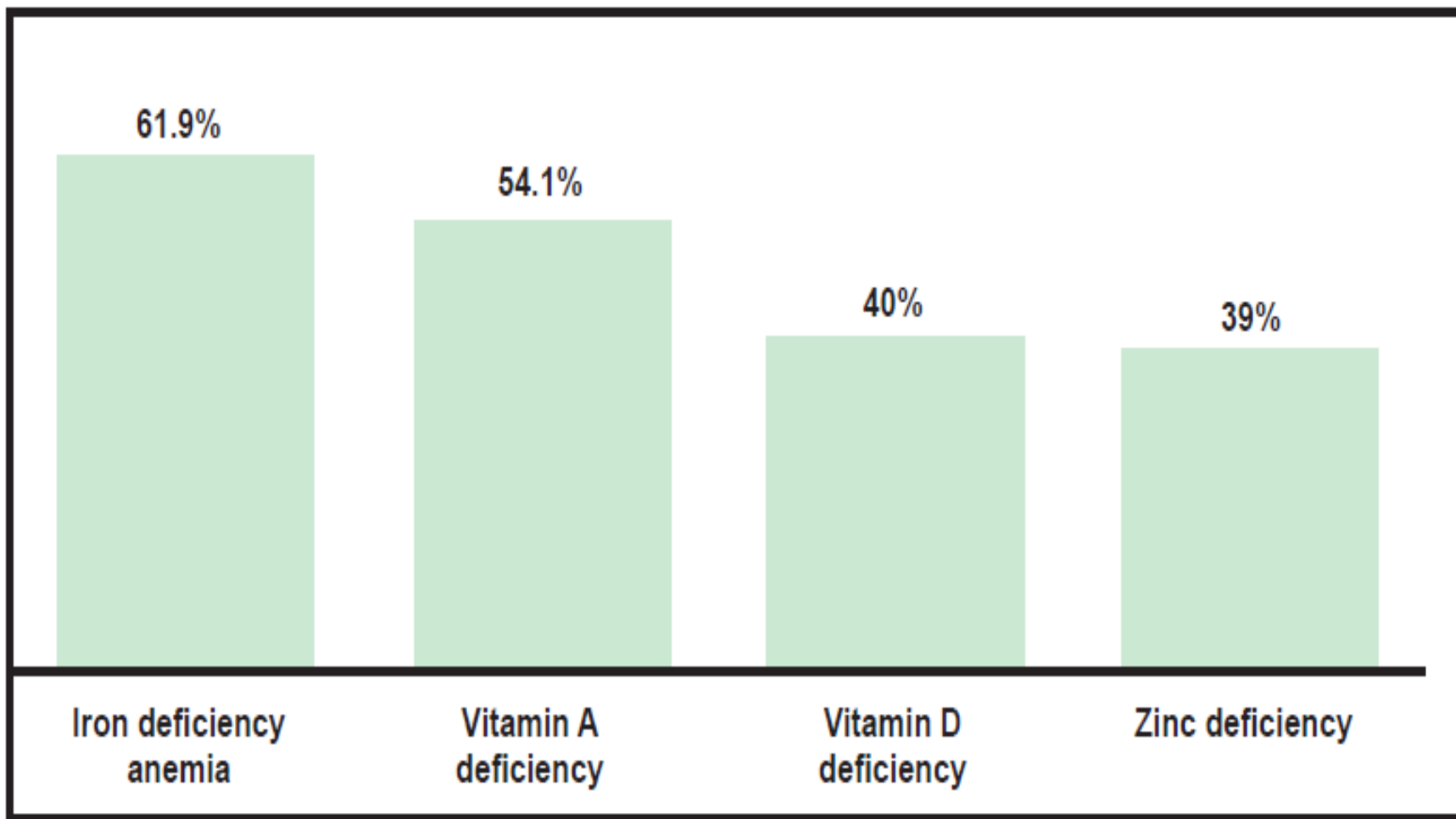
RECOMMENDED CITATION: International Food Policy Research Institute. 2017. *2017 Global Food Policy Report*. Washington, DC: International Food Policy Research Institute. <https://doi.org/10.2499/9780896292529>

