Agriculture in Pakistan

Metrics Used

We use the following indicators to generate our metrics

Value Added in Agriculture, constant 2010 US$: The net output of the Agriculture sector, including forestry hunting and fishing, after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciations of fabricated assets or depletion and degradation of natural resources.

Employment in Agriculture (% of total employment) (modeled ILO estimate): Employment is defined as persons of working age who were engaged in any activity to produce goods or produce services for pay or profit, whether at work during the reference period or not at work due to temporary absence from a job, or to working-time arrangement. The agriculture sector consists of activities in agriculture, hunting, forestry and fishing

Working Age Population: Total population between the ages 15 to 64.

Arable Land: Arable land (in hectares) includes land defined by the FAO as land under temporary crops (double-cropped areas are counted once), temporary meadows for mowing or for pasture, land under market or kitchen gardens, and land temporarily fallow. Land abandoned as a result of shifting cultivation is excluded.

Pakistan have low Value Added per Worker in Agriculture?

For it's level of GDP per Capita, Pakistan has a slightly above-expected valued added per worker in agriculture.

Comparing Value Added per Worker in Agriculture
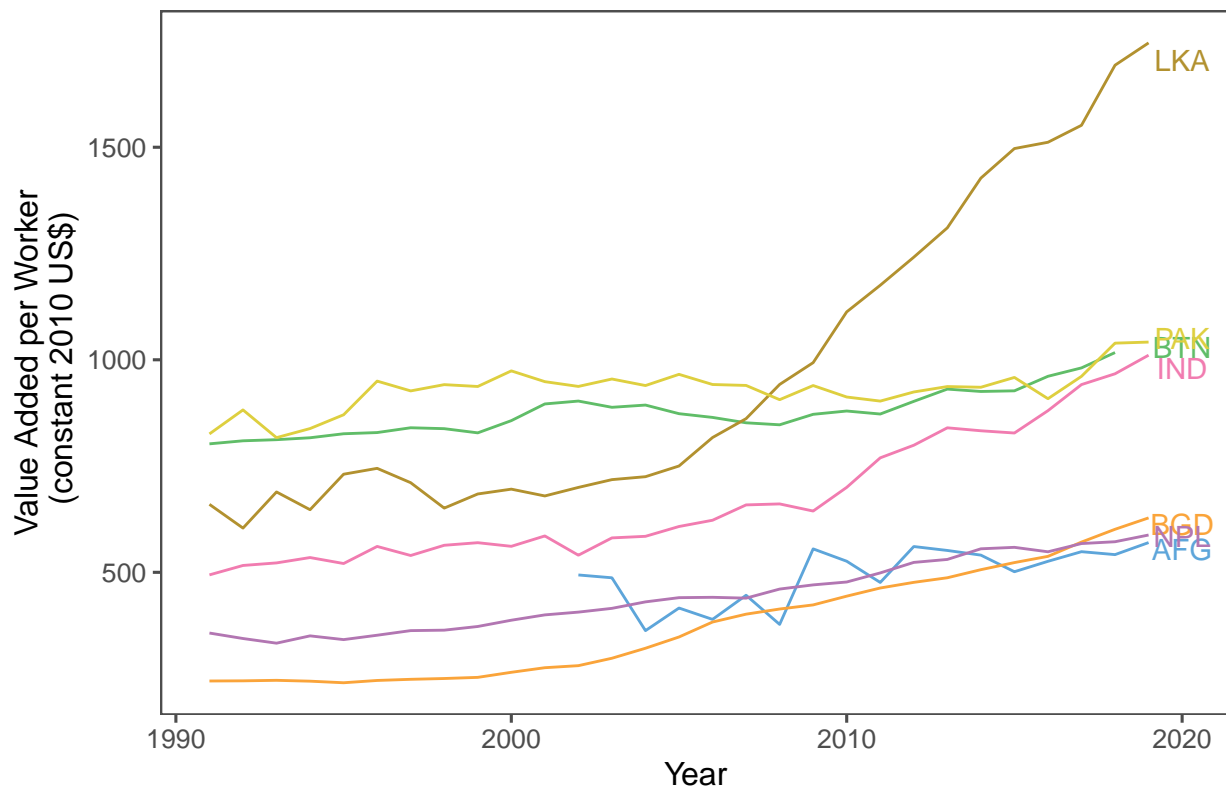Pakistan circled

Source: World Bank
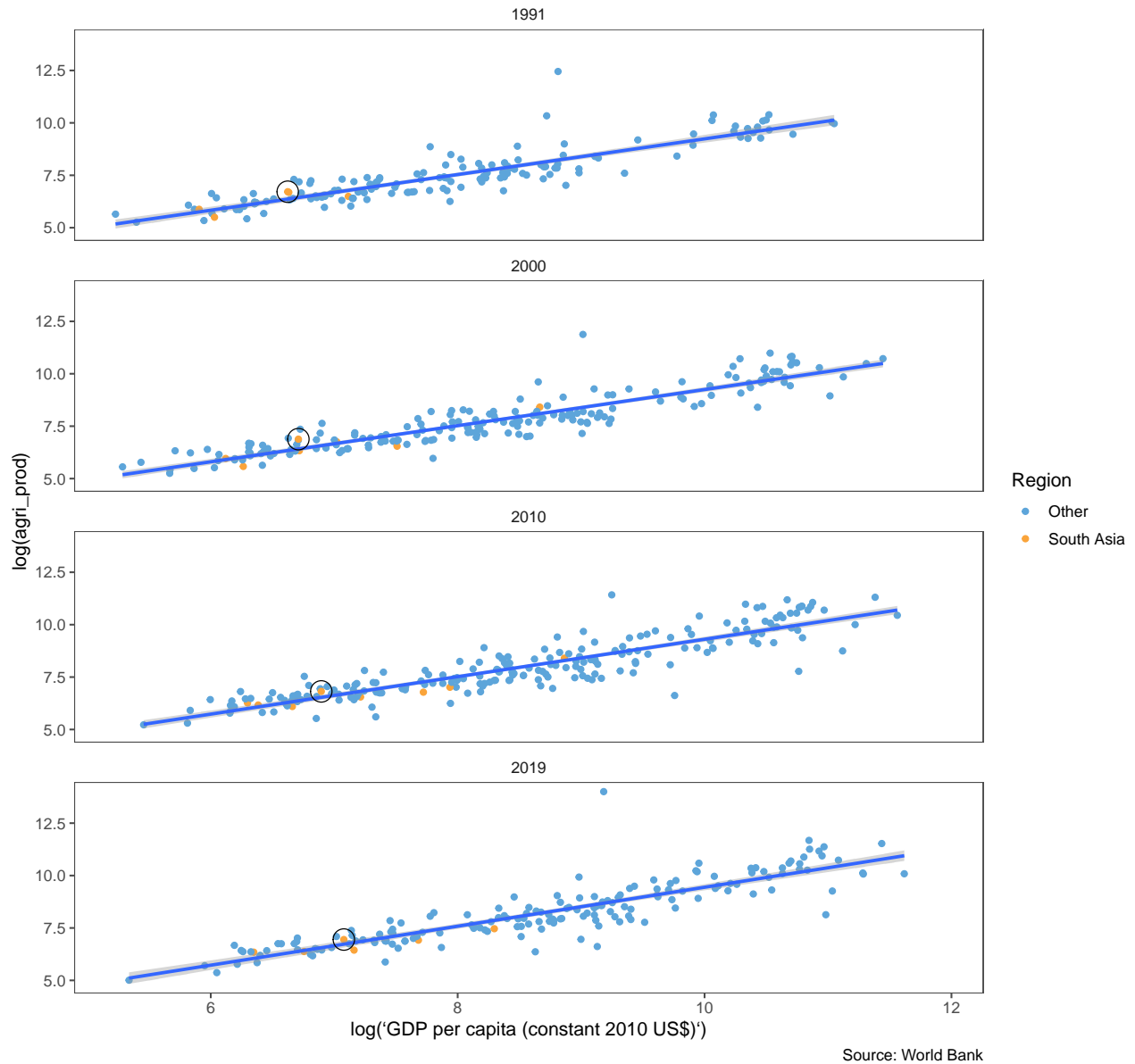
How does Pakistans Value Added per Worker Change over Time?

