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.

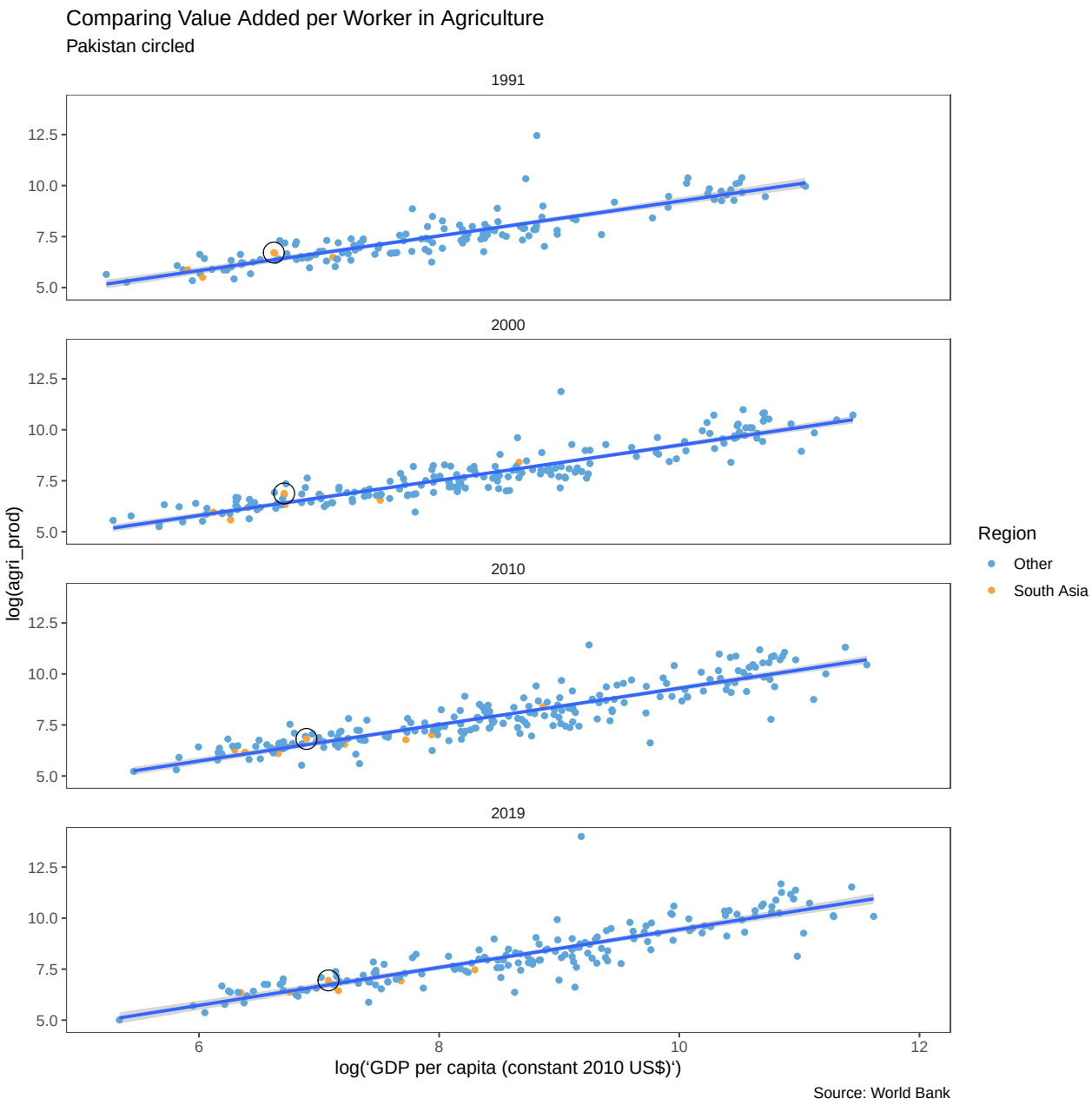
Employment in Agriculture (% of total employment) (modeled ILO estimate): Employment is defined as persons of working age who were engaged in any activity to produce goods or produce services for pay or profit, whether at work during the reference period or not at work due to temporary absence from a 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.

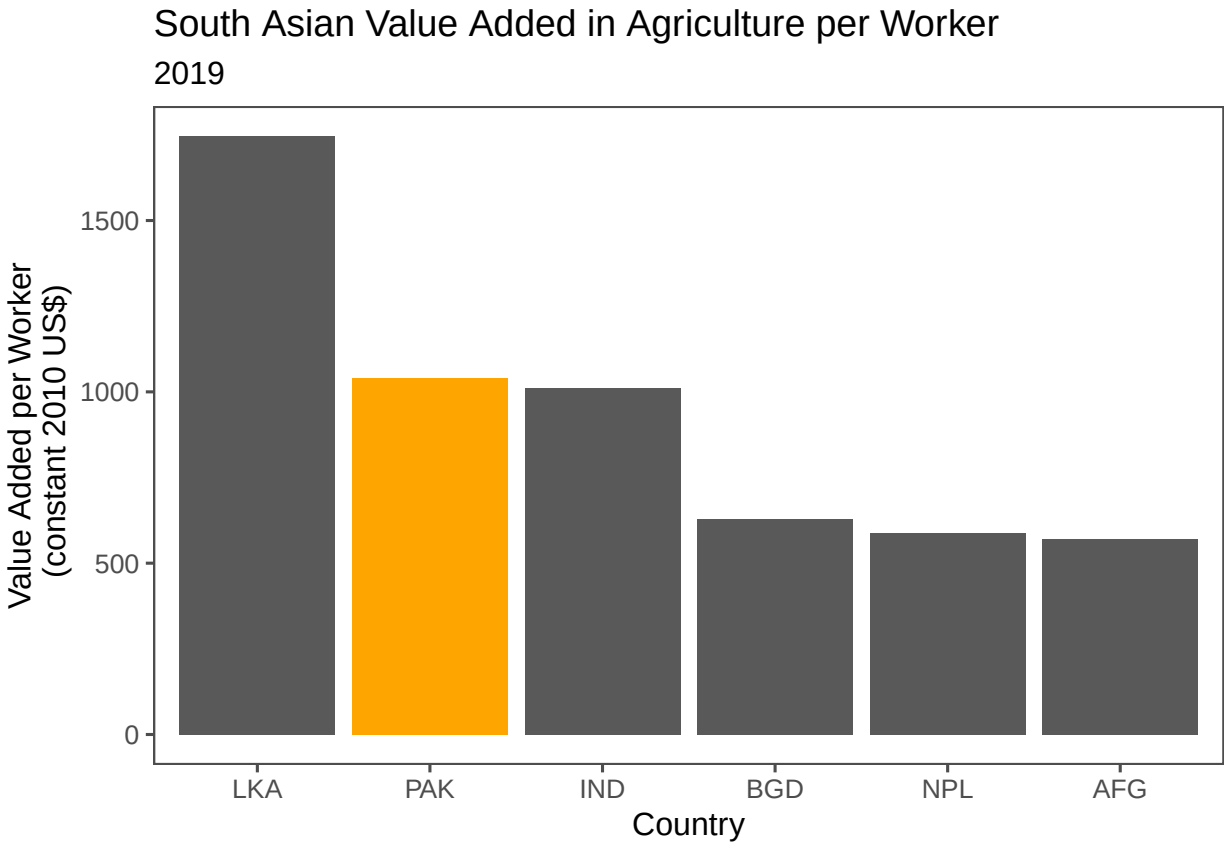
Pakistan have low Value Added per Worker in Agriculture?