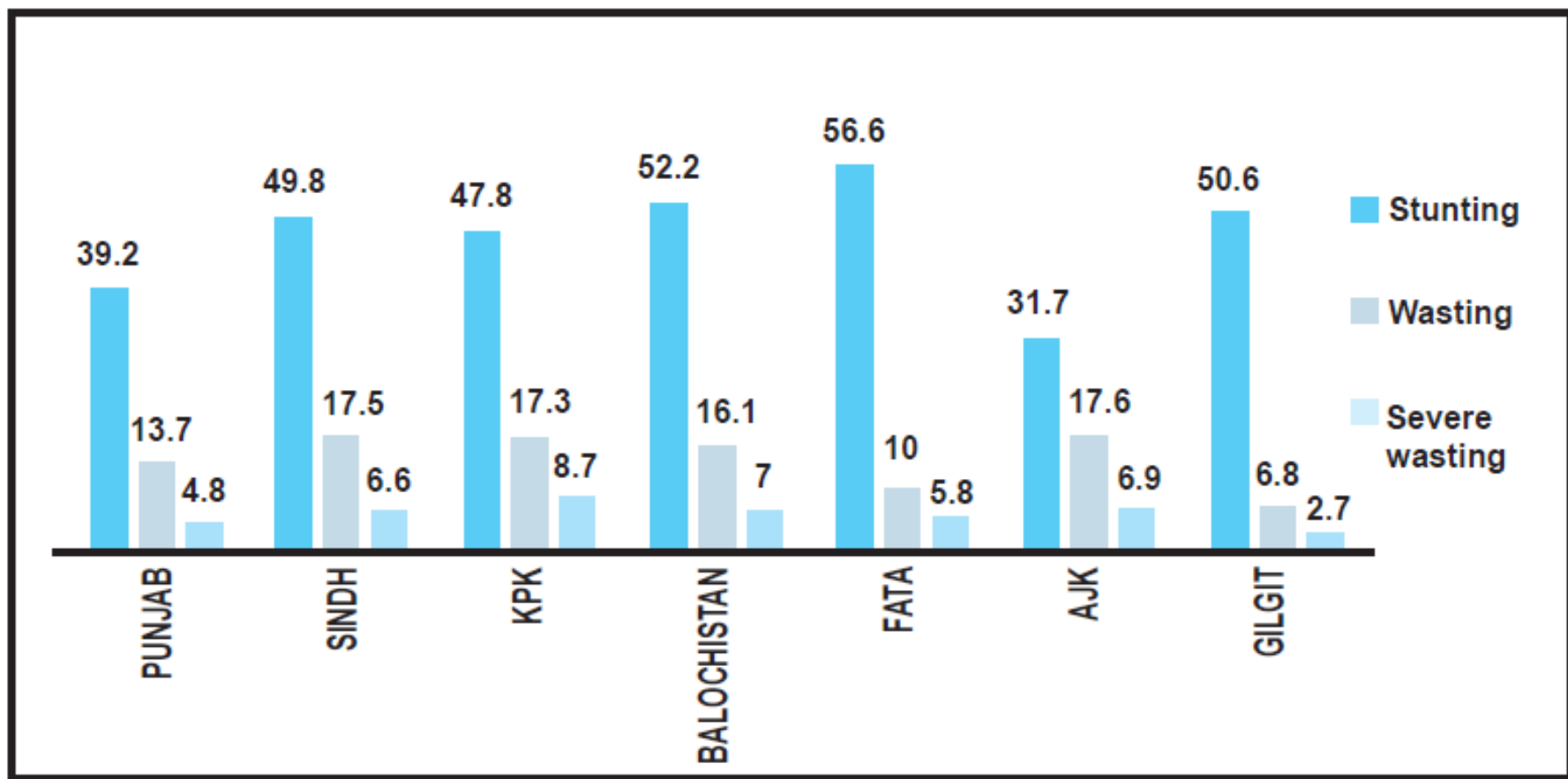
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FIGURE 3.4 Indicators of malnourishment in Pakistan, 1990–2011



Source: Authors, based on data from NNS (2011); NIPS (1992); PIDE (2001, 2002, 2010).





Agriculture sector issues and challenges

- Stagnating crop yields with wide gaps between progressive and average farmers
- Poor quality and inadequate supply of inputs and lack of infrastructure
- Under-performance of rural factor and input markets
- High pre and post-harvest losses
- Declining investment including in research, development and extension
- Frequent insect and pest attacks and high incidence of crop and livestock diseases
- Lack of capital and financial resources
- Lack of international competitiveness of some agricultural commodities
- Low crop diversification
- Highly skewed distribution of farm size and low economy of size and scale
- Inadequate supply of water and the inefficient use of available water resources
 - Gap between Operation and Maintenance (O&M) expenditure and revenue collection is 68%, 80% and 77% for Punjab, Sindh and KPK, respectively

Predominantly Small Farms - The Total Number of Under 5 Acres Farms has More than Tripled since 1960