While it has a relatively high level of value added per worker in agriculture, Pakistan has the slowest growth in value added per worker between 2000 and 2019 in South Asia.
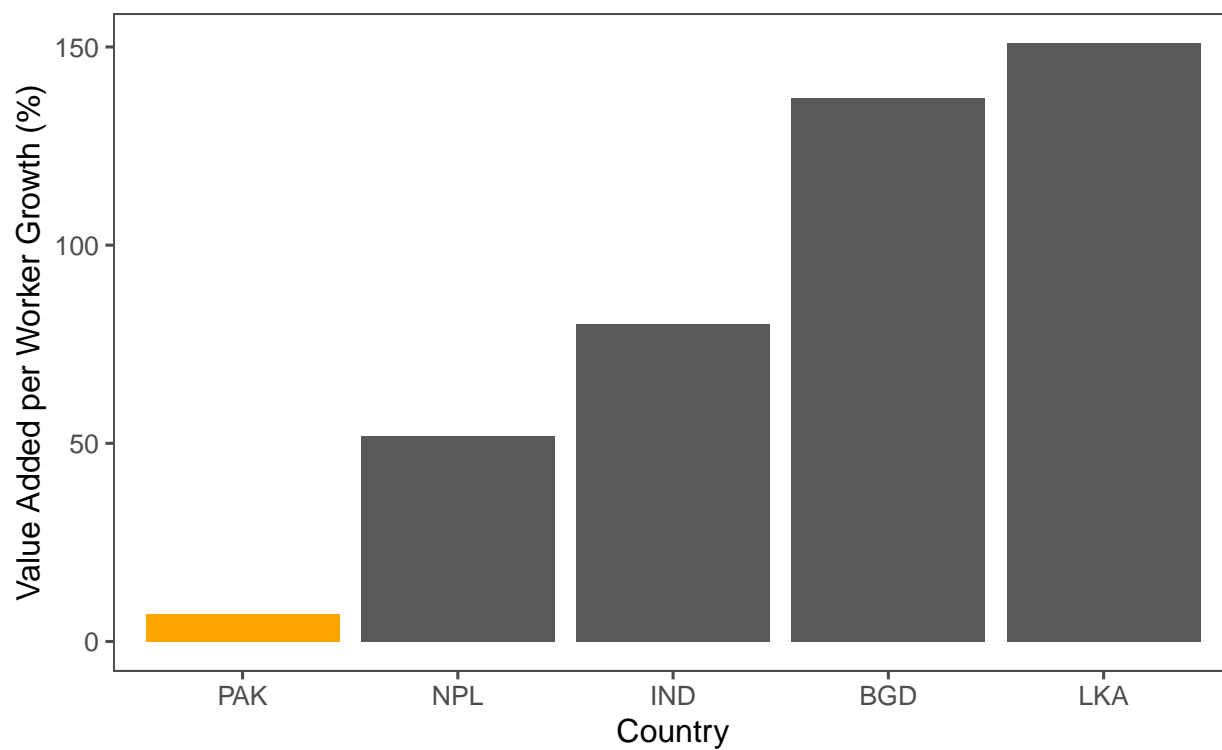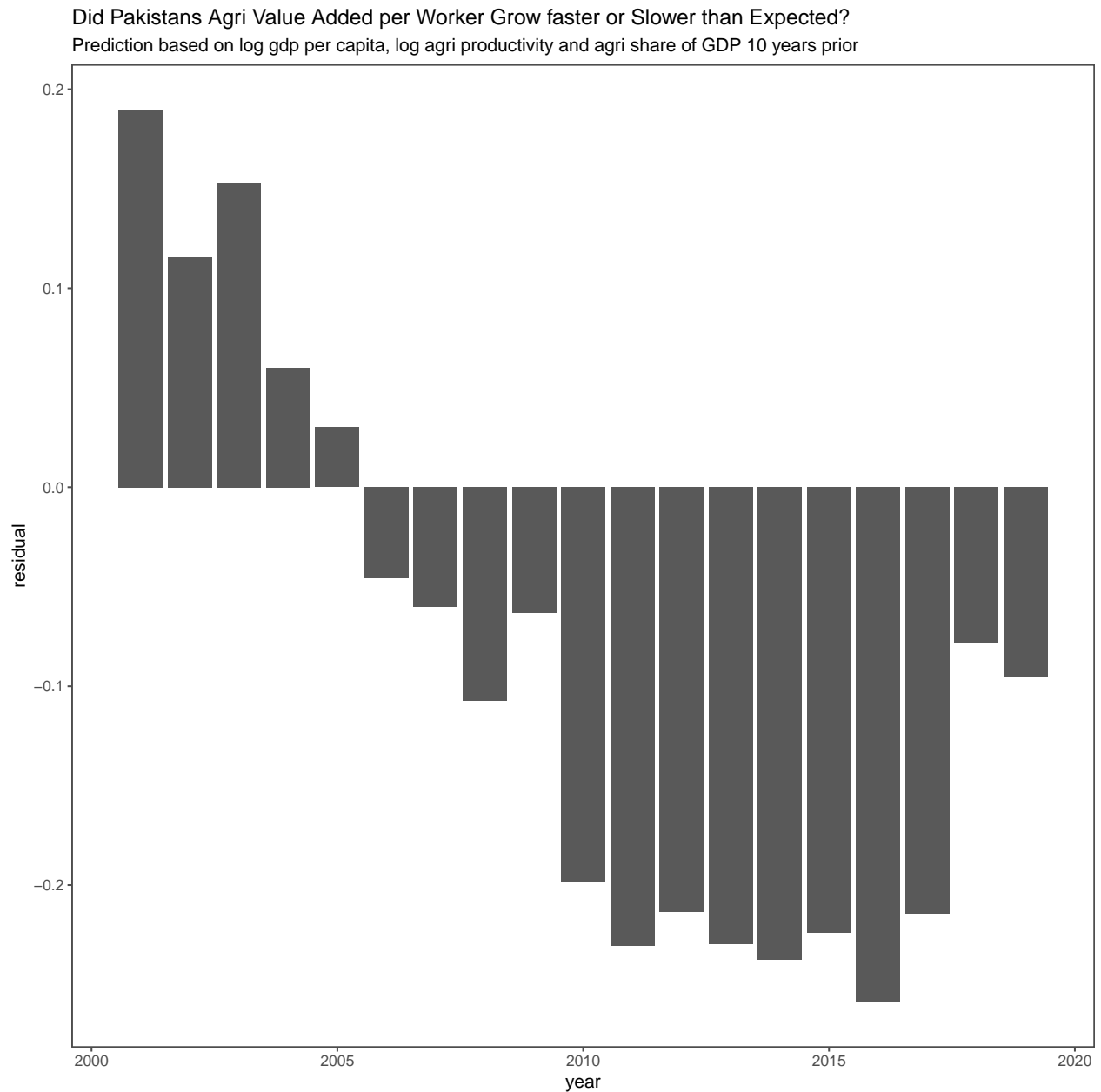
South Asian Value Added in Agriculture per Worker
2019
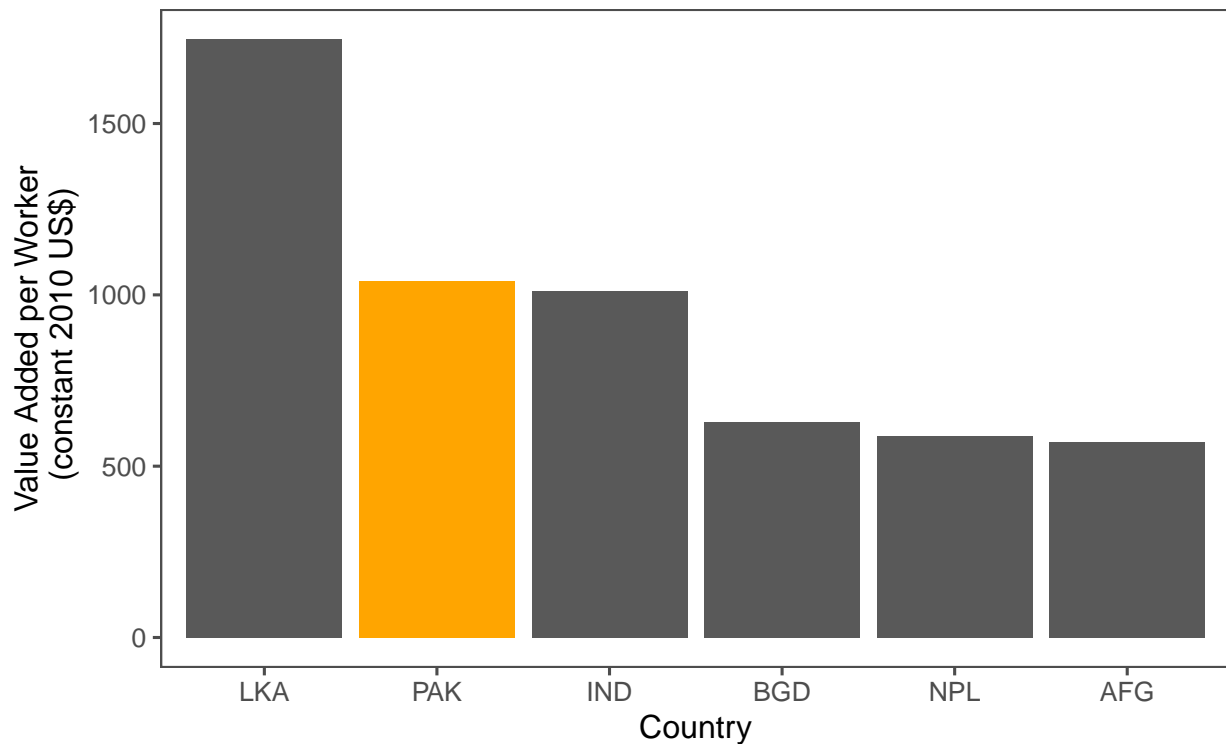
South Asian Value Added in Agriculture per Worker over Time

Growth in Value Added per Worker between 2000 and 2019
Agriculture in South Asia

Did Pakistans Agri Value Added per Worker Grow faster or Slower than Expected?
Prediction based on log gdp per capita, log agri productivity and agri share of GDP 10 years prior

## Decomposing Growth in Value Added per Worker

Value added per worker in agriculture is measured as gross output of the sector, minus intermediate costs, and divided by the number of people working in that sector.

Is Pakistans low growth driven by slow growth in value add, or by fast growth in the labor pool, compared to other south asian countries?

Both. Pakistan had the slowest growth in total agriculture value add between 2000 and 2019 in South Asia. Additionally, Pakistan had the largest growth in total agriculture labor in all of South Asia.

Decomposing the agriculture labor growth, we see that while both male and female labor growth is higher than comparators, female growth significantly outpaces male labor growth.

Percent growth in total agri value added between 2000 and 2019
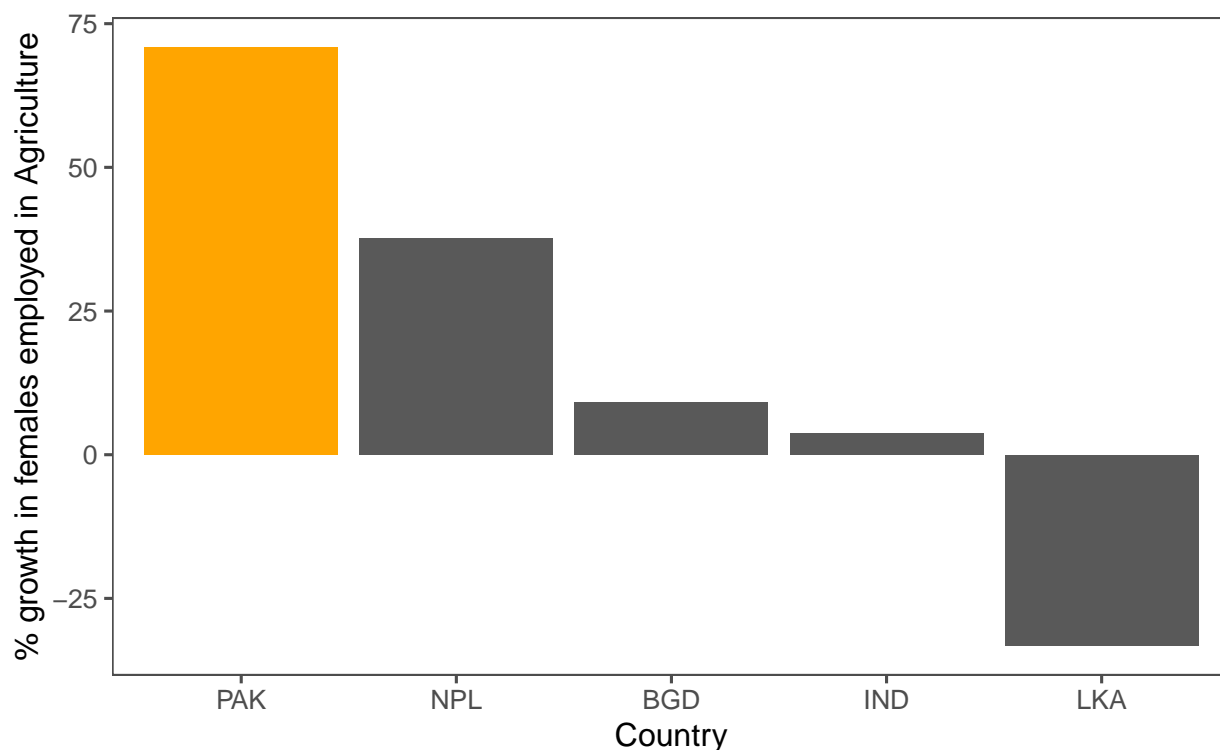South Asia
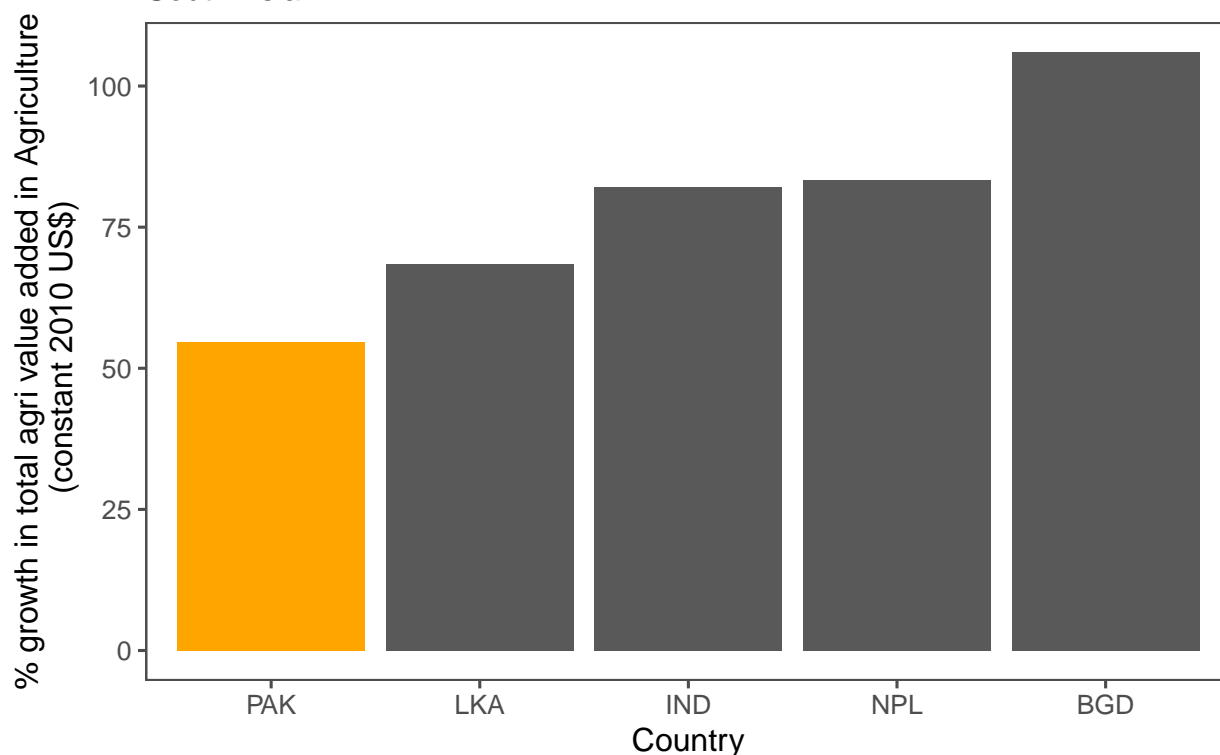
Percent growth in total labor employment between 2000 and 2019
South Asia
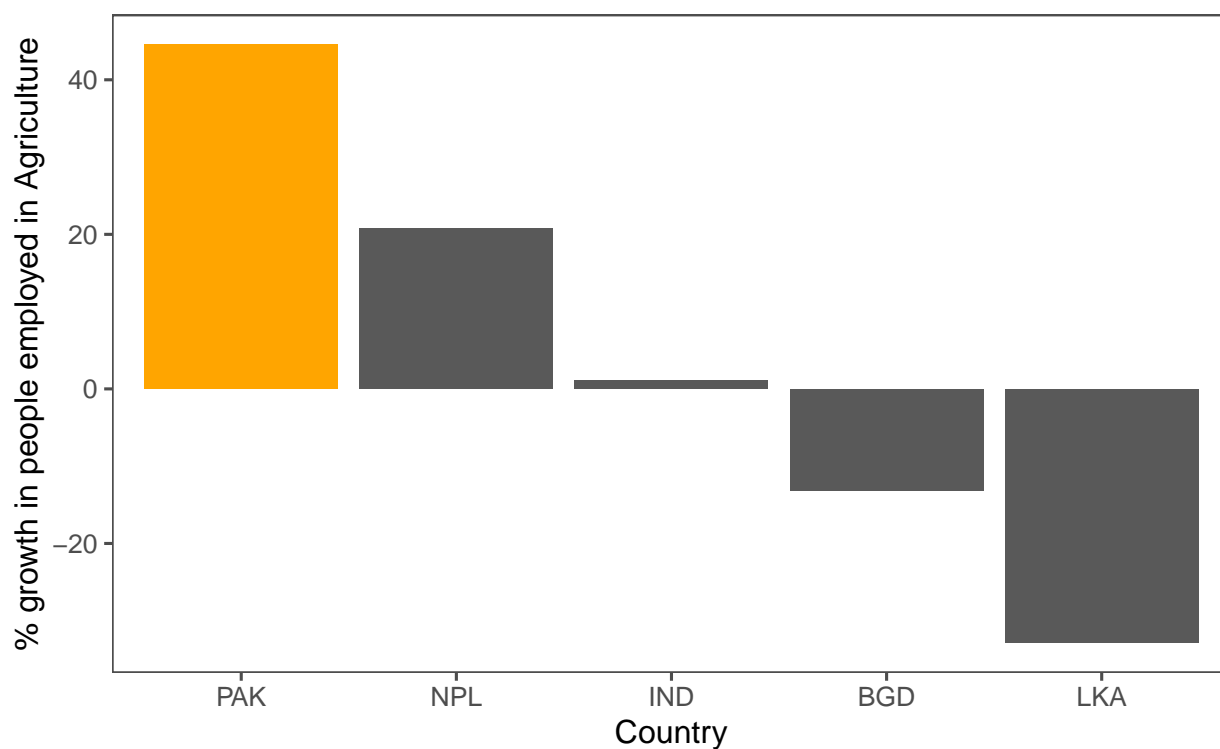
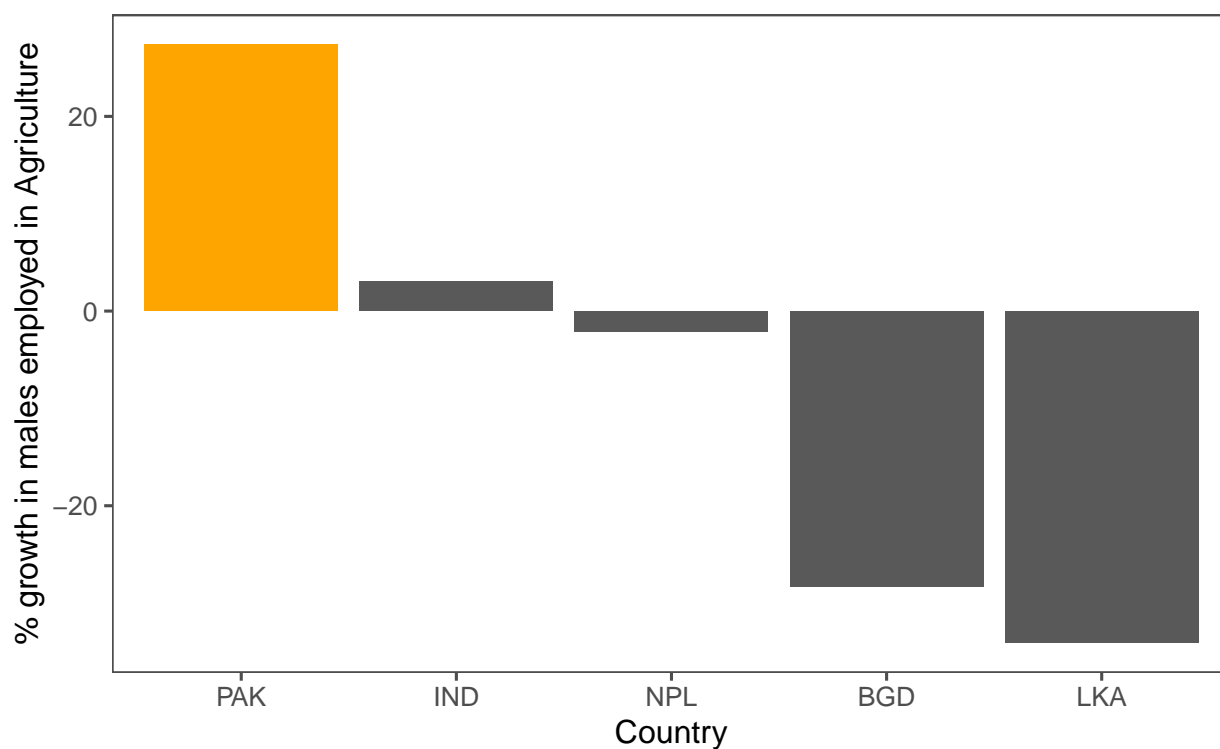We can decompose the growth in labor between men and women.