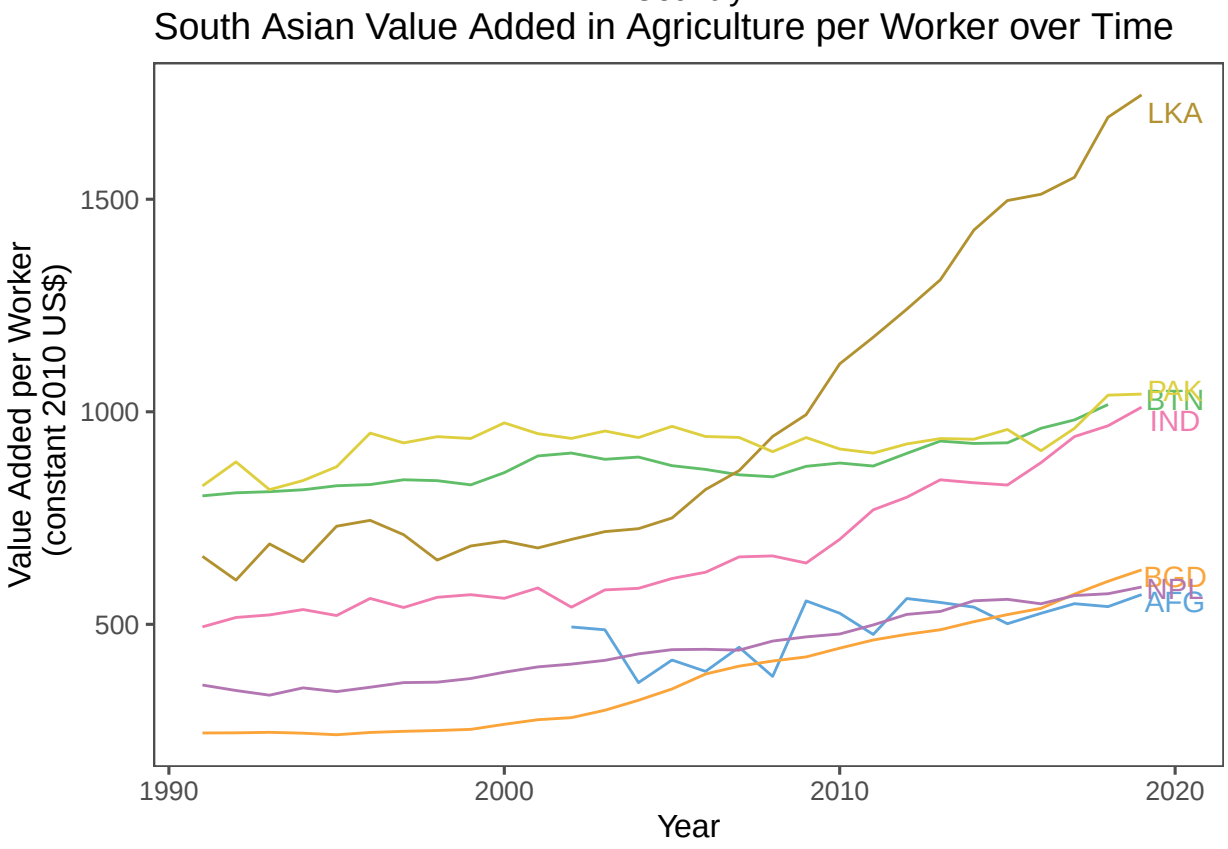
For it's level of GDP per Capita, Pakistan has a slightly above-expected valued added per worker in agriculture.

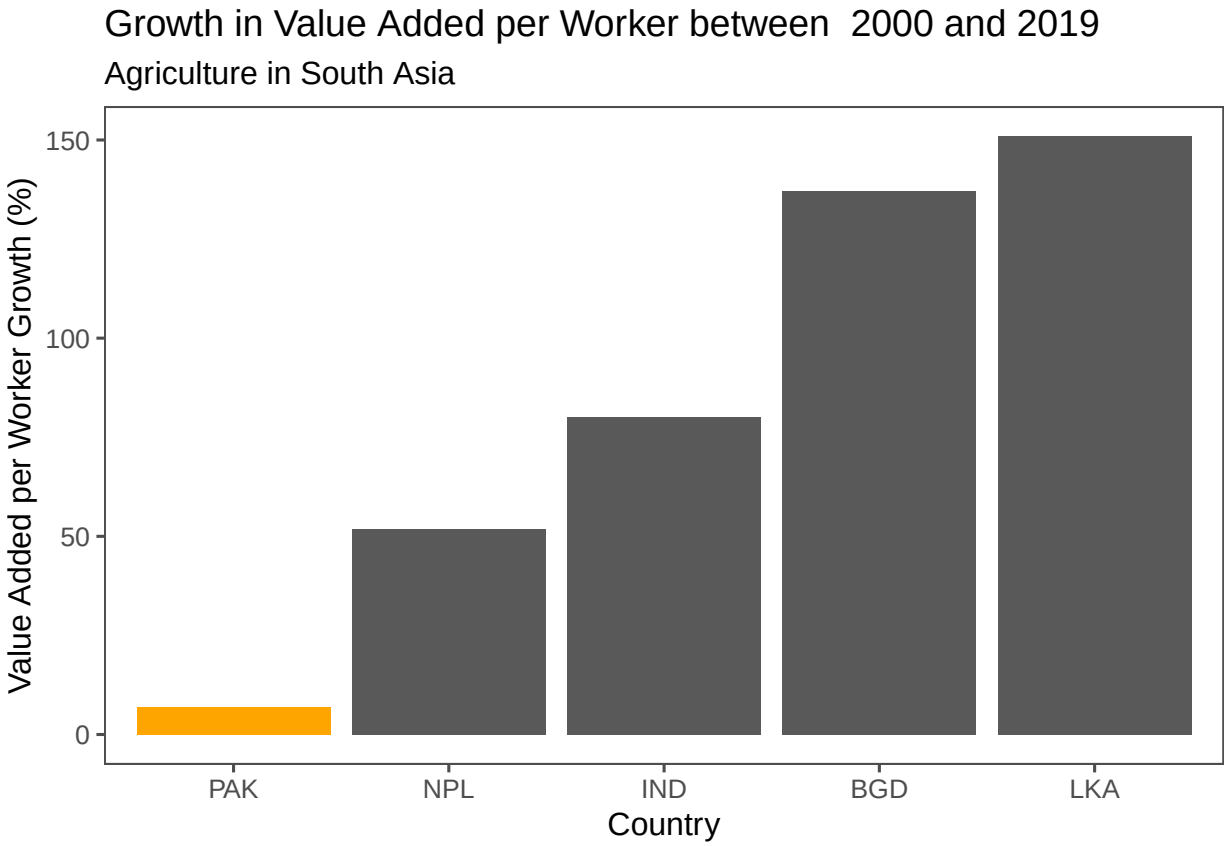


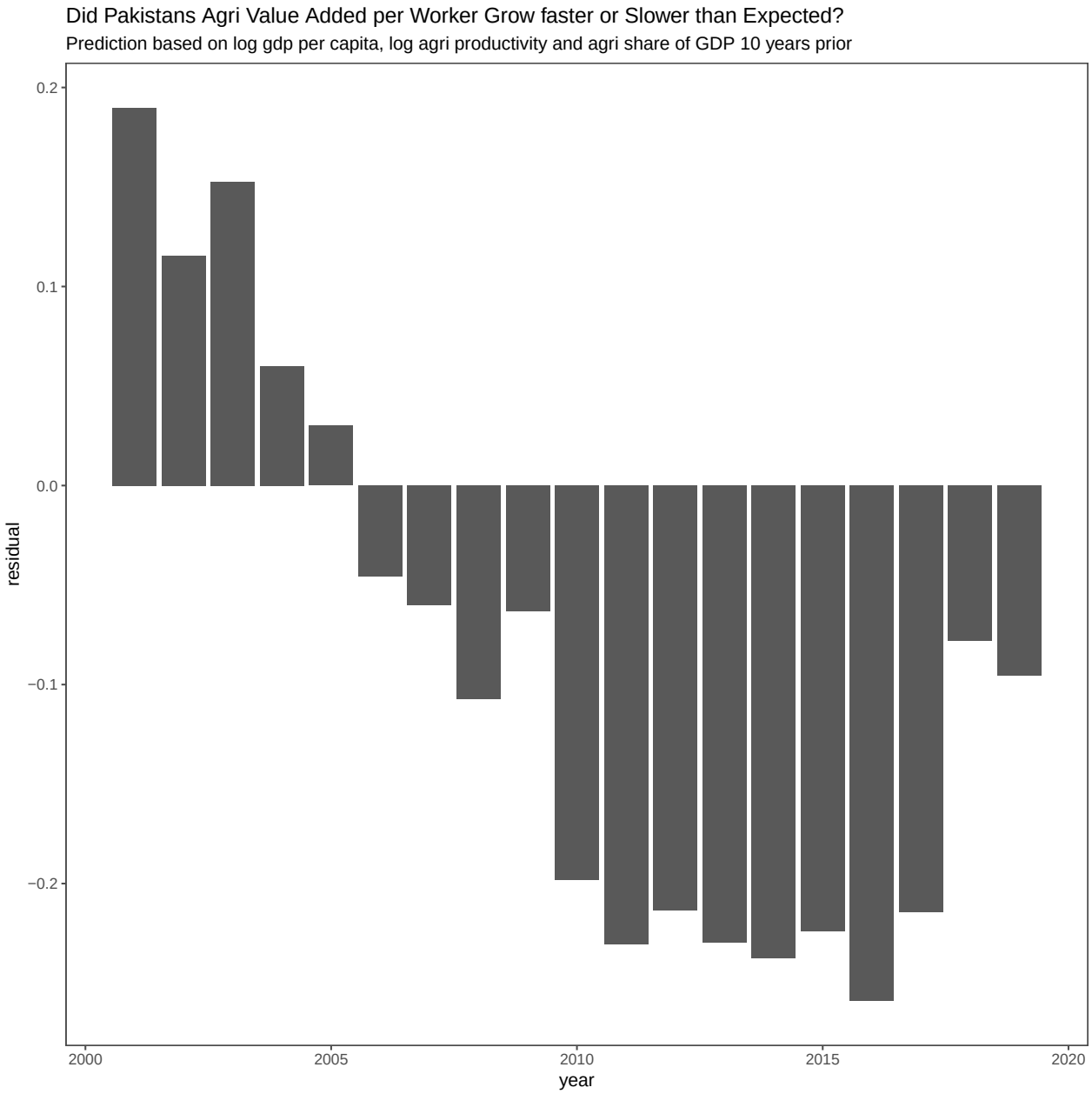
How does Pakistans Value Added per Worker Change over Time?