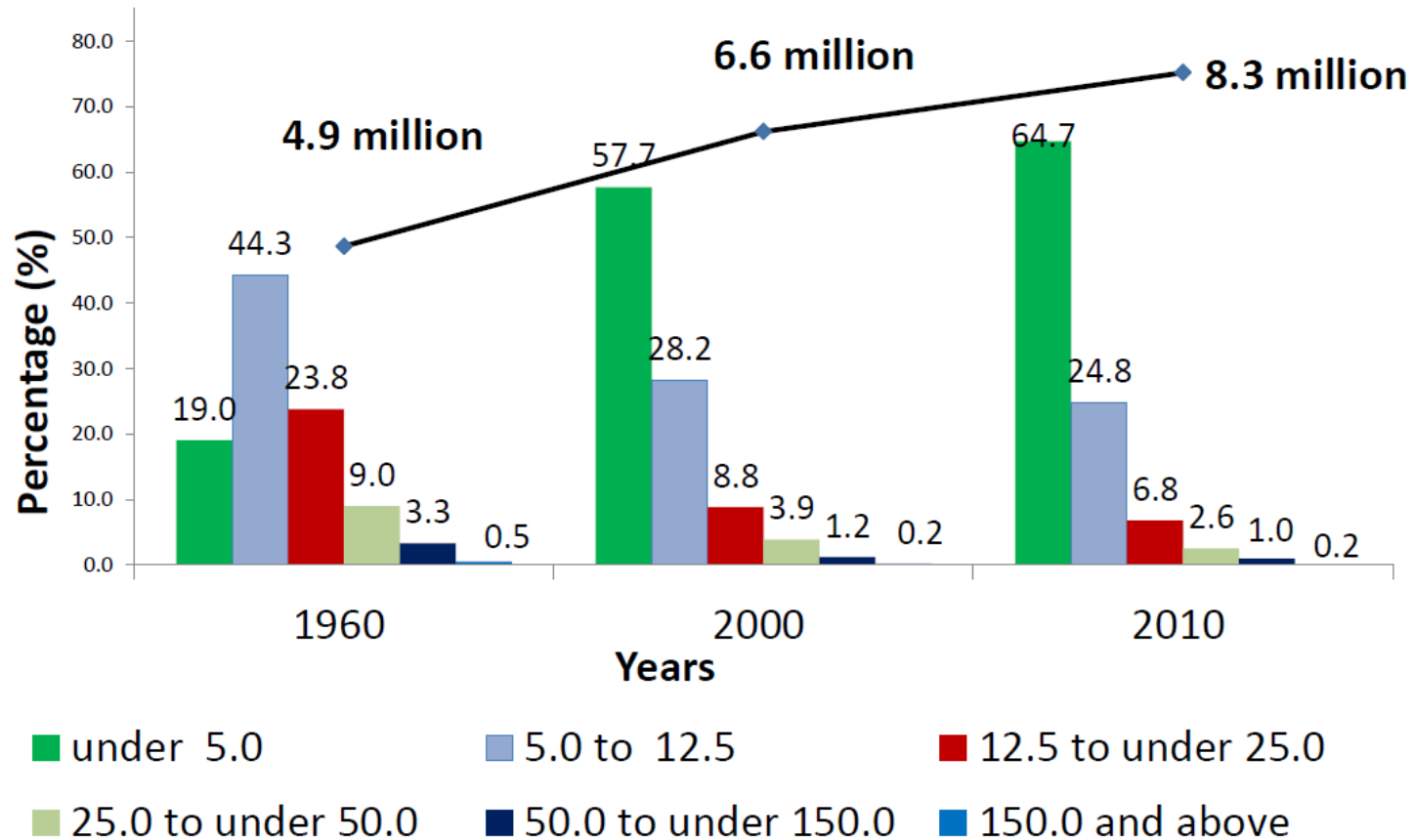
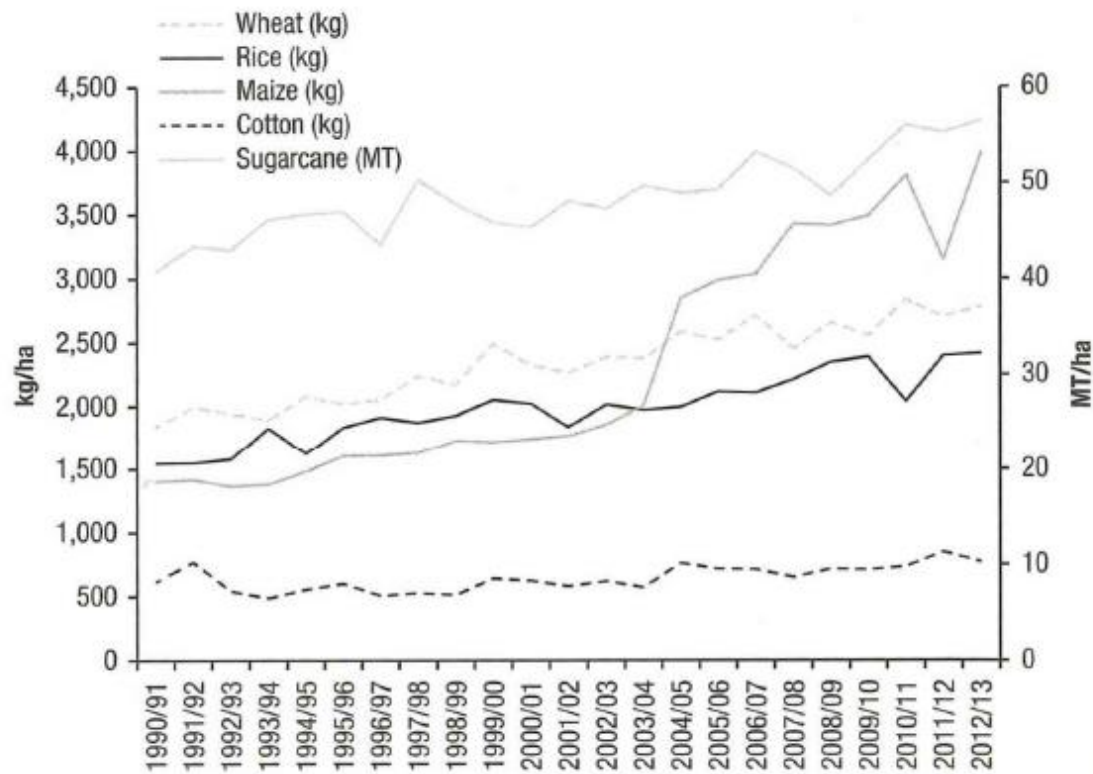


FIGURE 2.4 Yield per hectare of major crops and maize, 1990/1991–2012/2013



Source: Authors, based on data from GoP (2013).