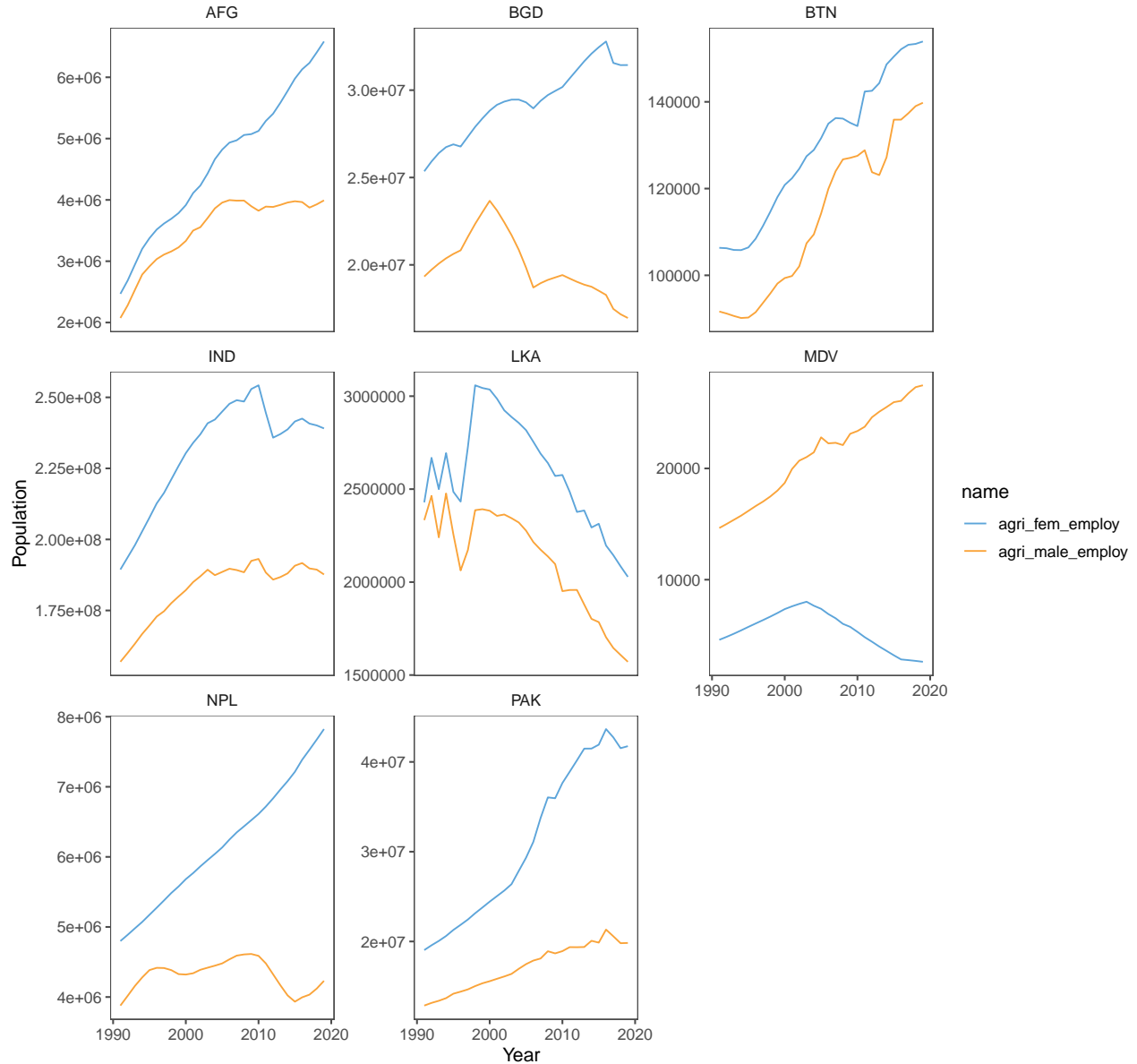## Percent growth in female labor employment between 2000 and 2019
South Asia

Percent growth in male labor employment between 2000 and 2019
Agriculture in South Asia

Female vs Male Employment in Agriculture over Time
Agriculture in South Asia

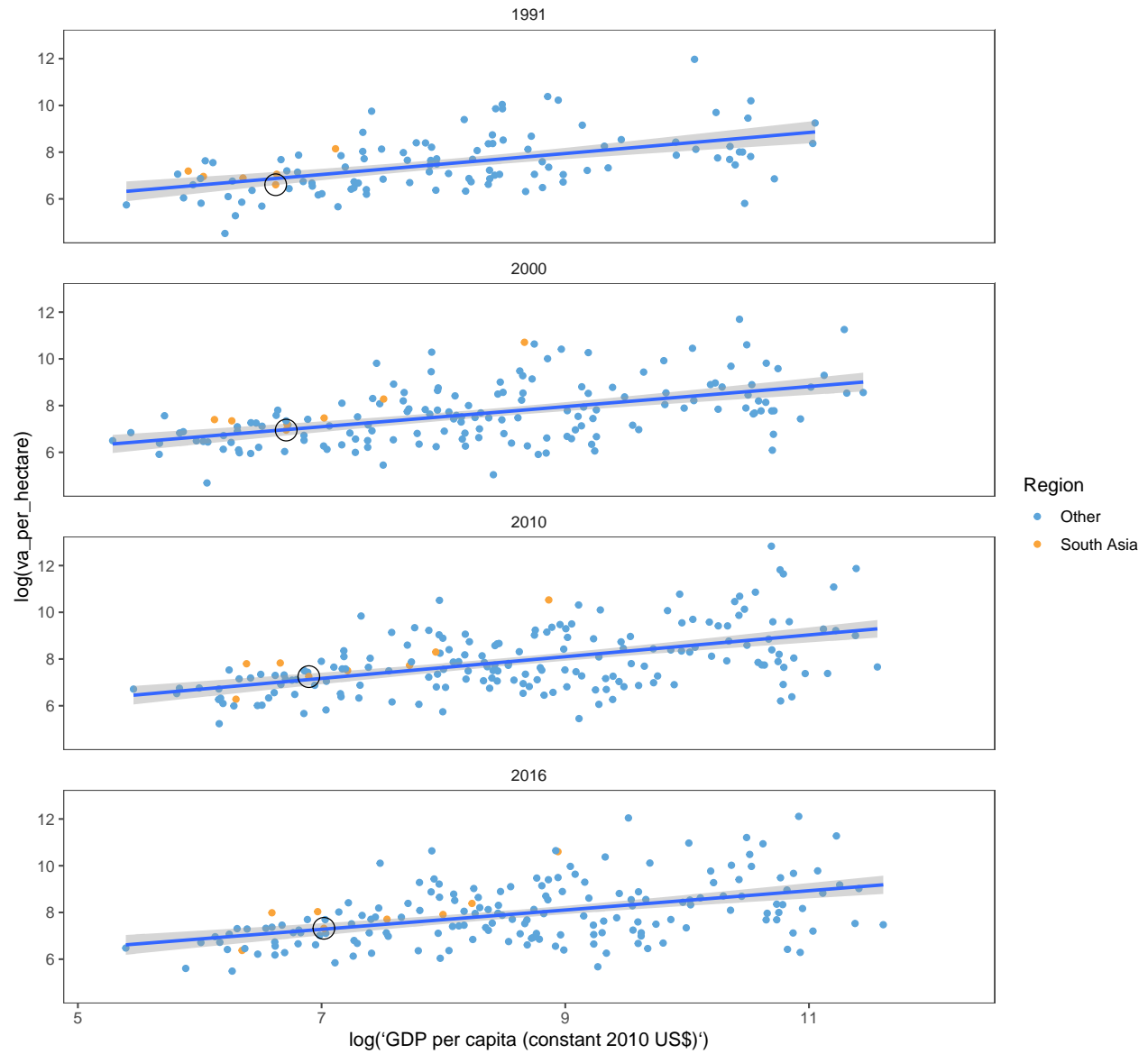## Value Added per Hectare of Arable Land

In the world, Pakistan has roughly expected levels of Value Added per Hectare of Arable land for its level of GDP per capita.