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
Value Added per Worker
(constant 2010 US$)
1500
1000
500
0
LKA
PAK
IND
BGD
NPL
AFG
Country


South Asian Value Added in Agriculture per Worker over Time
Value Added per Worker
(constant 2010 US$)
1500
1000
500
1990
2000
2010
2020
Year
LKA
PAK
BTN
IND
BGD
NPL
AFG


Growth in Value Added per Worker between 2000 and 2019
Agriculture in South Asia
Value Added per Worker Growth (%)
150
100
50
0
PAK
NPL
IND
BGD
LKA
Country



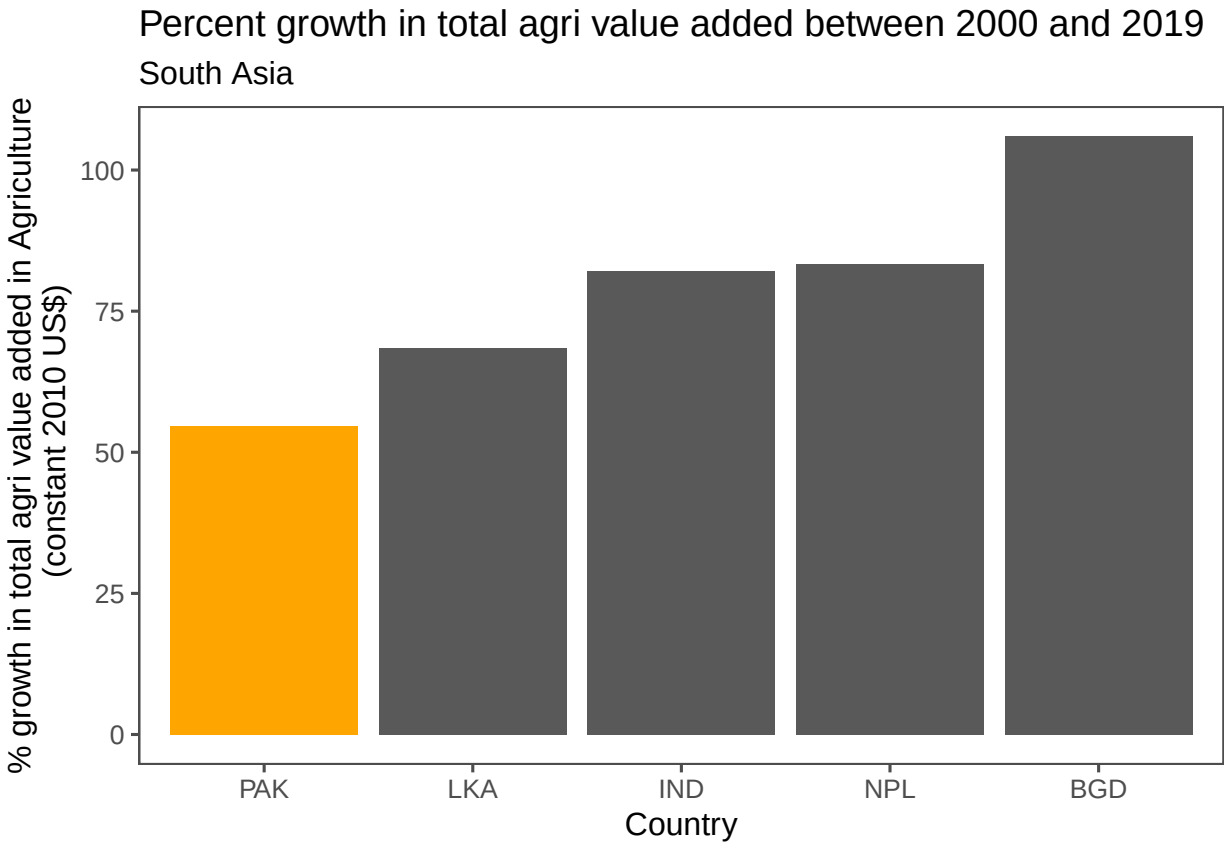
Decomposing Growth in Value Added per Worker

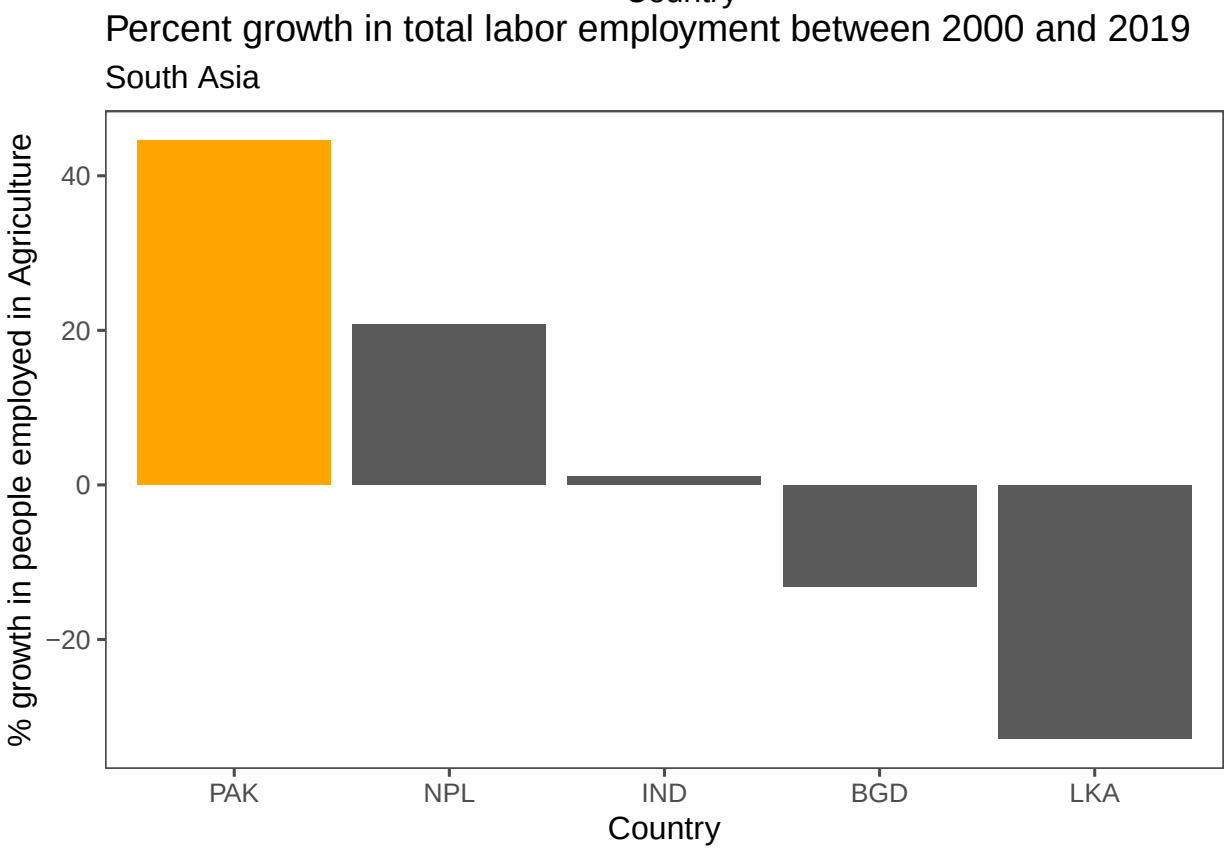
Value added per worker in agriculture is measured as gross output of the sector, minus intermediate costs, and divided by the number of people working in that sector.

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.