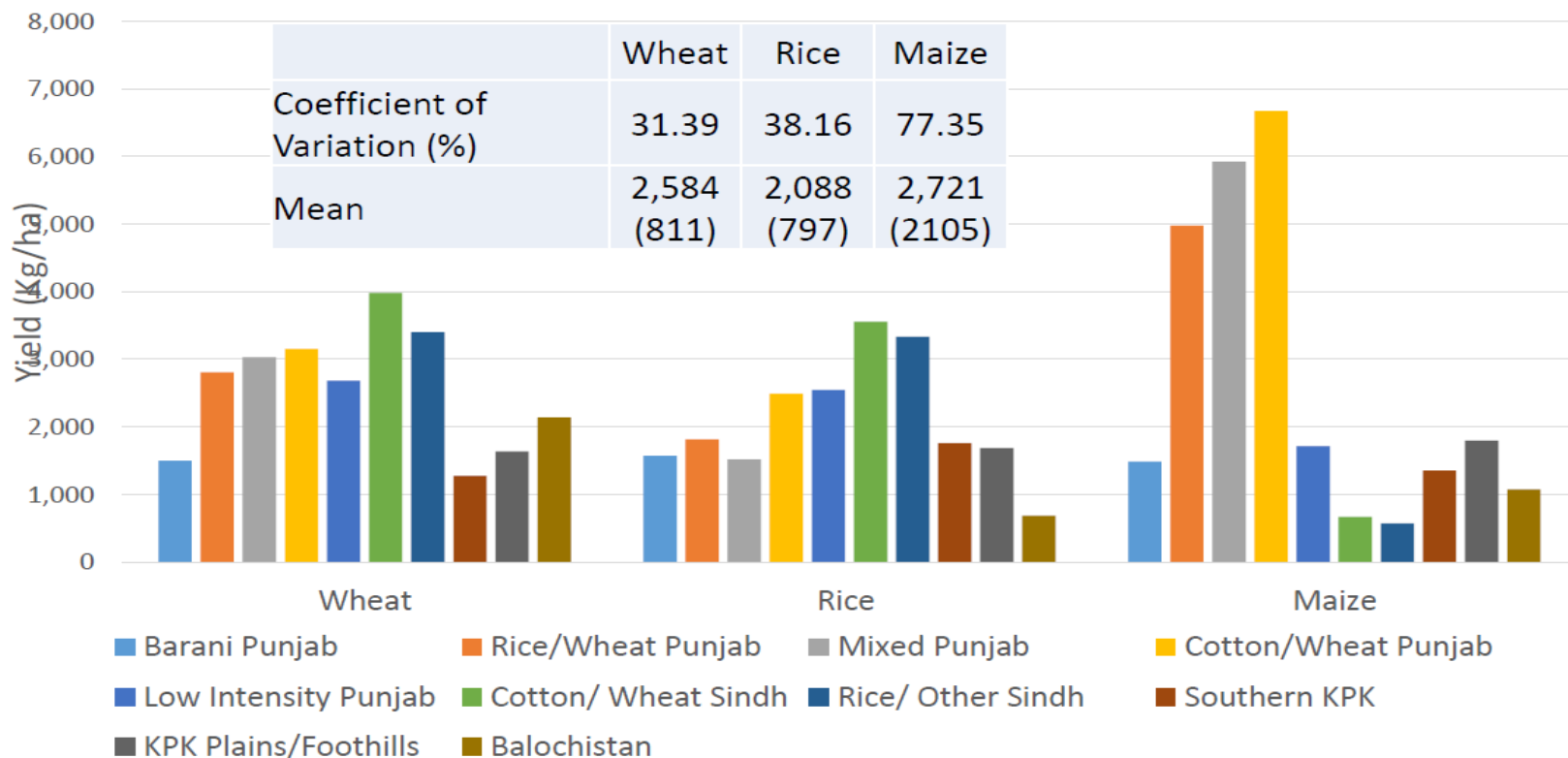
Note: kg = kilograms; ha = hectares; MT = metric tons.

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Table II *Pakistan's major crop yields to world average yields Nominal ratios (1990-2007)*

| Year | Seed Cotton | Potato | Wheat | Chic-pea | Rice | Sugar Cane | Maize |
|------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| 1990 | 1.13 | 0.69 | 0.71 | 0.79 | 0.66 | 0.67 | 0.38 |
| 1991 | 1.34 | 0.72 | 0.75 | 0.69 | 0.66 | 0.67 | 0.39 |
| 1992 | 1.05 | 0.75 | 0.78 | 0.72 | 0.66 | 0.71 | 0.35 |
| 1993 | 0.93 | 0.74 | 0.77 | 0.52 | 0.76 | 0.72 | 0.38 |
| 1994 | 1.02 | 0.89 | 0.77 | 0.55 | 0.67 | 0.75 | 0.36 |
| 1995 | 1.13 | 0.89 | 0.83 | 0.66 | 0.75 | 0.74 | 0.42 |
| 1996 | 0.95 | 0.81 | 0.78 | 0.86 | 0.76 | 0.75 | 0.38 |
| 1997 | 0.99 | 0.69 | 0.76 | 0.70 | 0.74 | 0.67 | 0.39 |
| 1998 | 0.99 | 0.85 | 0.83 | 0.90 | 0.76 | 0.77 | 0.39 |
| 1999 | 1.19 | 1.08 | 0.79 | 0.84 | 0.79 | 0.72 | 0.40 |
| 2000 | 1.13 | 1.04 | 0.92 | 0.74 | 0.78 | 0.72 | 0.41 |
| 2001 | 1.00 | 1.04 | 0.85 | 0.60 | 0.70 | 0.71 | 0.40 |
| 2002 | 1.07 | 0.99 | 0.84 | 0.49 | 0.78 | 0.74 | 0.43 |
| 2003 | 0.97 | 1.02 | 0.89 | 0.95 | 0.75 | 0.72 | 0.45 |
| 2004 | 1.13 | 1.01 | 0.81 | 0.78 | 0.74 | 0.76 | 0.58 |
| 2005 | 1.03 | 1.07 | 0.91 | 0.96 | 0.78 | 0.70 | 0.62 |
| 2006 | 0.98 | 0.80 | 0.90 | 0.59 | 0.77 | 0.73 | 0.61 |
| 2007 | 0.93 | 1.19 | 0.99 | 0.98 | 0.77 | 0.75 | 0.65 |
| AVE | 1.05 | 0.90 | 0.83 | 0.74 | 0.74 | 0.72 | 0.44 |