However, the next figure shows that Pakistan has the lowest value added per hectare of arable land in all of South Asia, bar Afghanistan.

Growth has also been slow, and it has only been faster than Sri Lanka. Sri Lanka has had a greater growth in value added over this time period, and has slower growth in this metric due to a 40% increase in the amount of Arable land over the period.
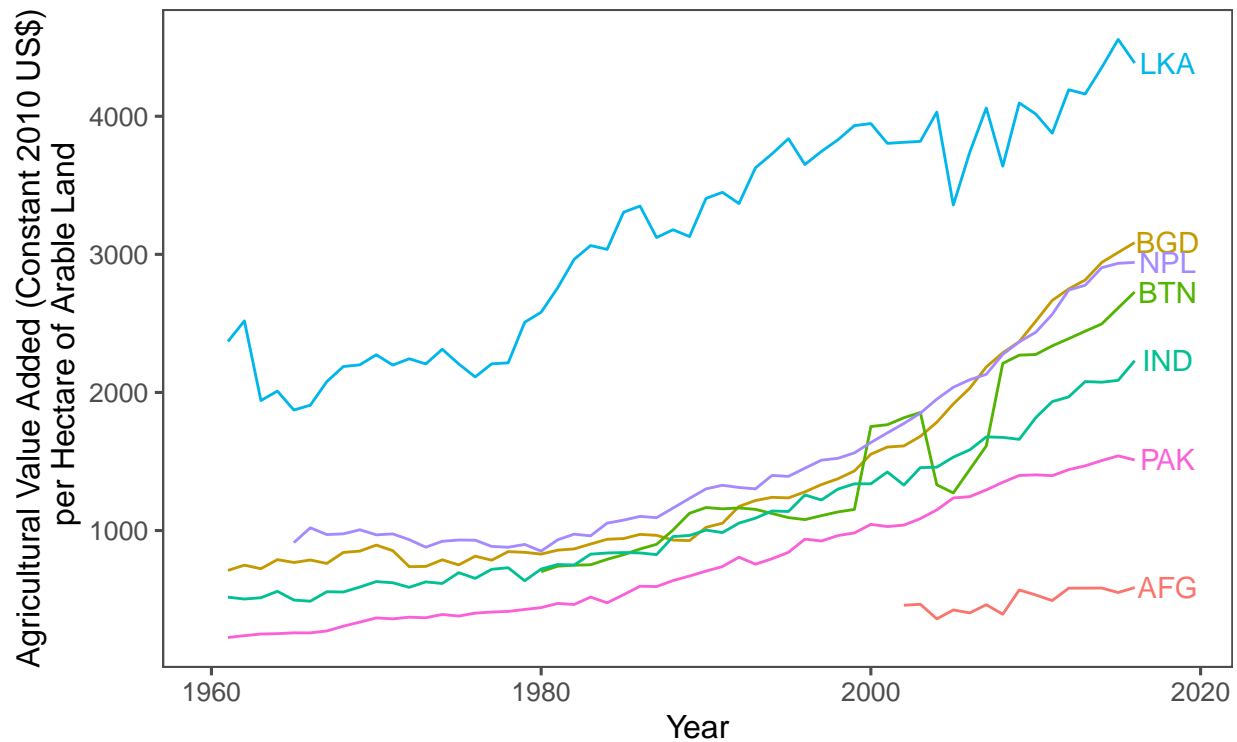
Comparing Agricultural Value Added per Hectare of Arable Land
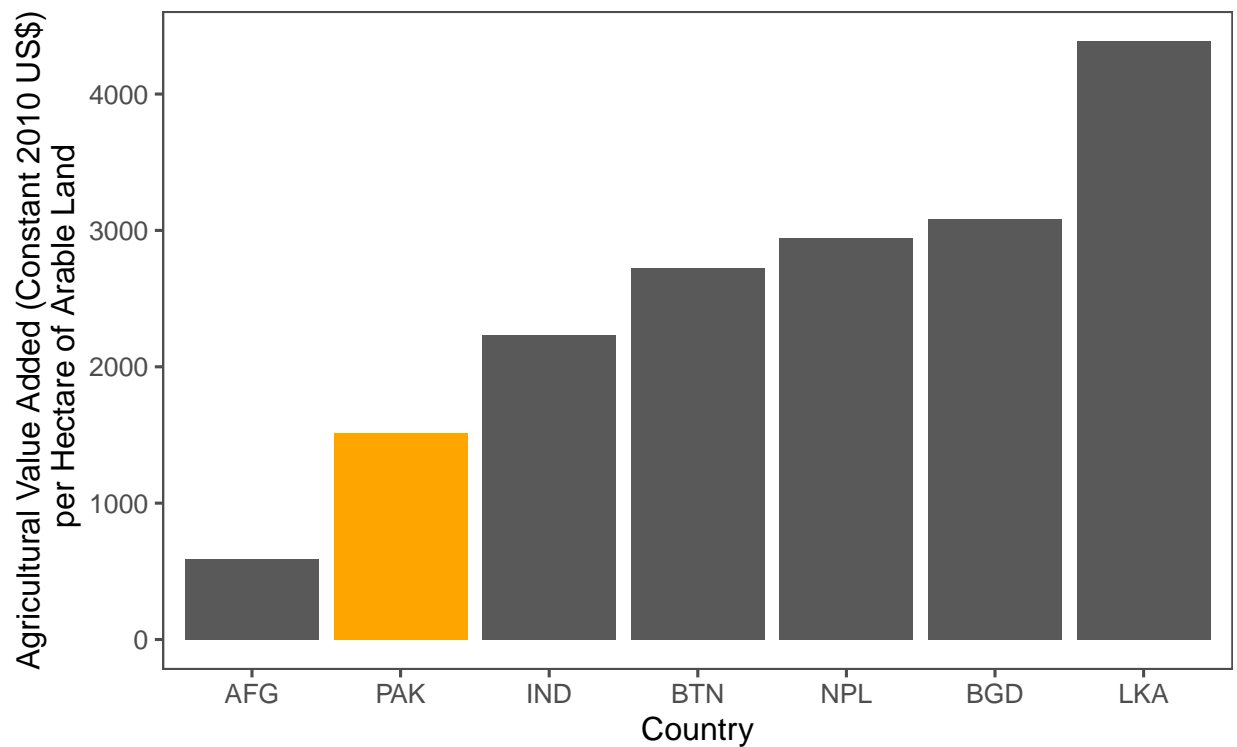
Pakistan circled

Source: World Bank
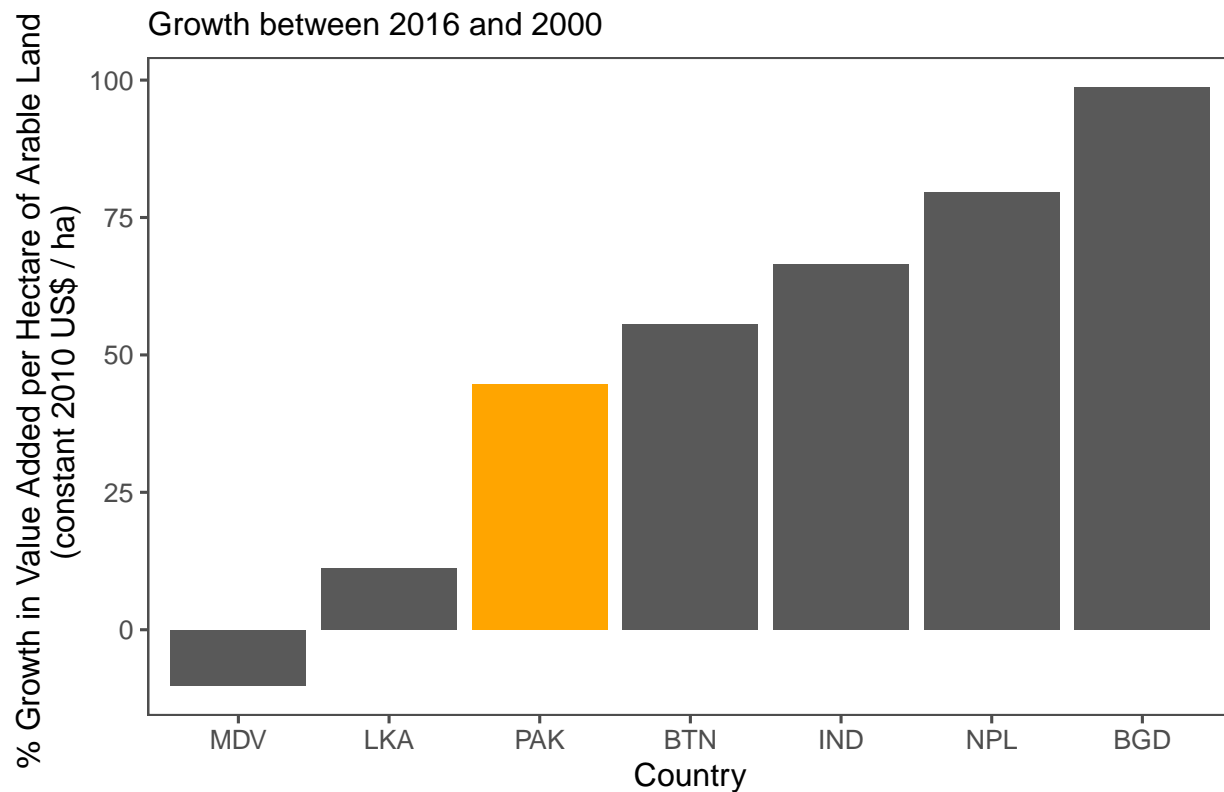
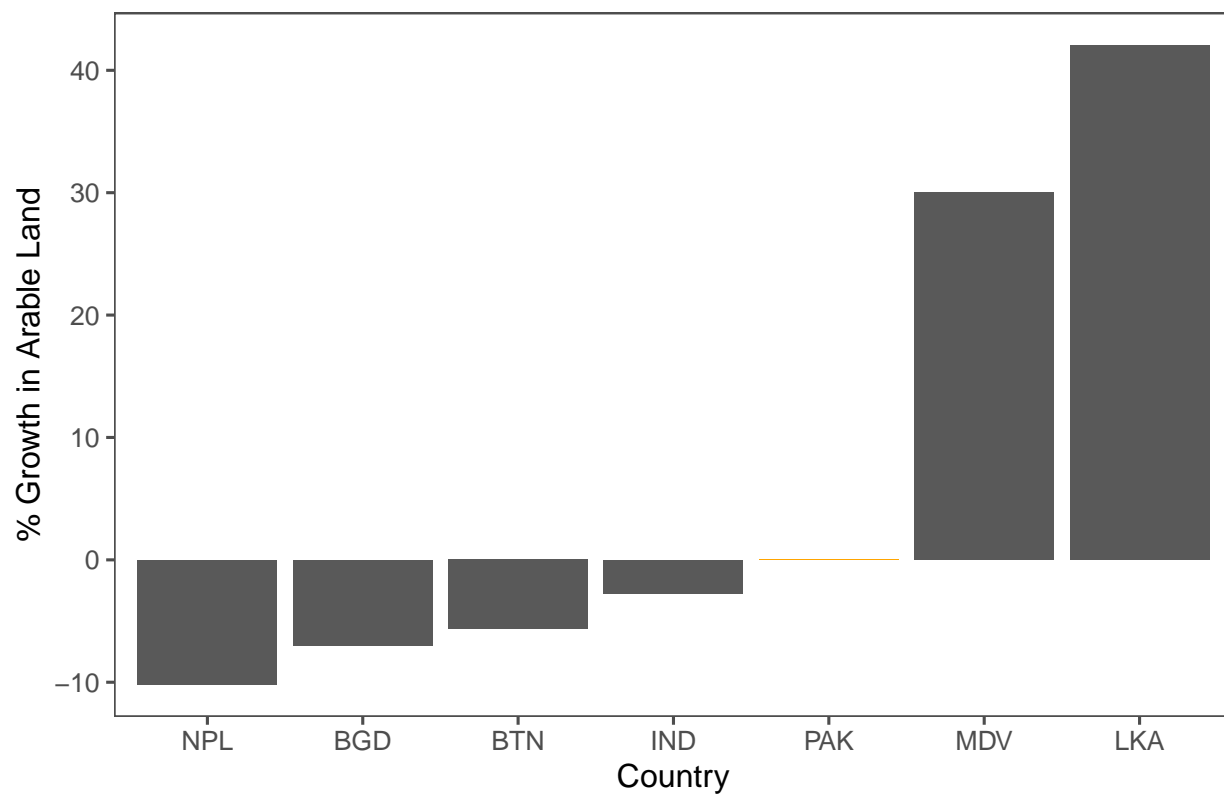Agriculture Value Added per Hectare of Arable Land

South Asia

Agriculture Value Added per Hectare of Arable Land

South Asia

Value Added per Hectare
Growth between 2016 and 2000

Growth in Arable Land between 2016 and 2000

Next Steps

We have seen that both the value added growth is slower than comparators, and that L is increasing much faster than comparators.