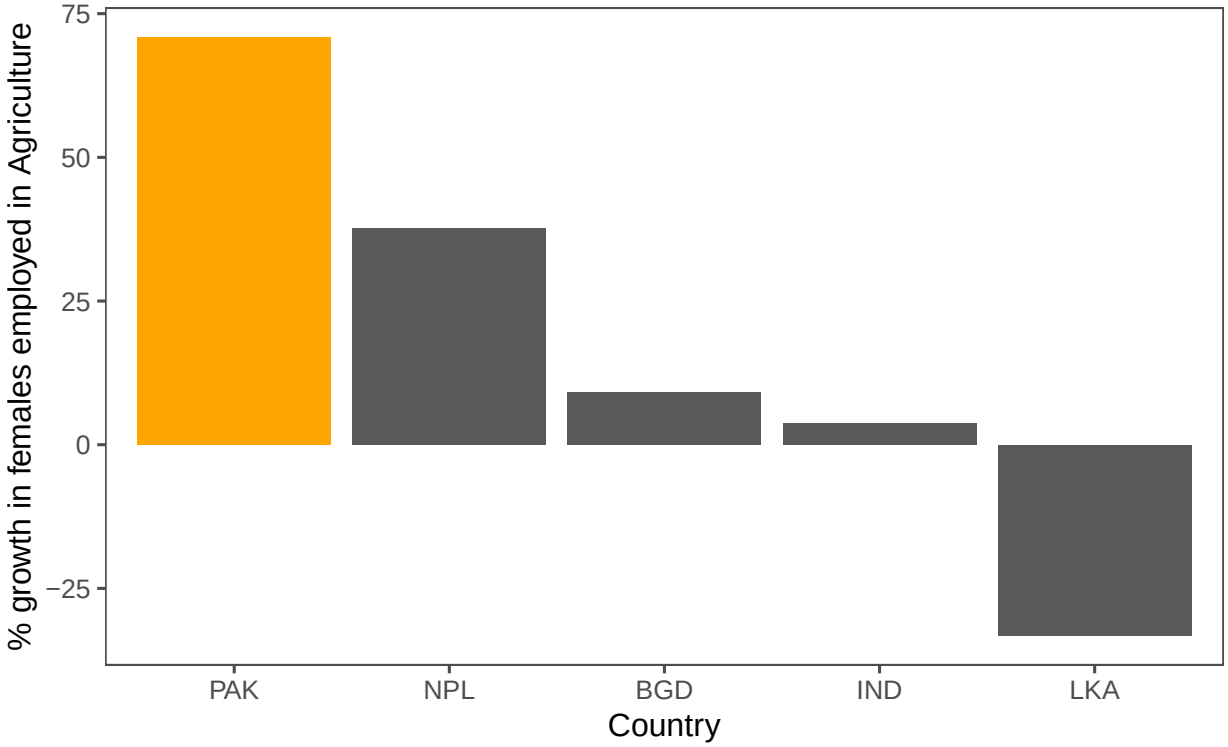




We can decompose the growth in labor between men and women.

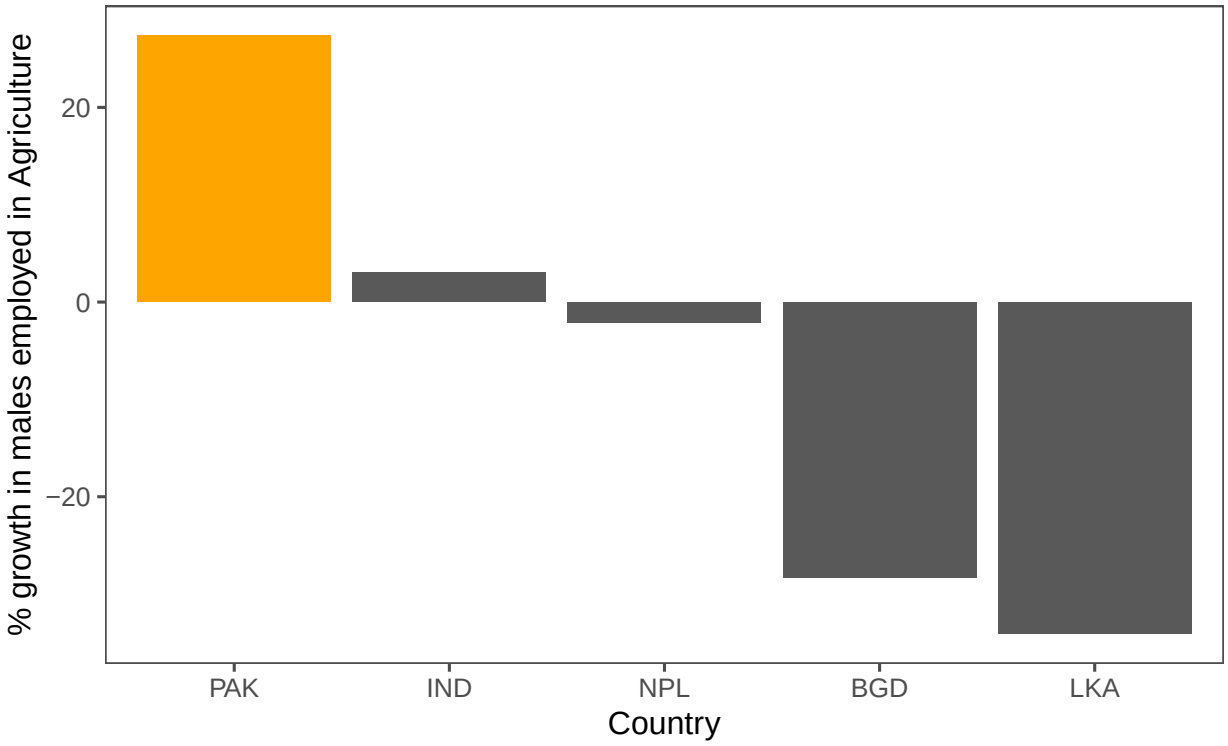
Percent growth in female labor employment between 2000 and 2019