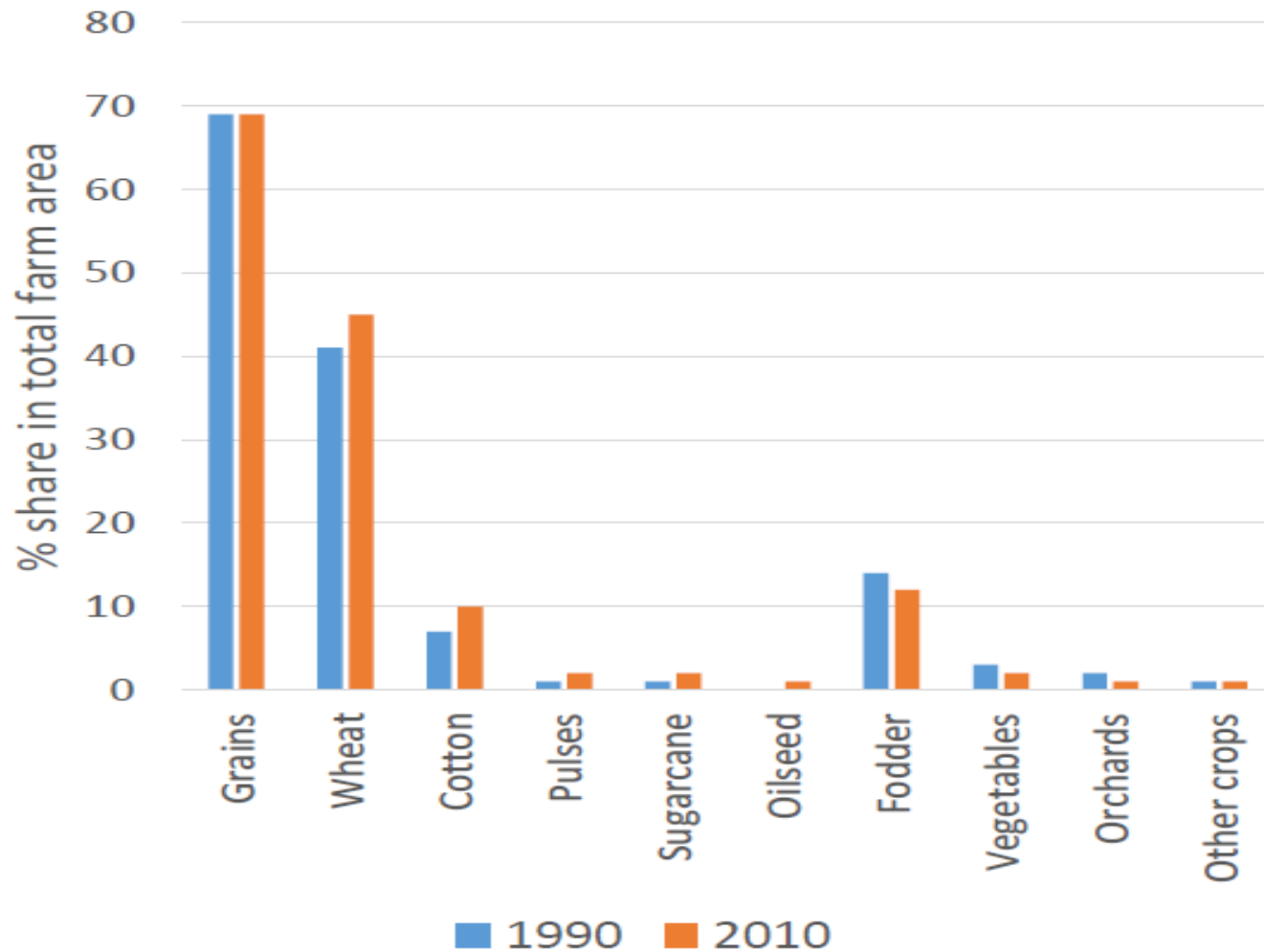
Large variability of Crop Yields across Agro-climatic Zones in Pakistan 2010-11



Source: Computed from HIES (2010-11)

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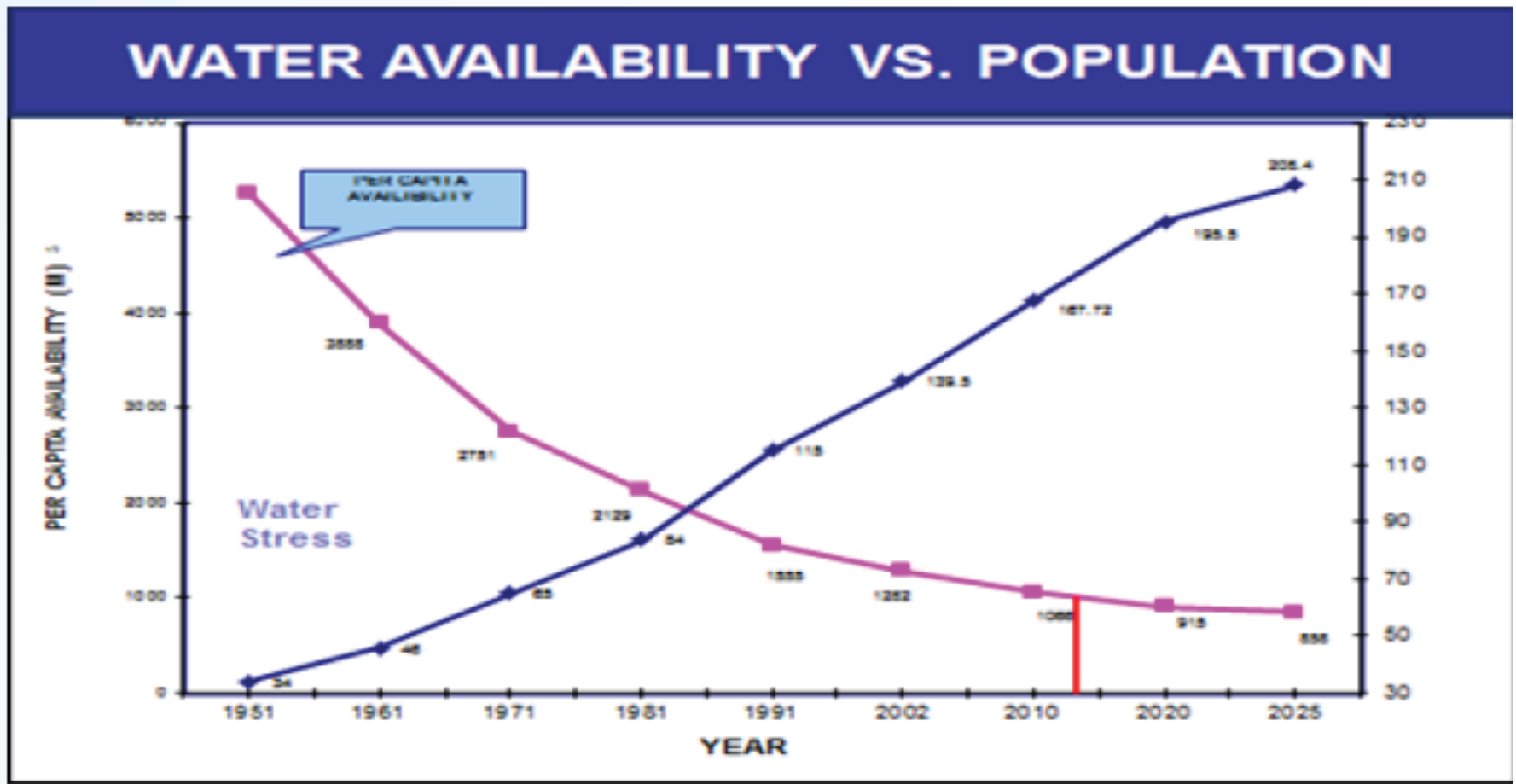
Limited diversification