There is significant room to increase the value added in agriculture. And this may be the problem to fixate on for now. Even with all these extra workers, who maybe cannot find a job in the industrial sector, we cannot boost the value added. Even if an 'average' number of people instead had shifted to work in industry, the value added would be lower compared to other countries.

We see that Pakistan has the least productive land in South Asia, other than Afghanistan. Is this true at a subnational level as well? Why is it so unproductive? Can we get variation in district-level land productivity? What drives that variation?

Is Pakistan growing the wrong crops? Maybe the quantity being produced on the land is actually growing over time, but the prices are falling. For some reason, farmers are not switching to better crops. Todo: rule out a price effect so that we can focus on quantity questions.

Are people using the wrong mix of inputs, driving lower quantities? Can we see this at a macro level?

Are intermediate costs rising for some reason, far more than in other countries? What are the intermediate costs? How does FAO / the world bank take them out?

Other notes:

According to this data, there are almost 2x as many women working in agriculture than men. I am curious what this actually means - do they only do particular jobs, work on particular crops? Maybe interventions need to target increasing the productivity of women in Agriculture.

Gross Crop Production Patterns

% Growth of Gross Crop Production (constant 2014–2016 US$)
South Asia, 2000–2016
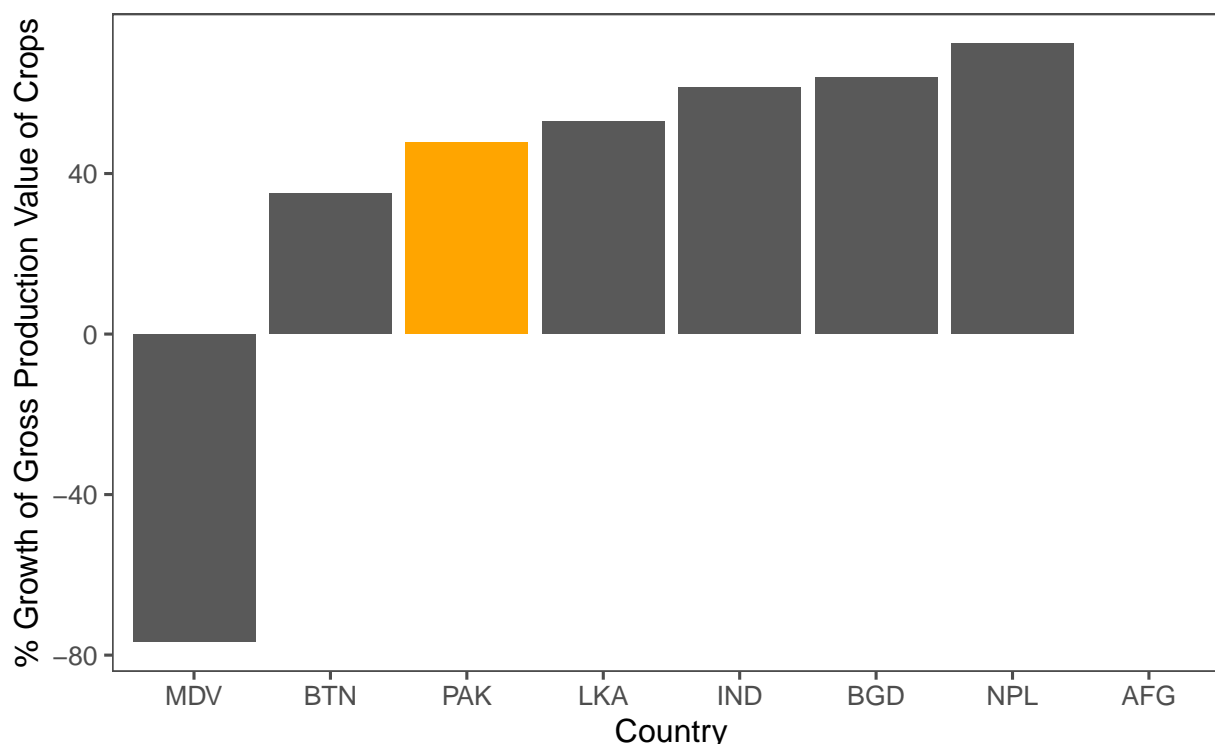
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## [1] "countrycode"                          "year"