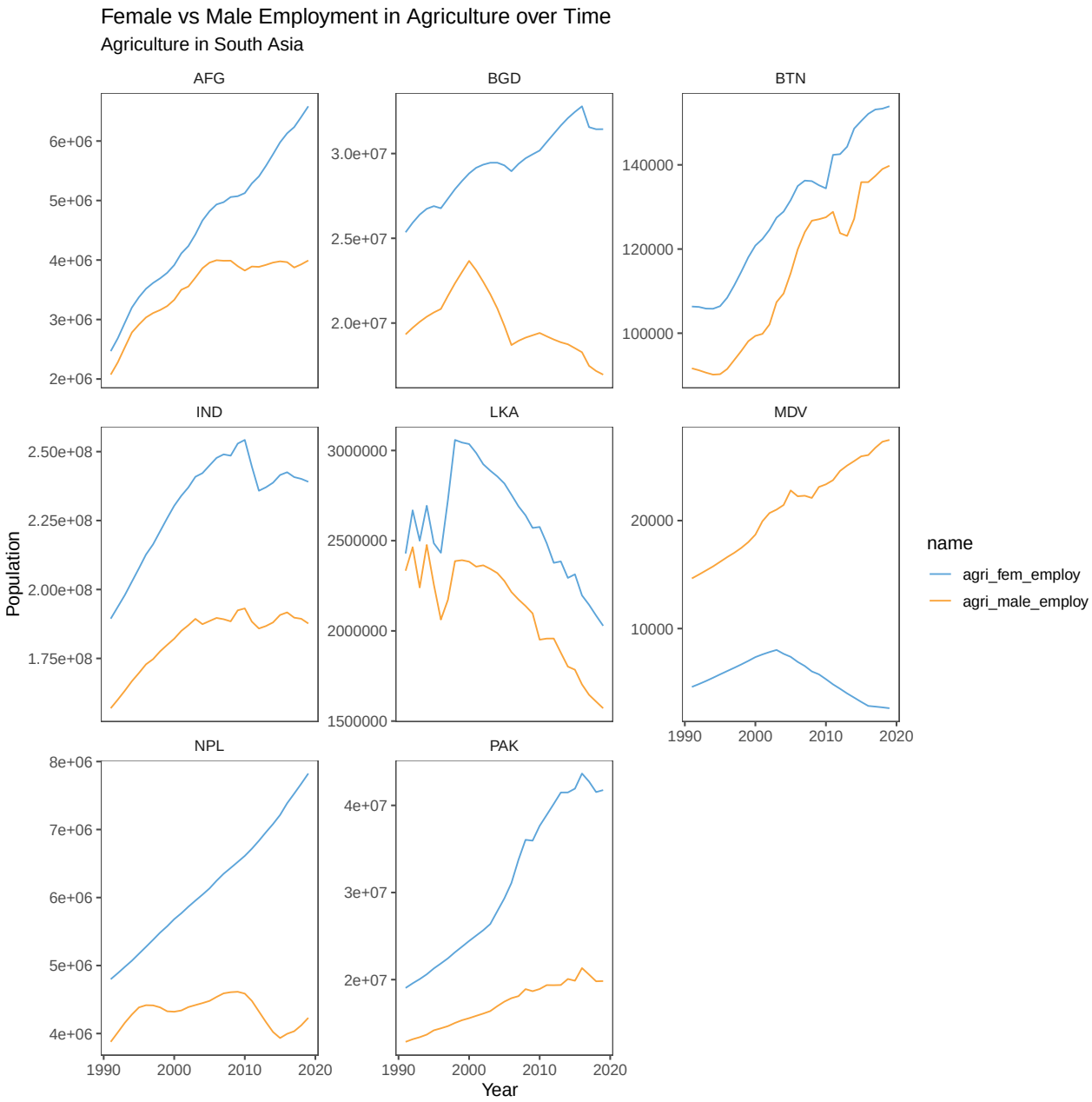
South Asia



Percent growth in male labor employment between 2000 and 2019

Agriculture in South Asia





Value Added per Hectare of Arable Land

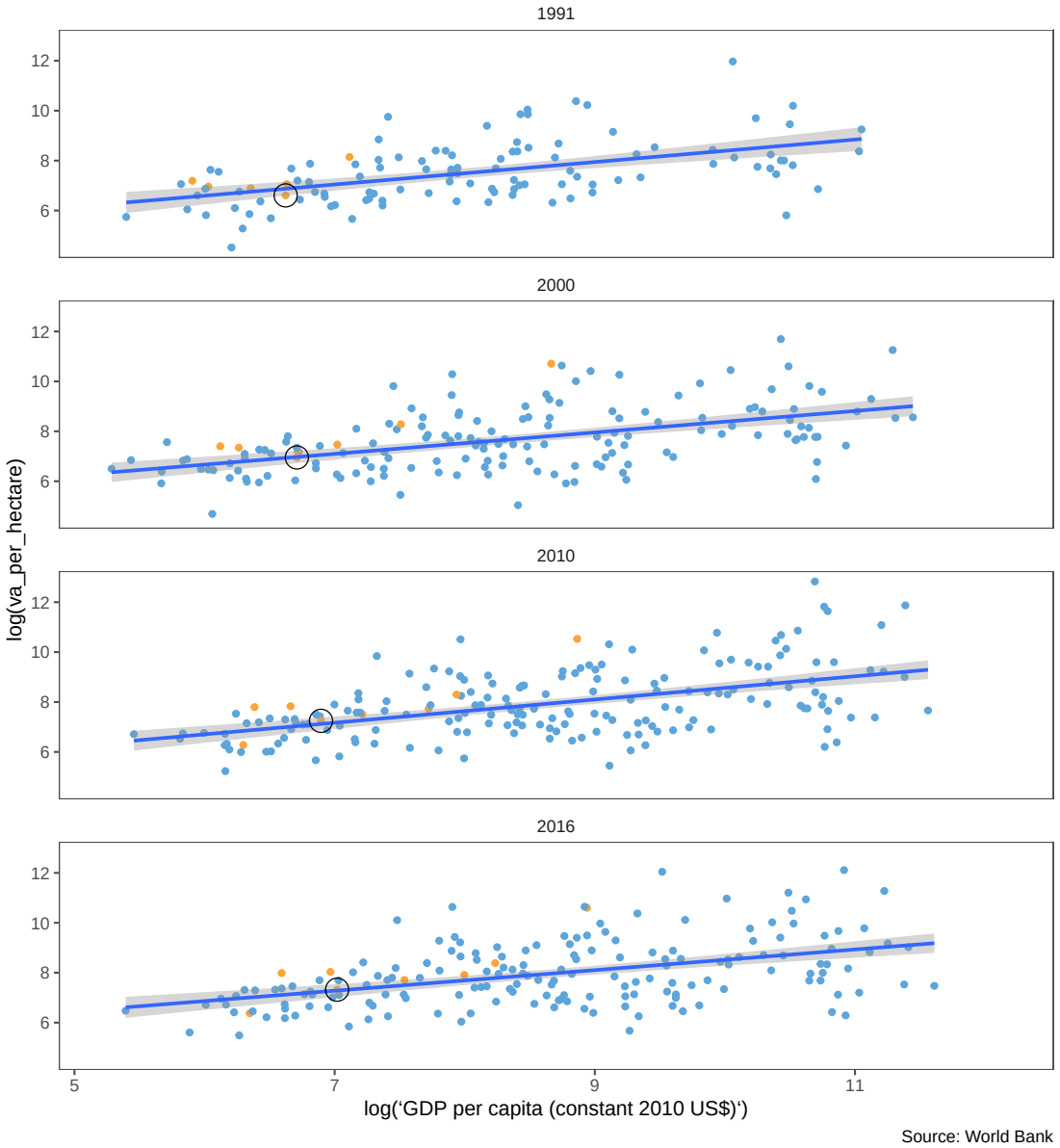
In the world, Pakistan has roughly expected levels of Value Added per Hectare of Arable land for its level of GDP per capita.

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

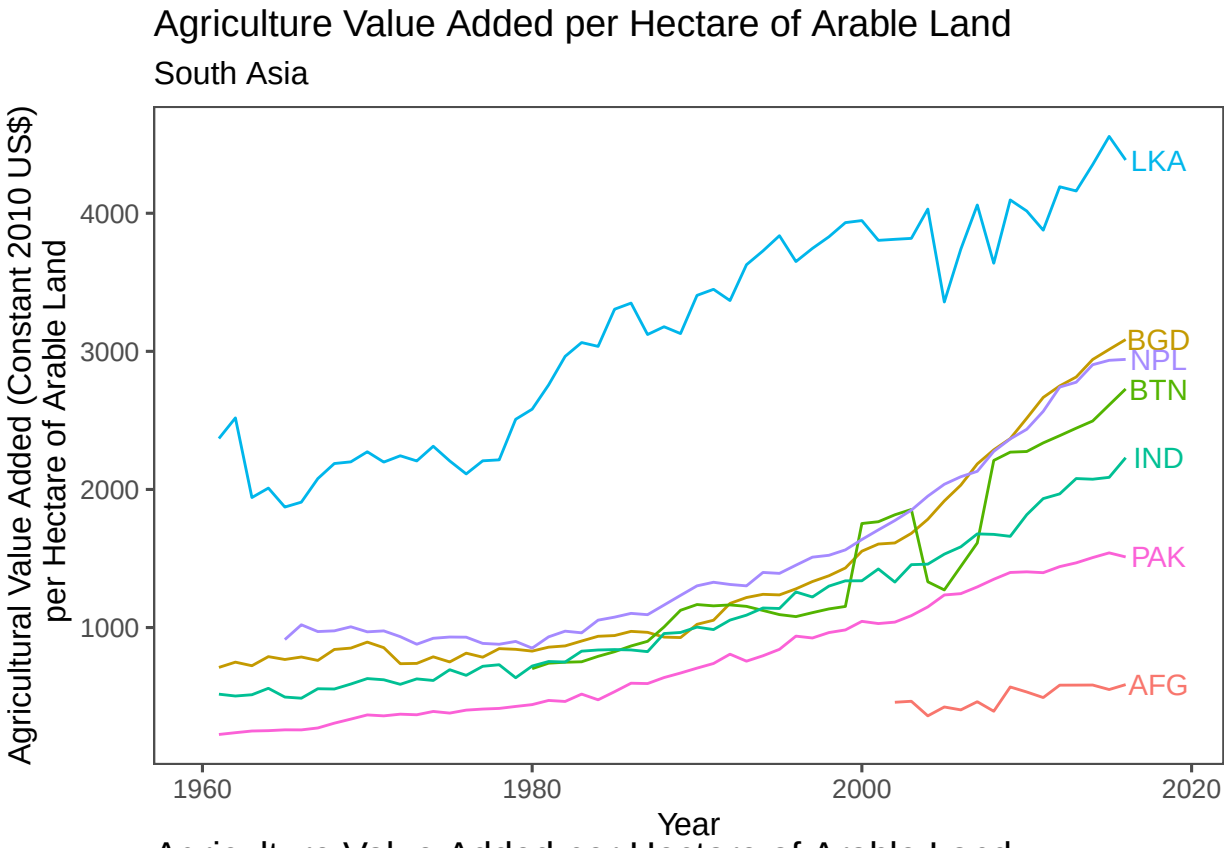
Growth has also been slow, and it has only been faster than Sri Lanka. Sri Lanka has had a greater growth in value added over this time period, and has slower growth in this metric due to a 40% increase in the amount of Arable land over the period.