Source: Agriculture Census of Pakistan

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Water availability and population growth, 1951-2025 (Cubic meters)



Source: WWF-Pakistan, 2007

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| | |
|---|-----|
| Water Sources | MAF |
| Surface water reservoirs (Kalabagh, Basha, and Dassu) | 17 |
| Surface water reservoirs (12 small dams sites proposed) | 16 |
| Water lost in canals and distributaries | 21 |
| Water lost in minors | 5 |
| Water lost in water courses | 15 |
| Ground Water | 9 |
| Sub Total: | 83 |

Source: WAPDA (2010)

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| Year | Water Required (MAF) | Water Available at Farm Gate (Surface+ Groundwater) (MAF) | Shortage (MAF) |
|------|----------------------|---|----------------|
| 2000 | 149 | 109 | 40 |
| 2013 | 215 | 107 | 108 |
| 2025 | 277 | 126 | 151 |

Source: WAPDA (2010)



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Post harvest losses



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Postharvest Losses in Peaches (Swat)

| Crops | Post Harvest Losses (%) |
|-------------------|-------------------------|
| Fruits | |
| Citrus | 15 |
| Mango | 25 |
| Dates | 35 |
| Apple | 14 |
| Pear | 15 |
| Peach | 15 |
| Plum | 25 |
| Apricot | 25 |
| Other fruits | 24.4 |
| Vegetables | |
| Potato | 15.2 |
| Onion | 20 |
| Tomato | 40 |
| Other vegetables | 30.5 |

Ibrahim & Anwar, 2004, Horticulture Education, Extension & Training System in Pakistan

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Requirement of Processing Units

(000)Tones

| Commodity | Production (2009-10) | Marketable Volume @ 75% of Production | Export (2009-10) | Export Potential | Existing No. of Units | Total Annual Existing Capacity ¹ | Gap V/S available capacity | No. of Units Required |
|----------------------------------|----------------------|---------------------------------------|------------------|------------------|-----------------------|---|----------------------------|-----------------------|
| Citrus | 2395 | 1796 | 361 | 400 | 110 | 495 | -95 | |
| Mango | 1875 | 1406 | 85 | 200 | 9# | 27 | 173 | 23 ² |
| Dates (fresh & dried) | 575 | 431 | (6+1 15) | (25+12 5) | 19 ³ | 10 ³ | 15 | 15 ³ |
| Seasonal Vegetables | 3508 | 2631 | 86 | 120 | 0 | 0 | 100 | 17 ⁴ |

¹ Based at full operation, ² Based on 5-10 tons/hr capacity,

³ For fresh Dates based on 1 ton/hr capacity, ⁴ Based on 3 ton/hr capacity

Including projects being supported by FIRMS-USAID

Lack of storage facilities for horticulture products

(000Tons)

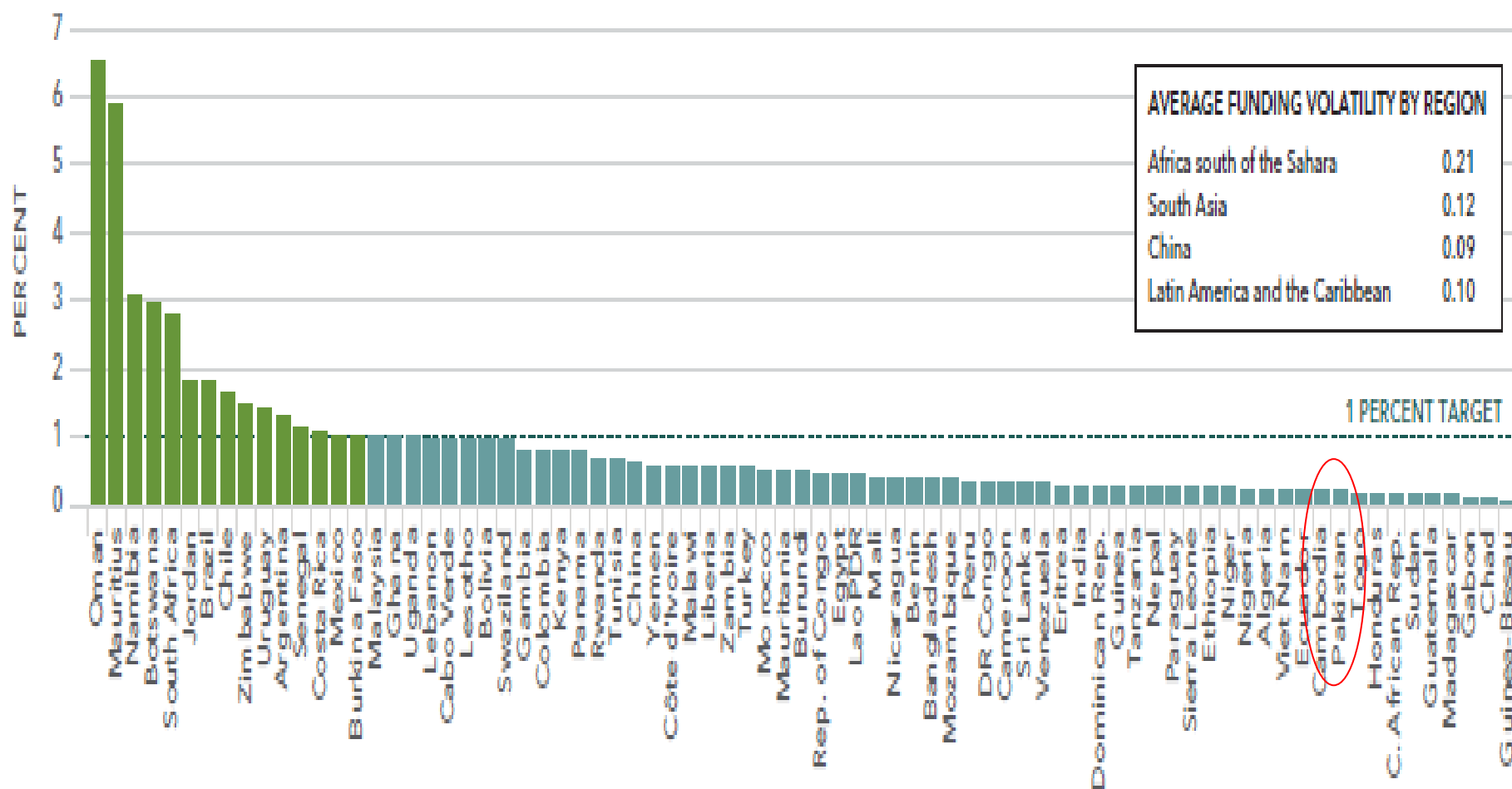
| Clusters | Production (2009-10) | Market able Volum e @ 80% of Production | Storage Requirement ² | Stores Available In Pakistan | | Gap/Requirements ⁴ | |
|---------------------|-------------------------|---|--|------------------------------------|------------------------------|-------------------------------|------------------------------|
| | | | | Capacity ³ | No. of Units ¹ | Gap in Capacity | No. of Units ⁴ |
| Kinnow | 2395 | 1796 | 539 | 194 | 119 | 345 | 115 |
| Mango | 1875 | 1406 | 70 | 25 | 15 | 46 | 23 |
| Apple | 459 | 344 | 138 | 34 | 21 | 103 | 34 |
| Other Fruits | 2451 | 1838 | 551 | 172 | 105 | 380 | 190 |
| Potato | 2540 | 1905 | 762 | 323 | 197 | 439 | 146 |
| Other Vegetables | 5320 | 3990 | 798 | 169 | 103 | 629 | 315 |
| Total | 15040 | 11280 | 2858 | 916 | 560 | 1942 | 708 |