## [3] "gross_production_1416_usd"             "regionname"
## [5] "adminregion"                           "incomelevel"
## [7] "Agri GDP Share"                        "Agri Value Added (current US$)"
## [9] "Agri Value Added (constant 2010 US$)"  "GDP per capita (constant 2010 US$)"
## [11] "Agri Employment"                      "Agri Female Employment"
## [13] "Agri Male Employment"                 "pop-working-age"
## [15] "population"                           "pop-working-age-female"
## [17] "pop-working-age-male"                 "pop-working-age2"
## [19] "Agricultural Land"                    "Arable Land"
## [21] "Cereal yield"                         "Irrigated Land"
## [23] "Irrigated Land2"                      "agri_employ"
## [25] "agri_prod"                            "agri_fem_employ"
## [27] "agri_male_employ"                     "va_per_hectare"
## [29] "gross_prod_per_ha"                    "prev_gross_prod"
## [31] "prev_gross_prod_per_ha"               "gross_prod_growth"
## [33] "gross_prod_per_ha_growth"
```
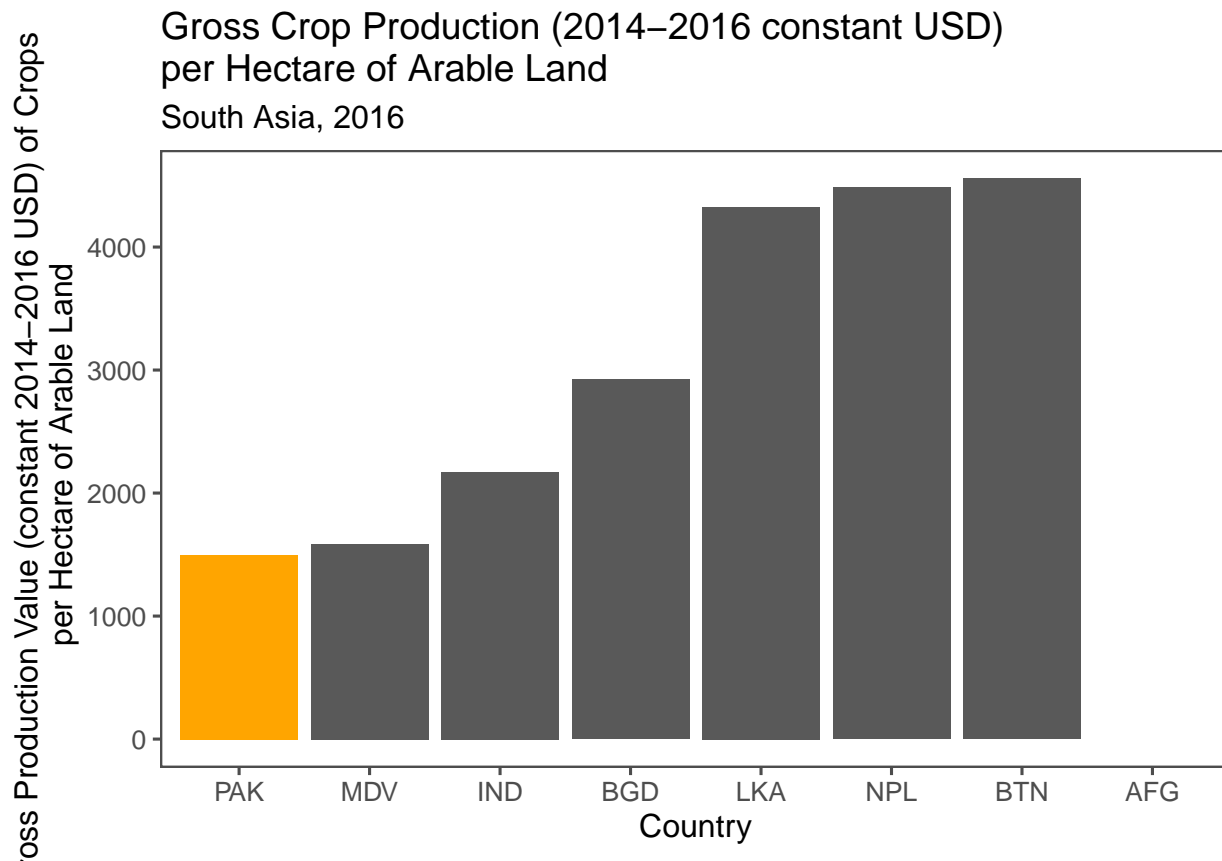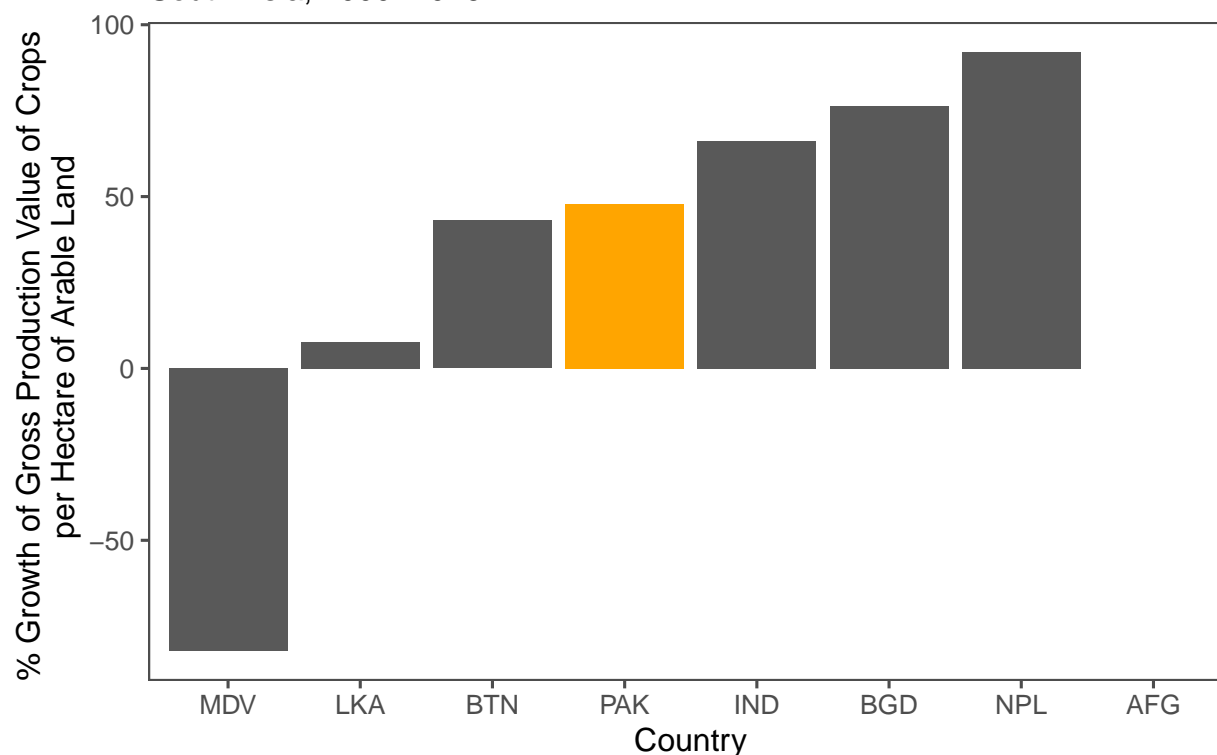
Gross Crop Production (2014–2016 constant USD) per Hectare of Arable Land
South Asia, 2016

% Growth of Gross Crop Production per Hectare of Arable Land
### South Asia, 2000–2016

The crop data confirms that just looking at crop production, Pakistan is low gross output for its level of arable land. Growth is also not great.

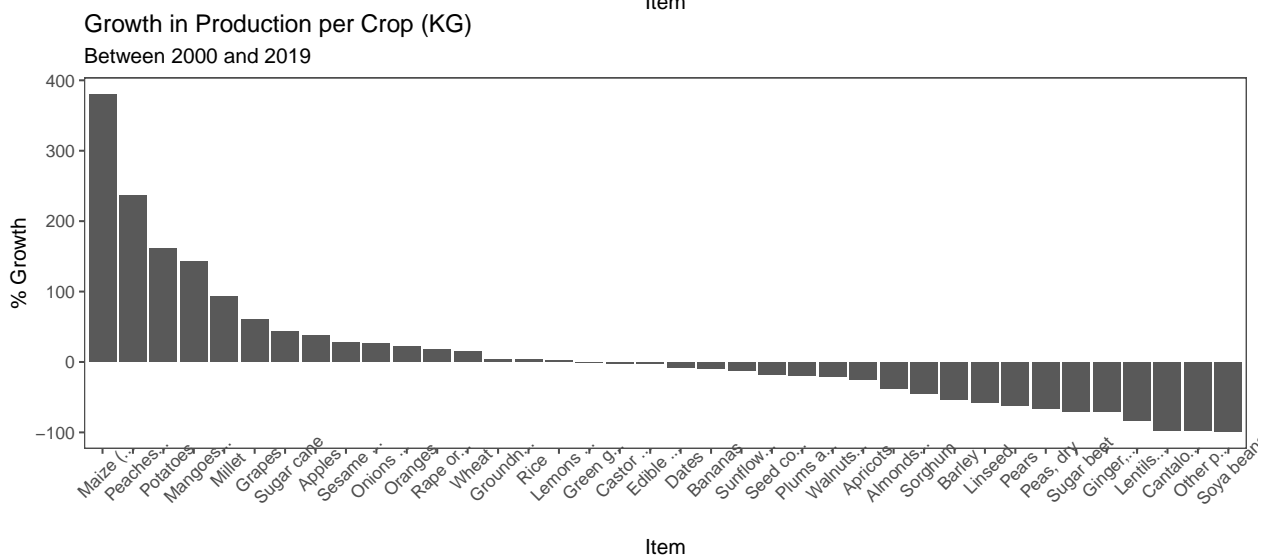Now, we can start to look at per crop, the land allocated to it, and the money squeezed out. We should look at things like the concentration of crops in each. The top n crops for Pakistan, how has their production per hectare changed over this time period? How does that relate to others in South Asia?

For each crop, how much of the growth was driven by price changes? Each crop has gross production, change in land, change in price.