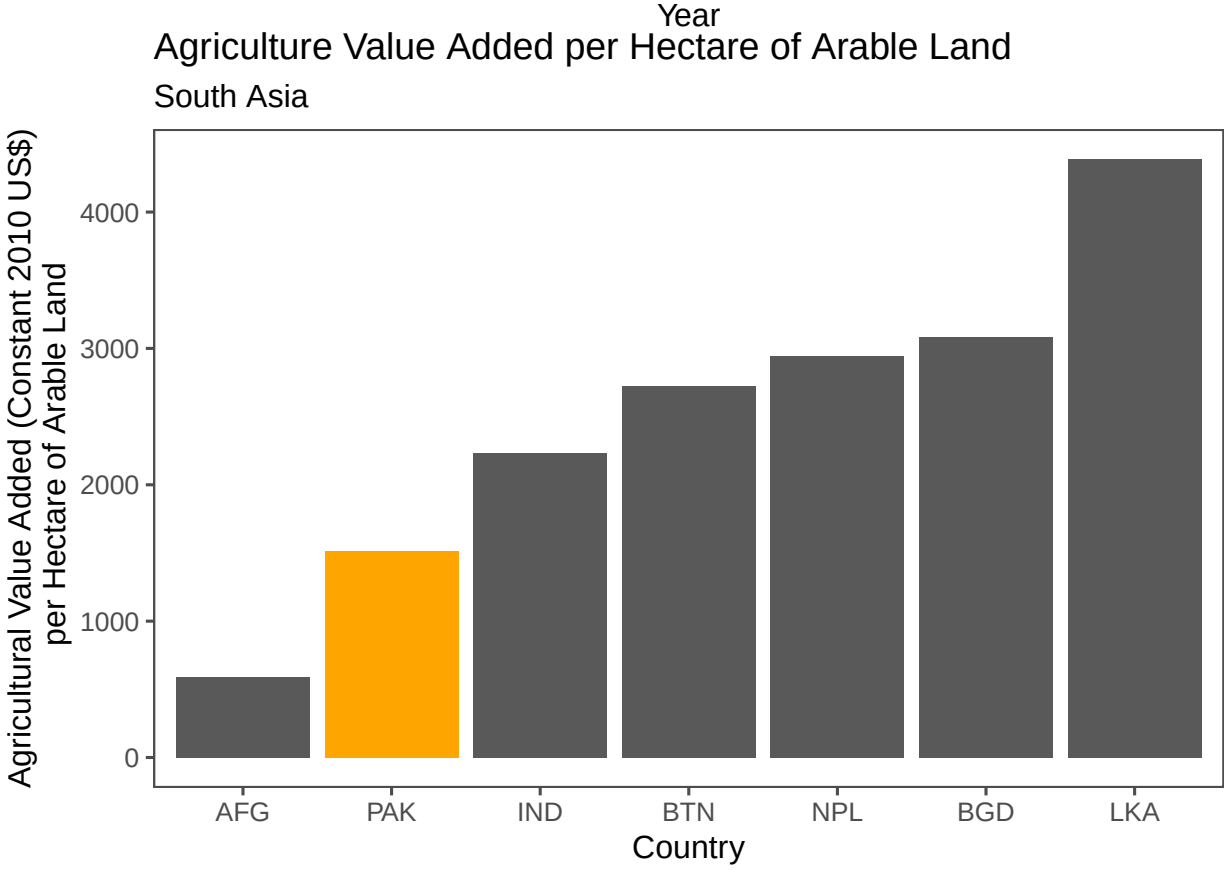
Comparing Agricultural Value Added per Hectare of Arable Land