TABLE 1 Agricultural Science and Technology Indicators

| Low- and middle-income countries by region | Year | Agricultural research spending | | | Volatility | Agricultural researchers (FTEs) | | | |
|--|------|--------------------------------|---------------------------|---------------------|------------|---------------------------------|------------------|-------------------------------------|--|
| | | 2011 PPP dollars (million) | 2011 US dollars (million) | as a share of AgGDP | | Total | Female share (%) | Share of PhD-qualified (% of total) | PhD-qualified older than 50 (as % of total PhDs) |
| Bangladesh | 2012 | 250.6 | 78.2 | 0.37 | 0.13 | 2,121.0 | 12.4 | 35.3 | 39.8 |
| Cambodia | 2010 | 22.4 | 7.4 | 0.18 | na | 284.4 | 21.9 | 5.9 | 10.5 |
| China | 2013 | 9,366.2 | 5,081.5 | 0.62 | 0.09 | na | na | na | na |
| India | 2014 | 3,298.4 | 1,067.8 | 0.30 | 0.05 | 12,746.6 | 18.3 | 73.2 | 38.3 |
| Lao PDR | 2010 | na | na | na | 0.23 | 227.2 | na | 6.5 | 38.0 |
| Malaysia | 2010 | 592.3 | 282.5 | 0.99 | na | 1,609.4 | 49.2 | 24.9 | 43.1 |
| Nepal | 2012 | 53.4 | 17.8 | 0.28 | 0.21 | 403.4 | 12.5 | 14.8 | 76.7 |
| Pakistan | 2012 | 332.5 | 93.7 | 0.18 | 0.09 | 3,678.3 | 10.8 | 20.7 | 34.5 |
| Sri Lanka | 2009 | 61.8 | 21.6 | 0.34 | na | 618.8 | 46.9 | 24.2 | na |
| Viet Nam | 2010 | 136.0 | 44.5 | 0.18 | na | 3,744.2 | na | 17.8 | na |

RECOMMENDED CITATION: International Food Policy Research Institute. 2017. *2017 Global Food Policy Report*. Washington, DC: International Food Policy Research Institute. <https://doi.org/10.2499/9780896292529>

AGRICULTURAL R&D SPENDING AS A SHARE OF AGRICULTURAL GDP



RECOMMENDED CITATION: International Food Policy Research Institute. 2017. *2017 Global Food Policy Report*. Washington, DC: International Food Policy Research Institute. <https://doi.org/10.2499/9780896292529>

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Warranted policies, plans and programs

- Development and adoption of new varieties
- Better access to markets for inputs (seeds, fertilisers, farm mechanization, credit, water) and outputs
- Improved infrastructure including storage and cooling facilities
- Reduction in post harvest losses
- Greater investment in research, development and extension
- Improved quality and fulfilment of quarantine requirements for international markets and competitiveness
- Greater diversification, especially minor but high value crops
- Effort for greater selling/buying power and economy of size and scale – cluster farming/structural adjustment
- Enhanced water supply but more efficient water use through better water management
- Governance and institutional reforms in water sector



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What type of policy intervention is needed to improve agriculture sector productivity and food security?