Area and Production share for crops in Pakistan

Year: 2019
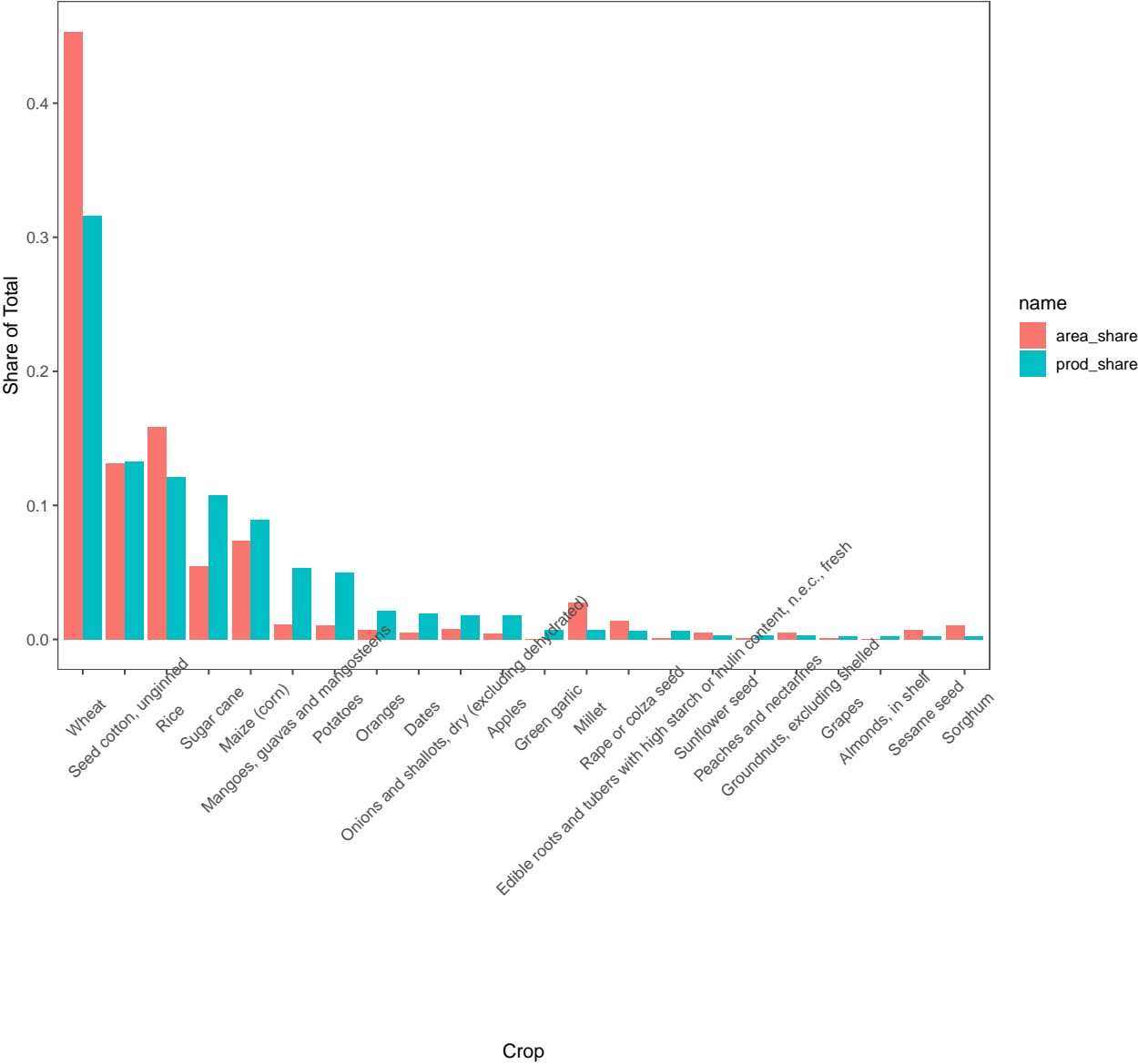
Source: FAOSTAT

Growth in Area Harvested per Crop

Between 2000 and 2019

Growth in Production per Crop (KG)

Between 2000 and 2019

Growth in Yield per Crop (KG/Ha)
Between 2000 and 2019

Price changes for crops in Pakistan
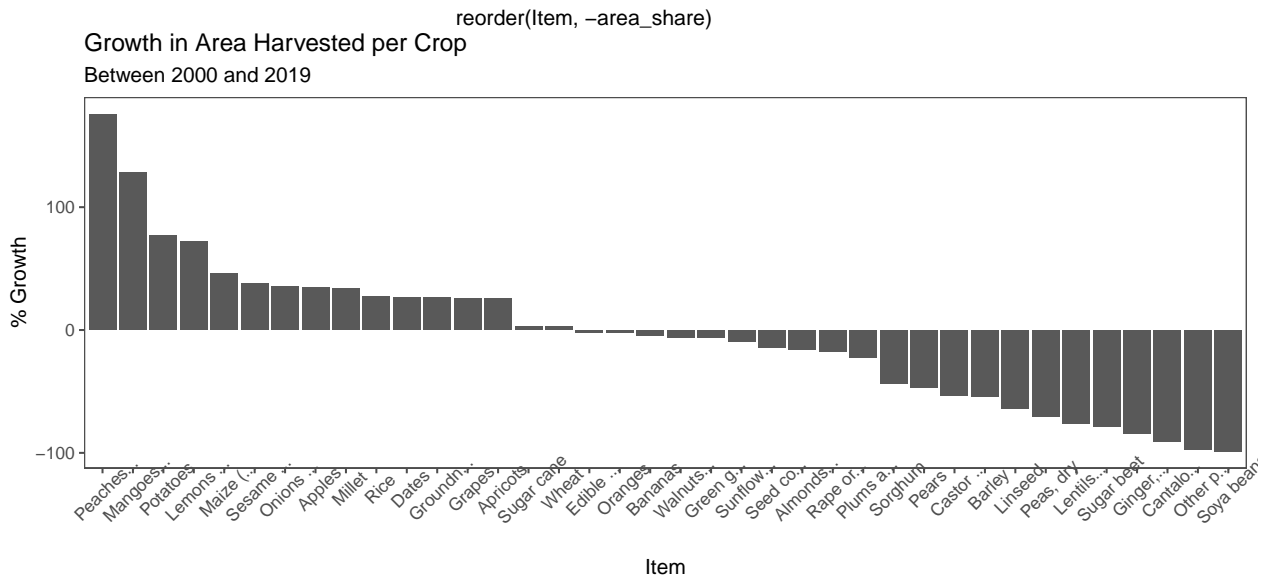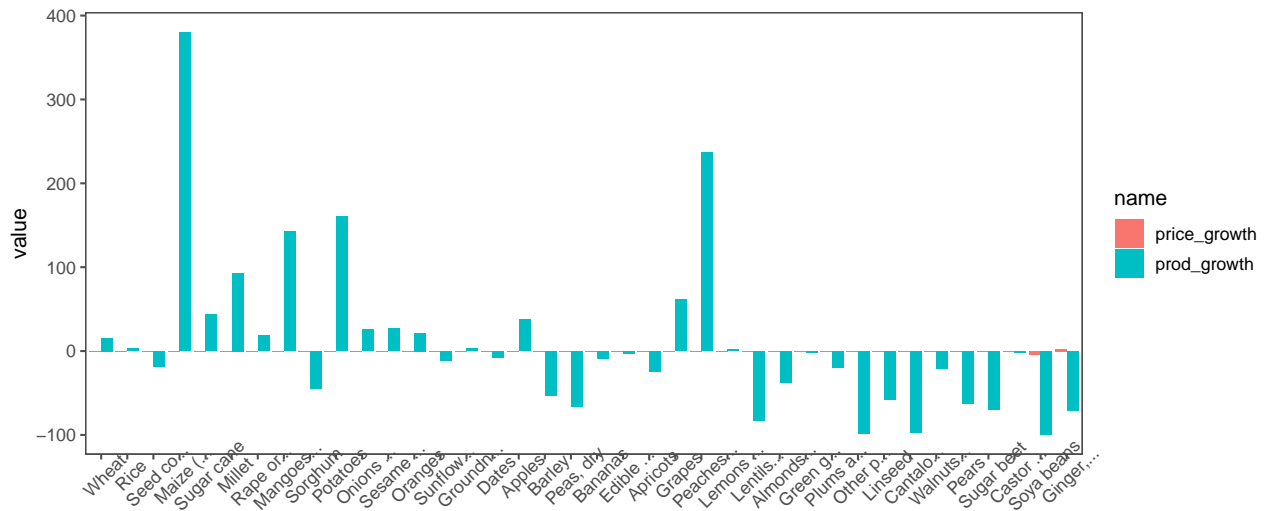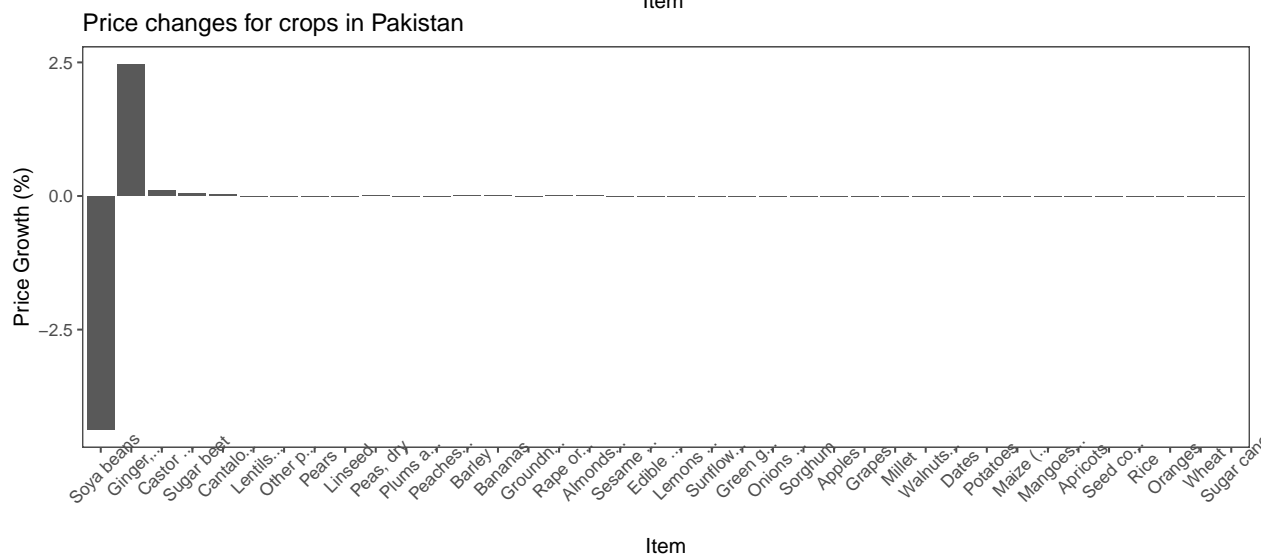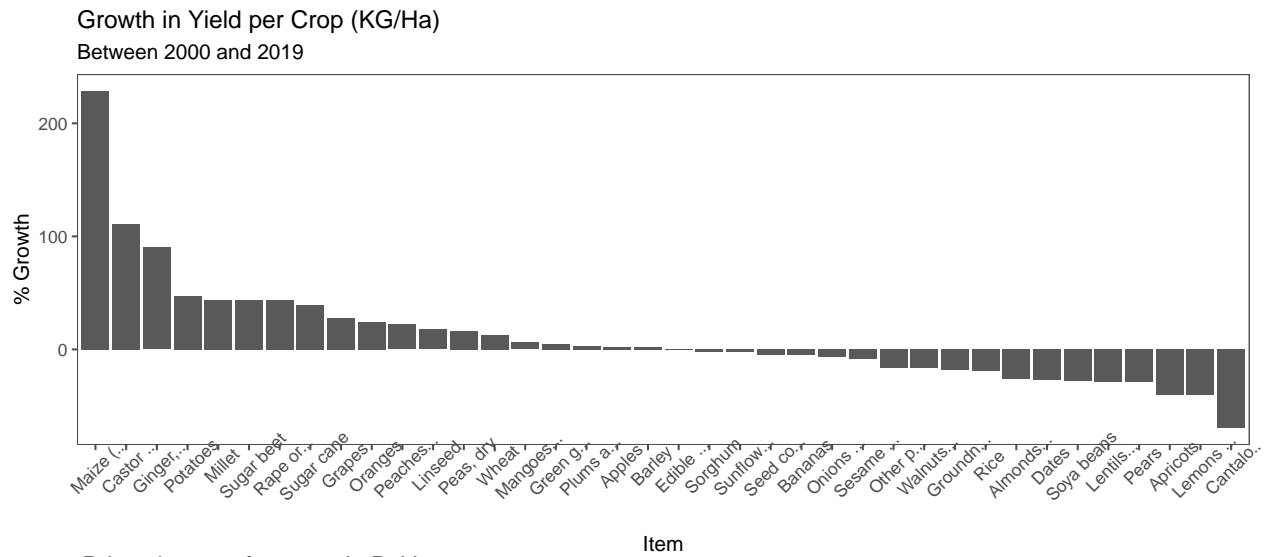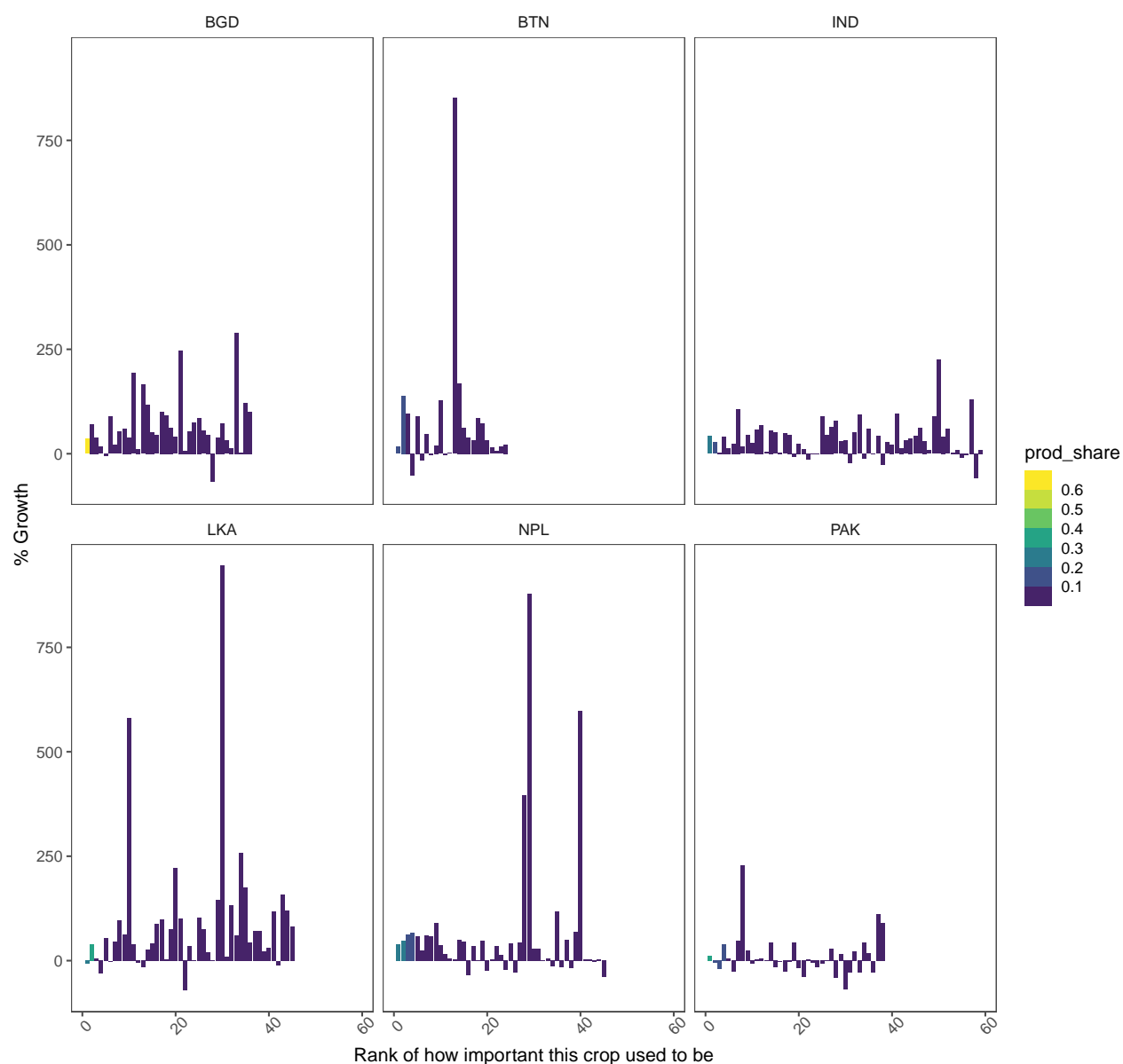
Growth in Yield per Crop (KG/Ha)
Between 2000 and 2019

Item	Production Ranking	Prod Share	Area Share	Prod Share Growth	Area Share Growth	Yield Growth	Avg Yield Growth	Avg Price	Econ Price	Yield Growth	Prod Growth	Area Growth
Maize (corn)	5	8.9	7.3	290.2	39.7	228.6	167.2	282.5	253.7	228.6	379.7	46.0
Potatoes	7	5.0	1.0	112.0	69.3	47.2	49.3	312.9	228.2	47.2	160.6	77.1
Mangoes, guavas and mangosteens	6	5.3	1.1	96.9	118.3	6.1	48.4	507.0	523.5	6.1	142.1	128.2
Sugar cane	4	10.8	5.4	16.5	-1.5	39.1	11.2	85.6	36.4	39.1	43.3	3.0
Apples	11	1.8	0.4	11.9	28.7	2.2	50.1	723.2	661.2	2.2	37.6	34.6

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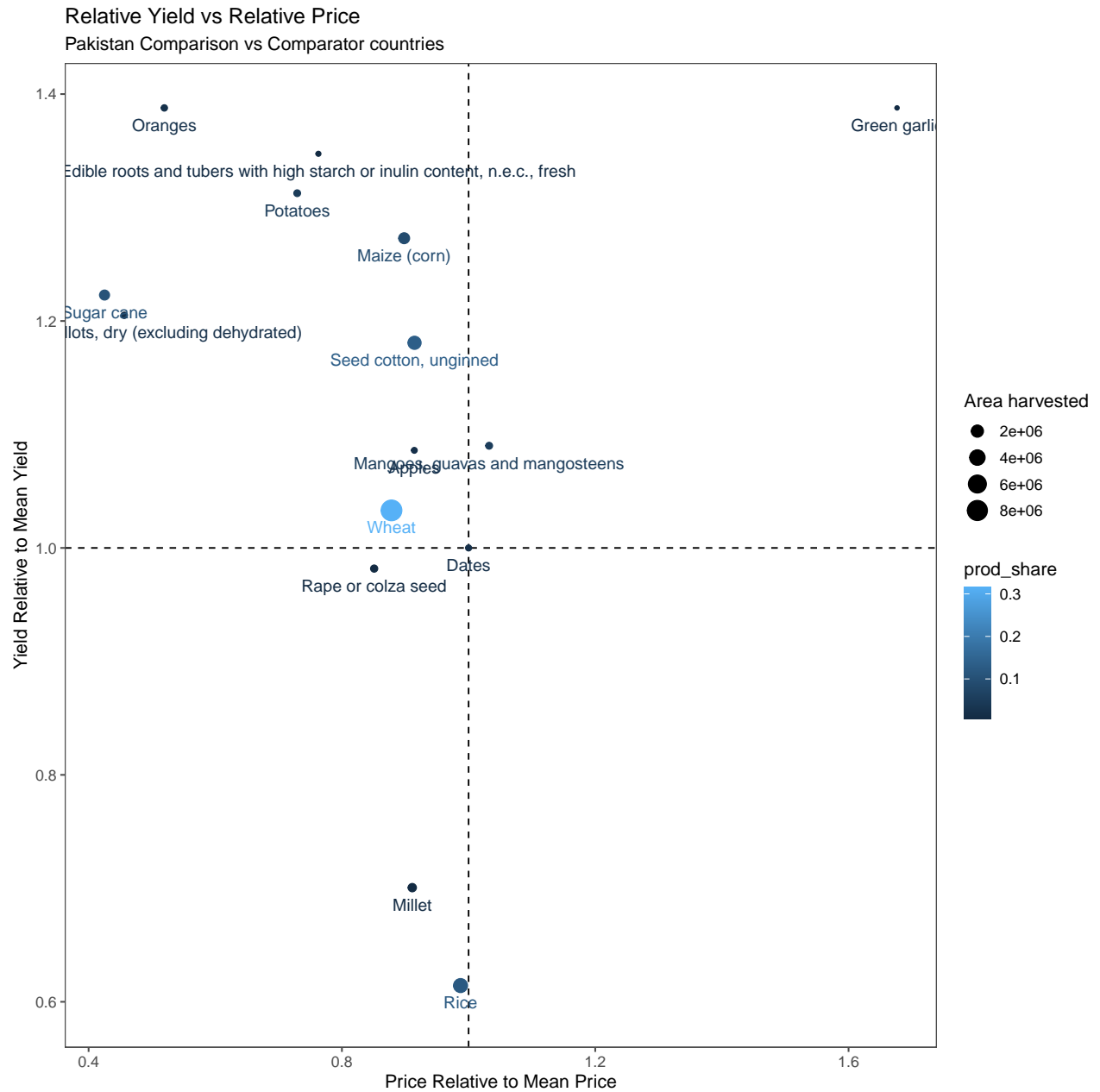| Item	Production Ranking	Prod Share	Area Share	Prod Share Growth	Area Share Growth	Yield Growth	Avg Yield Growth	Avg Price	Price	Econ Yield Growth	Prod Growth	Area Growth
Onions and shallots, dry (excluding dehydrated)	10	1.8	0.8	2.6	29.2	-6.6	68.8	422.2	192.6	-6.6	26.2	35.1
Oranges	8	2.1	0.7	-1.1	-6.6	24.6	25.9	567.4	294.8	24.6	21.6	-2.4
Wheat	1	31.6	45.3	-6.0	-1.9	12.7	35.4	331.4	291.0	12.7	15.5	2.5
Rice	3	12.1	15.9	-16.3	22.1	-19.4	46.1	370.2	365.5	-19.4	2.9	27.7
Dates	9	1.9	0.5	-25.0	21.1	-27.1	-27.1	771.4	771.4	-27.1	-7.8	26.6