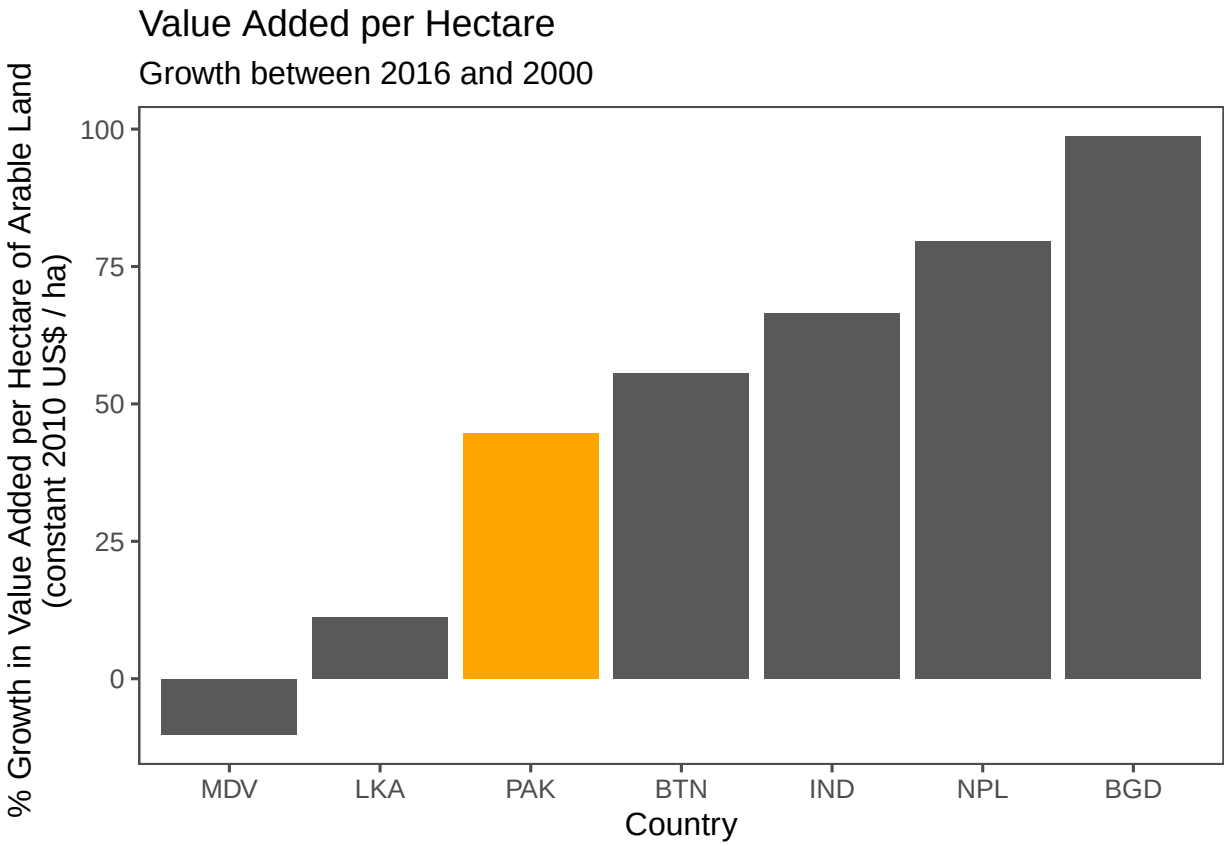
Pakistan circled

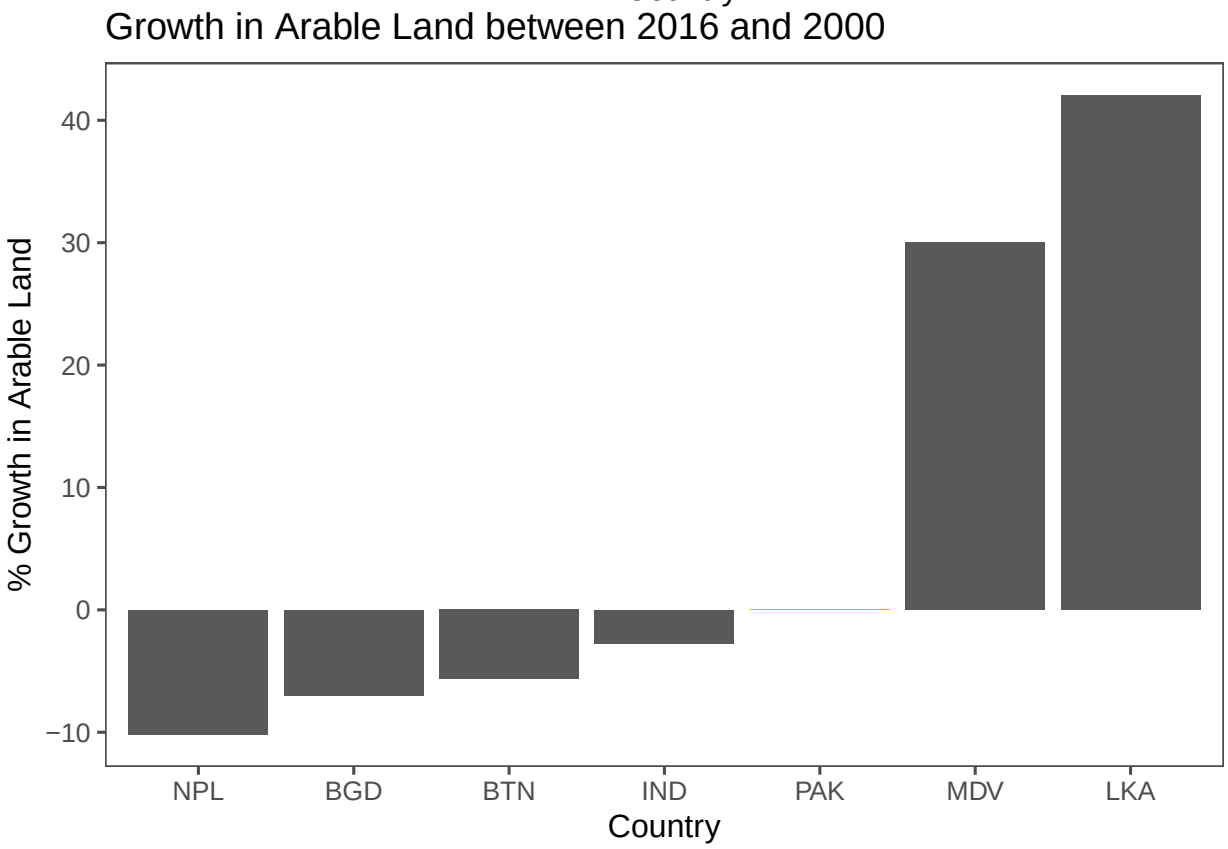


Source: World Bank


Agriculture Value Added per Hectare of Arable Land
South Asia
Agricultural Value Added (Constant 2010 US$) per Hectare of Arable Land
4000
3000
2000
1000
LKA
BGD
NPL
BTN
IND
PAK
AFG
1960
1980
2000
2020
Year


Agriculture Value Added per Hectare of Arable Land
South Asia
Agricultural Value Added (Constant 2010 US$) per Hectare of Arable Land
4000
3000
2000
1000
0
AFG
PAK
IND
BTN
NPL
BGD
LKA
Country


Value Added per Hectare
Growth between 2016 and 2000
% Growth in Value Added per Hectare of Arable Land (constant 2010 US$ / ha)
100
75
50
25
0
MDV
LKA
PAK
BTN
IND
NPL
BGD
Country


Growth in Arable Land between 2016 and 2000
% Growth in Arable Land
40
30
20
10
0
−10
NPL
BGD
BTN
IND
PAK
MDV
LKA
Country

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.

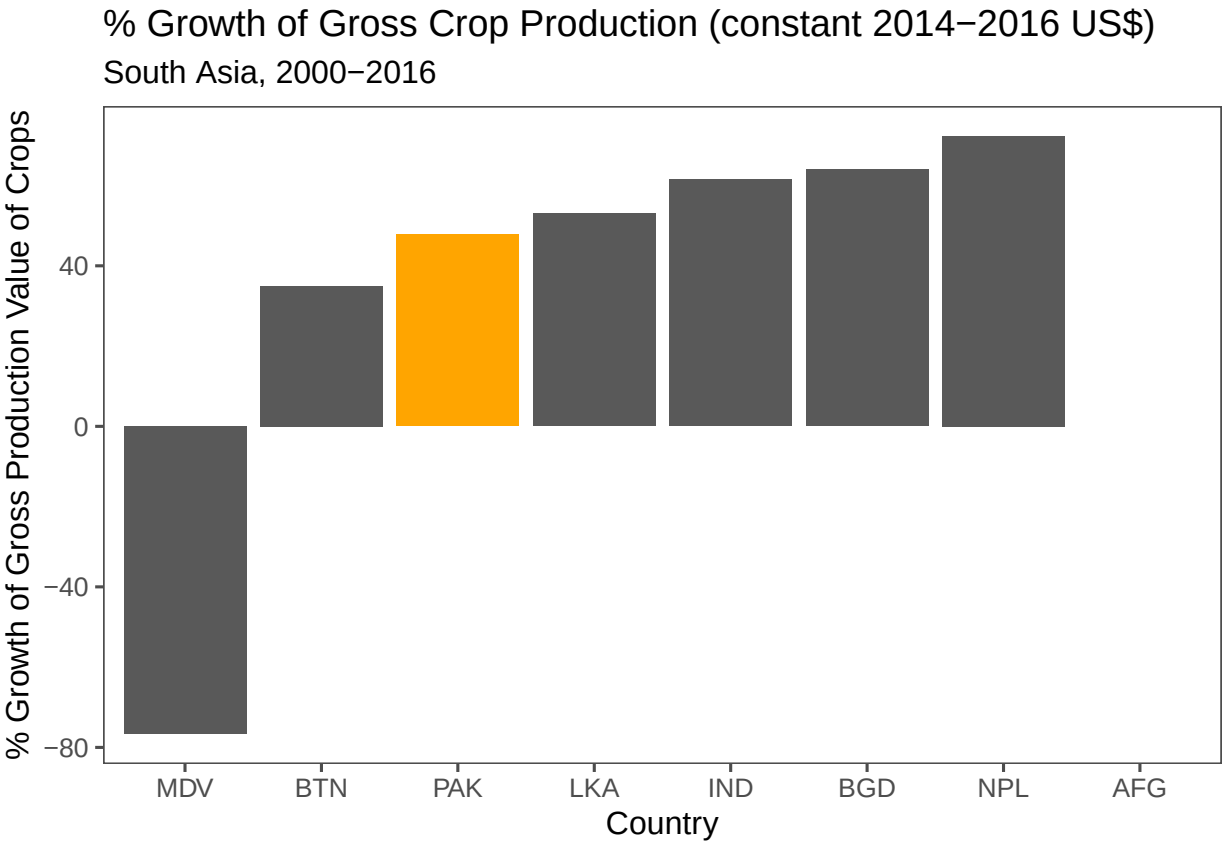
Are people using the wrong mix of inputs, driving lower quantities? Can we see this at a macro level?

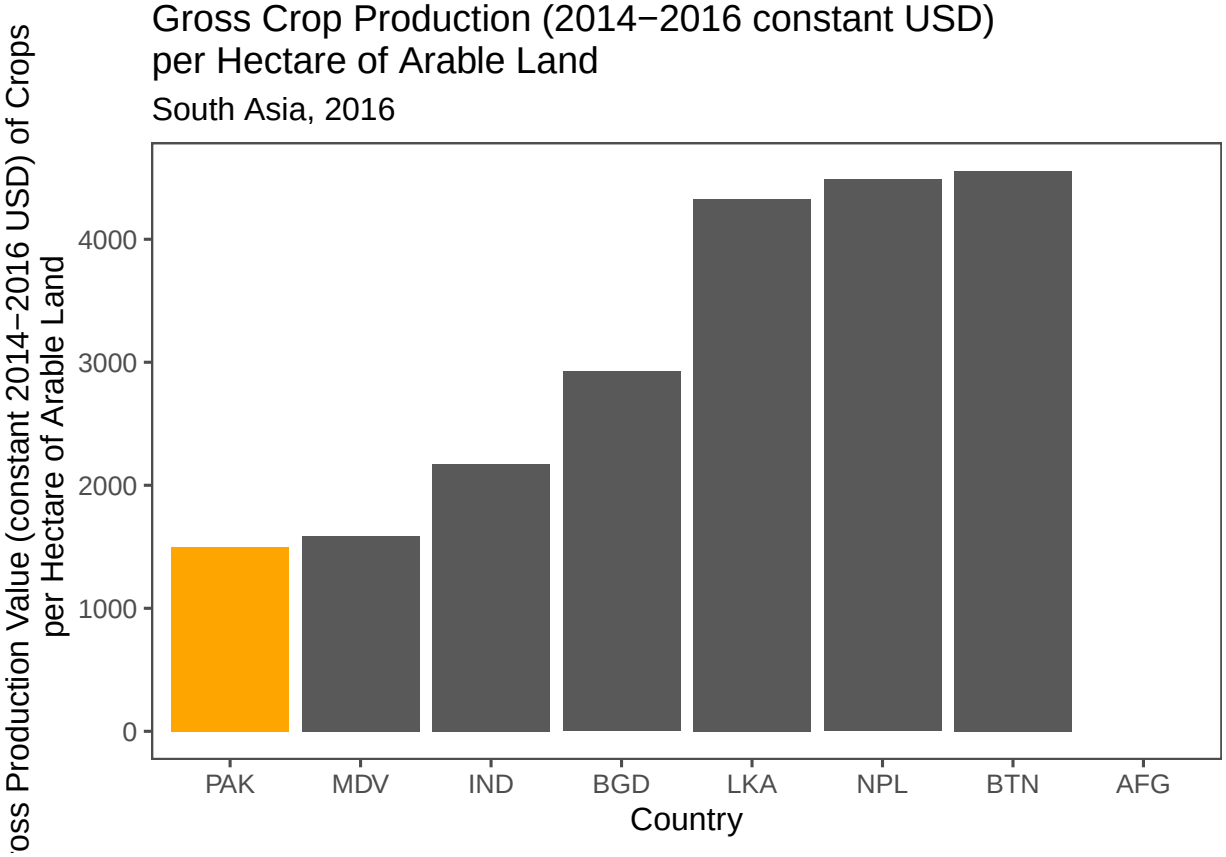
Are intermediate costs rising for some reason, far more than in other countries? What are the intermediate costs? How does FAO / the world bank take them out?