- **Supply related policies**
 - Rural infrastructure
 - Agricultural research and development, and extension
 - Institutions for agricultural resource management
 - Farm input and produce pricing
- **Demand related policies**
 - Income, growth and development
 - Education and knowledge
 - Food price stabilisation
- **Market related policies**
 - Effectiveness of markets
 - Policies to insulate local markets from global markets
 - Access to local markets

Policy analysis

- Good agricultural policies are fundamental to progress in the economic, social and environmental spheres.
- AND
- Scientific and empirical evidence in policy formulation is extremely important
- It is generally a low cost process with high and immediate beneficial impacts
 - Costs imposed by poor decisions are reduced through decisions which rely on rigorous and objective evidence

ACIAR's ADP program

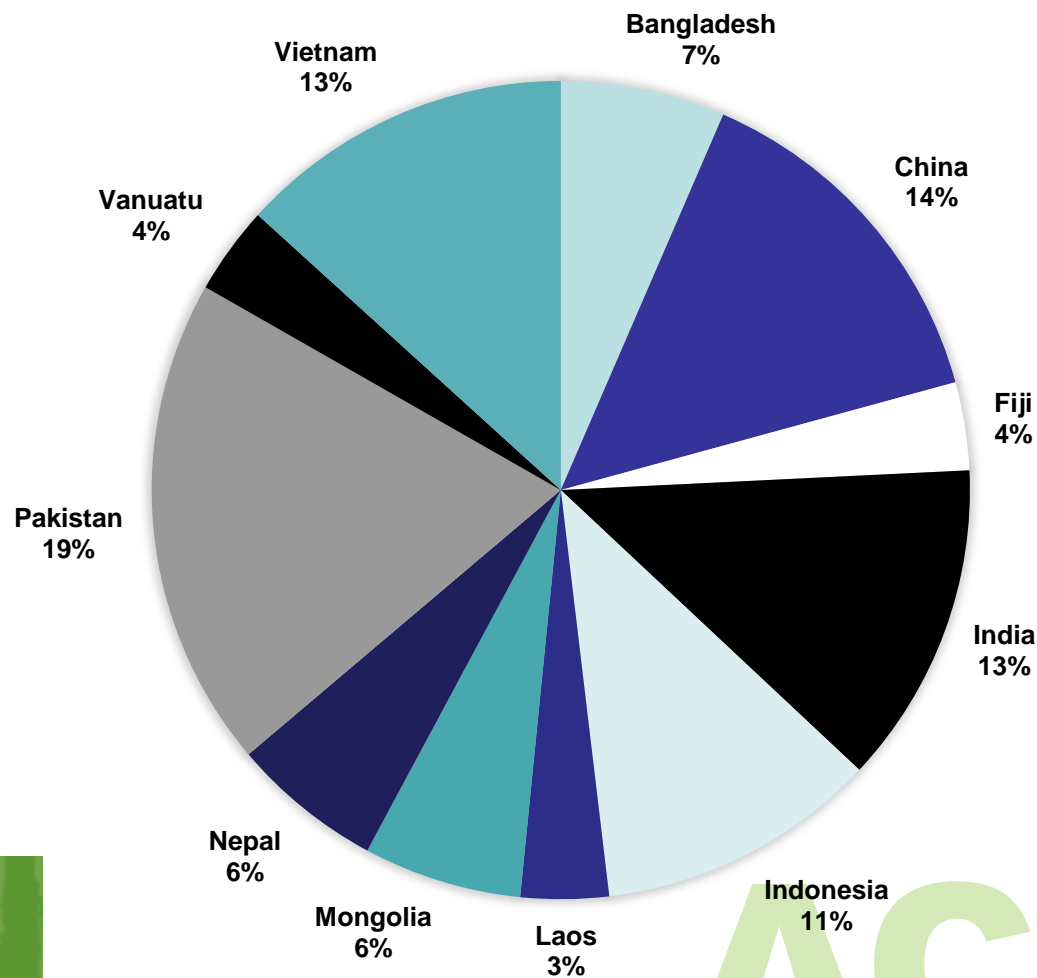
- Agricultural development policy is one of the 12 programs of ACIAR
- ADP program operates in both the **micro scale dimension and macro scale dimension**
- The Program supports both **stand-alone projects and multidiscipline-based projects** across the ACIAR research programs.
- Policy components operate in several biophysical program areas, including AGB, FST, LPS and LWS.
- The project helps understand:
 - Commonly used agricultural **policy alternatives**
 - Impact of the increasing **regional/globalisation of trade** and associated rules-based approaches
 - Impact of domestic markets on **supply, demand and price**
 - Impact of **domestic market and trade-regulatory developments**
 - Impact of **agricultural reform, land and water use policy, forest policy and food security policy, regulation and environmental-management regimes and institutions**

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Prioritisation principles of ADP policy projects

- Political environment in the recipient country
- Receptiveness (appetite) of the policy work is at right time
- Project is realistic with greater depth of analysis and sufficient commitment
- Project does not crowd-out economic policy analysis
- Credibility of the project participants in the partner country
- Analysis is sound and credible with clear benefits
- Policy analysis is relevant to the circumstances of the country at that time
- Policy analysis is effectively promoted throughout the appropriate channels
- The project considers Australian capability and comparative advantage

ADP priority countries and funds allocation



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ACIAR/ADP projects in Pakistan

- Policies and institutional reforms to improve horticultural markets in Pakistan (ADP/2014/043)
- Economic analysis of policies affecting pulses (production) in Pakistan (ADP/2016/043)
- Enhancing smallholders performance through interventions and collaborative research: A case study of horticulture in Pakistan (ADP/2016/028)
- Enabling agricultural policies benefitting smallholders in dairy, citrus and mango industries of Pakistan (ADP/2010/091)
- Efficient participatory irrigation institutions to support productive and sustainable agriculture in south Asia (ADP/2014/045)
- Creating wealth in smallholders farms through efficient credit systems in Pakistan (ADP/2016/028)

The ACIAR logo is displayed in a large, light green, sans-serif font. It is positioned in the bottom right corner of the slide. To the left of the logo, there is a green rectangular area with a faint, repeating geometric pattern of stylized leaves or arrows pointing right.

A lot more to do with great coordination





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For more information please visit our website:

www.aciar.gov.au

OR

Contact the relevant ACIAR Research Program Manager ([details on website](#))

Thank you

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