Seed cotton, unginned	2	13.3	13.2	-33.4	-17.8	-4.9	50.8	726.6	664.6	-4.9	-18.2	-14.0

Lets look at prices of crops relative to others.

Pakistans Place in Price Distribution for Major Crops
2019
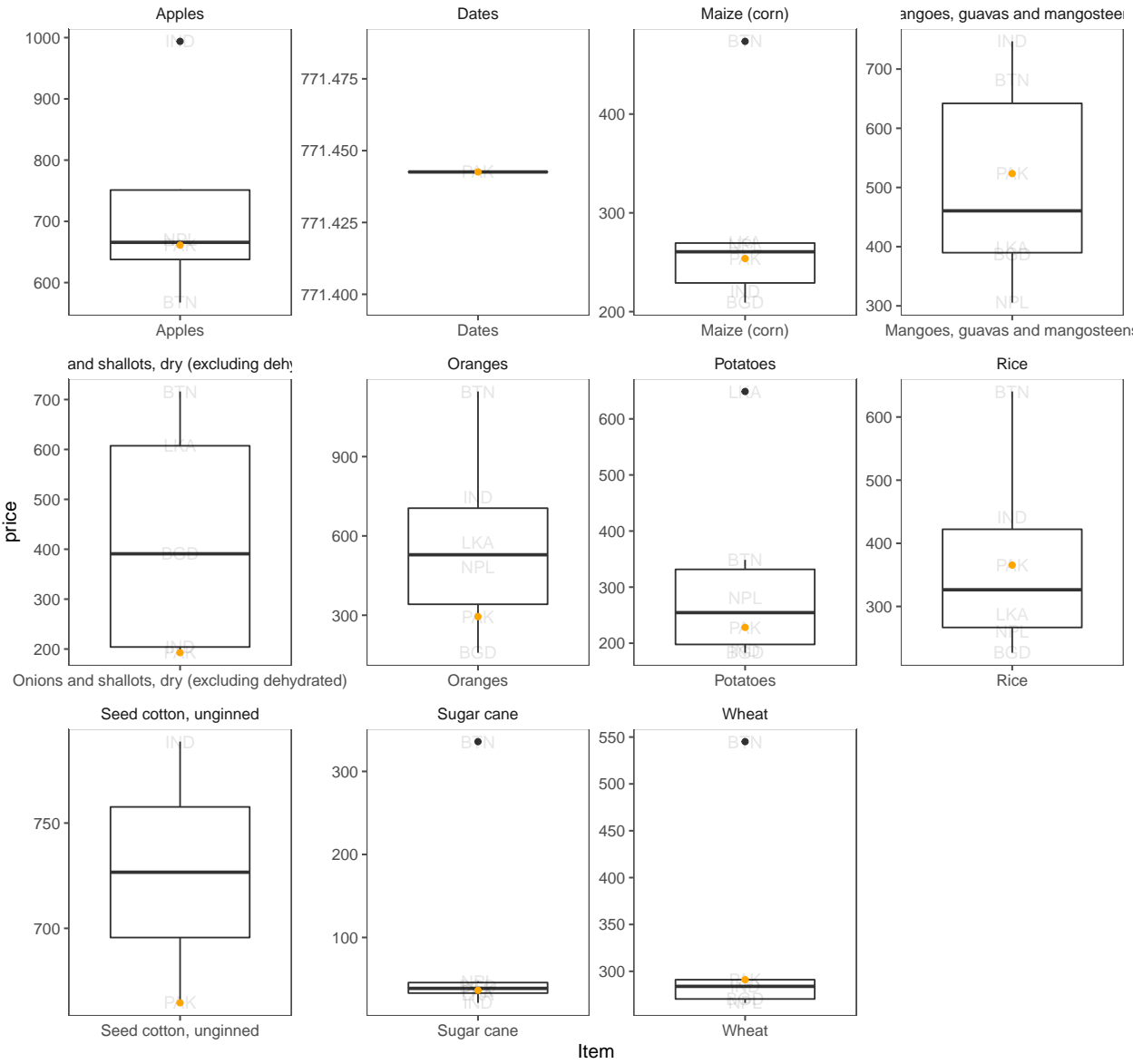
Pakistans Place in Yield Distribution for Major Crops
2019

Relative Yield vs Relative Price

Pakistan Comparison vs Comparator countries

Yield Relative to Mean Yield

Price Relative to Mean Price

Oranges

Edible roots and tubers with high starch or inulin content, n.e.c., fresh

Potatoes

Maize (corn)

Green garlic

Sugar cane

Shallots, dry (excluding dehydrated)

Seed cotton, unginned

Mangoes, guavas and mangosteens

Apples

Wheat

Dates

Rape or colza seed

Millet

Rice

Area harvested

2e+06
4e+06
6e+06
8e+06

prod_share

0.3
0.2
0.1

Relative Yield vs Relative Price

Pakistan Comparison vs Comparator countries

Yield Relative to Median Yield

Price Relative to Median Price

Maize (corn)

Green garli

Oranges

Sugar cane

Potatoes

Seed cotton, unginned

s, dry (excluding dehydrated)

Edible roots and tubers with high starch or inulin content, n.e.c., fresh

Apples

Mangoes, guavas and mangosteens

Rape or colza seed Dates

Wheat

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Rice

Area harvested

2e+06
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6e+06
8e+06

prod_share

0.3
0.2
0.1

Relative Yield vs Relative Price

Comparison vs Comparator countries

Relative Yield vs Relative Price
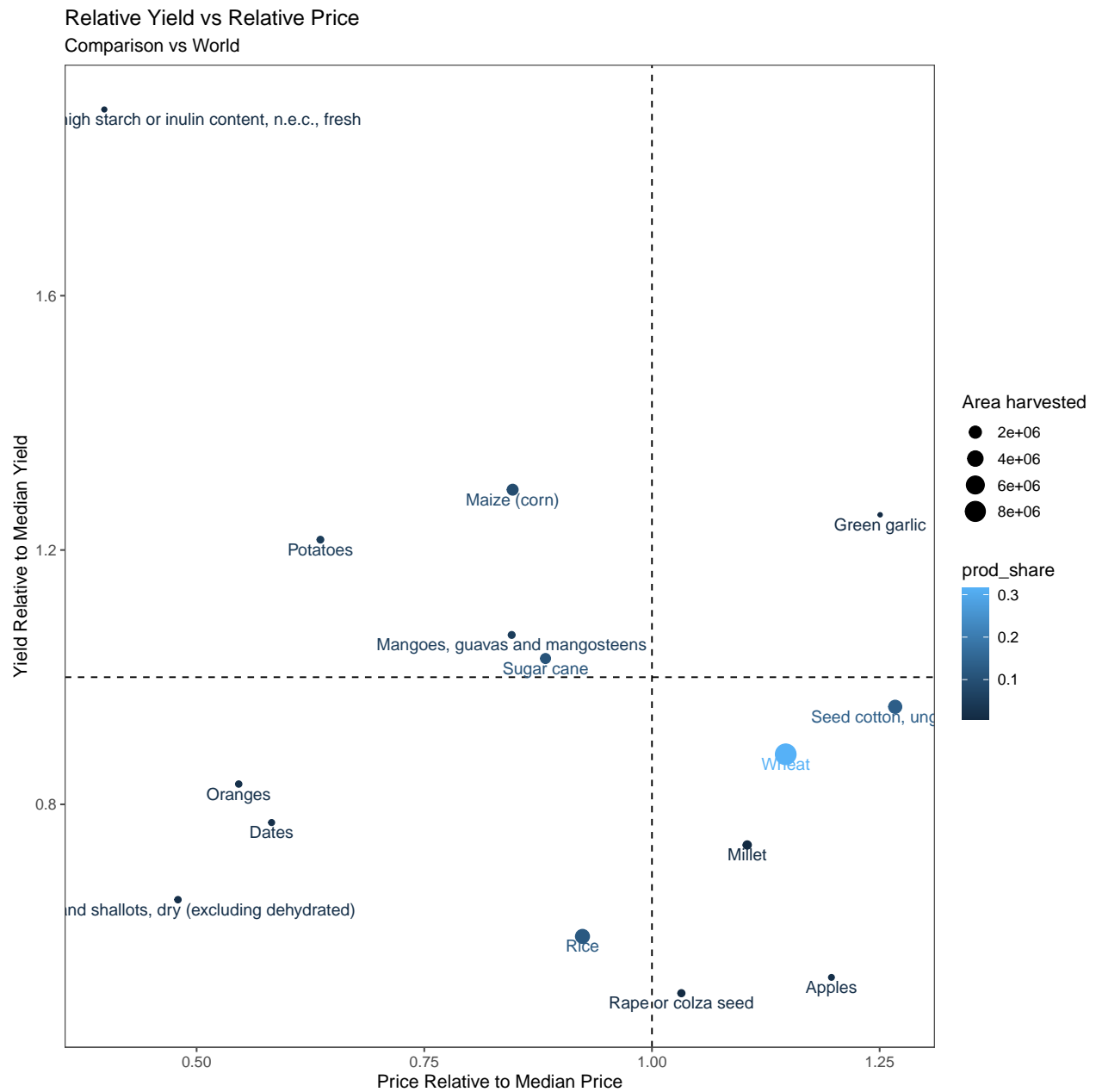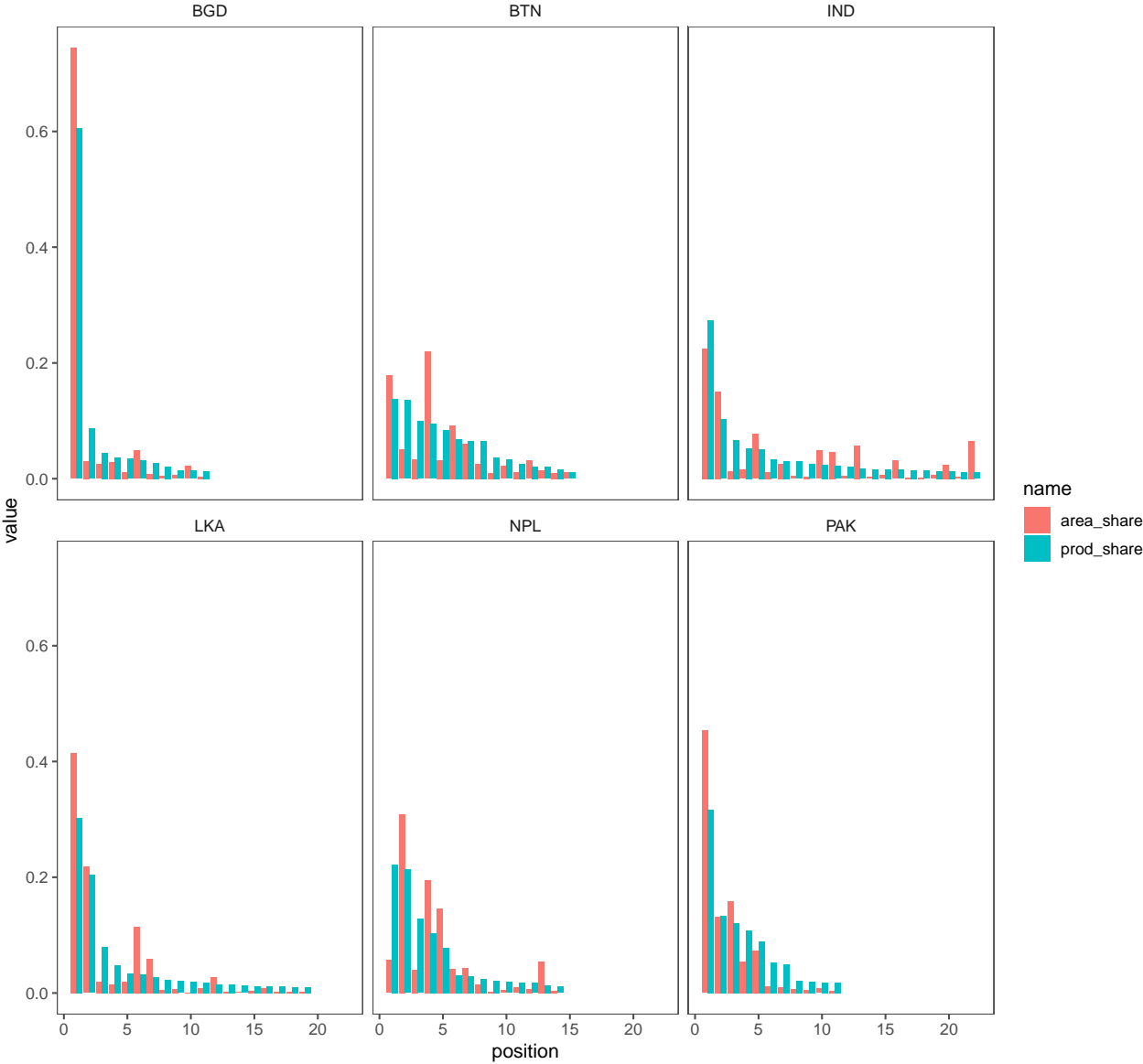Comparison vs World

Appendix

Below I got curious about the relationship between concentration in crops

Area and Production share for crops in South Asia
Year: 2019

Source: FAOSTAT

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South Asian Crop and Area concentration over Time