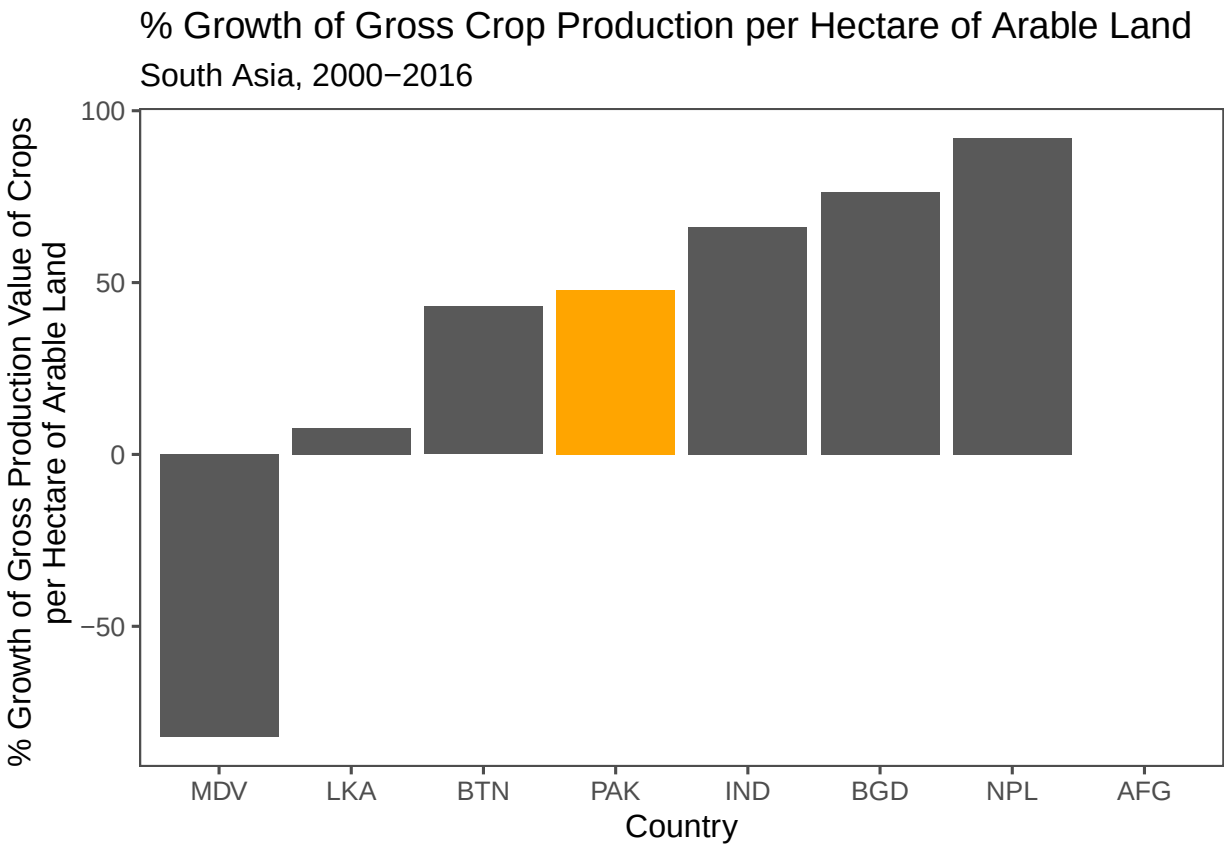
Other notes:

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



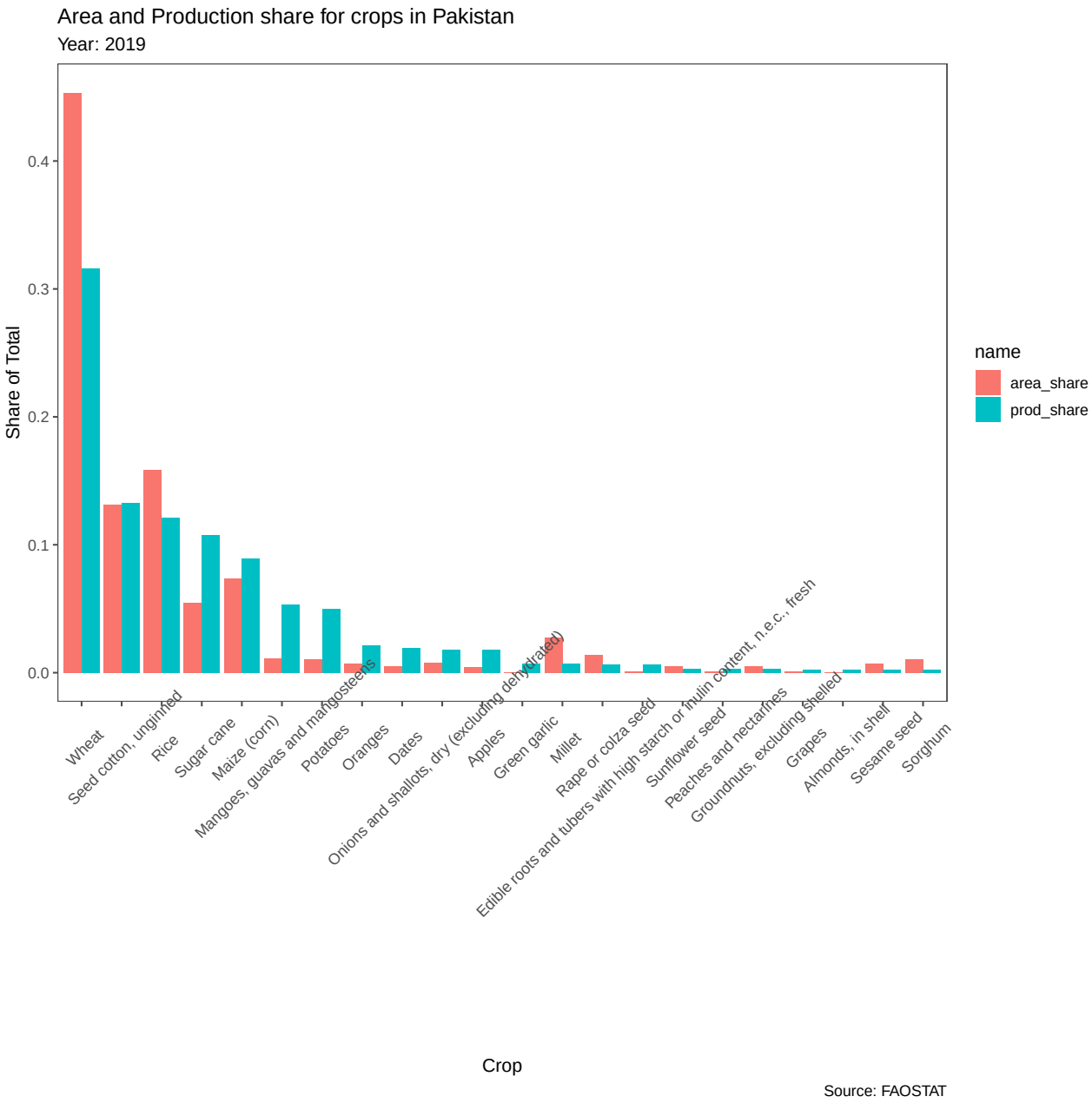


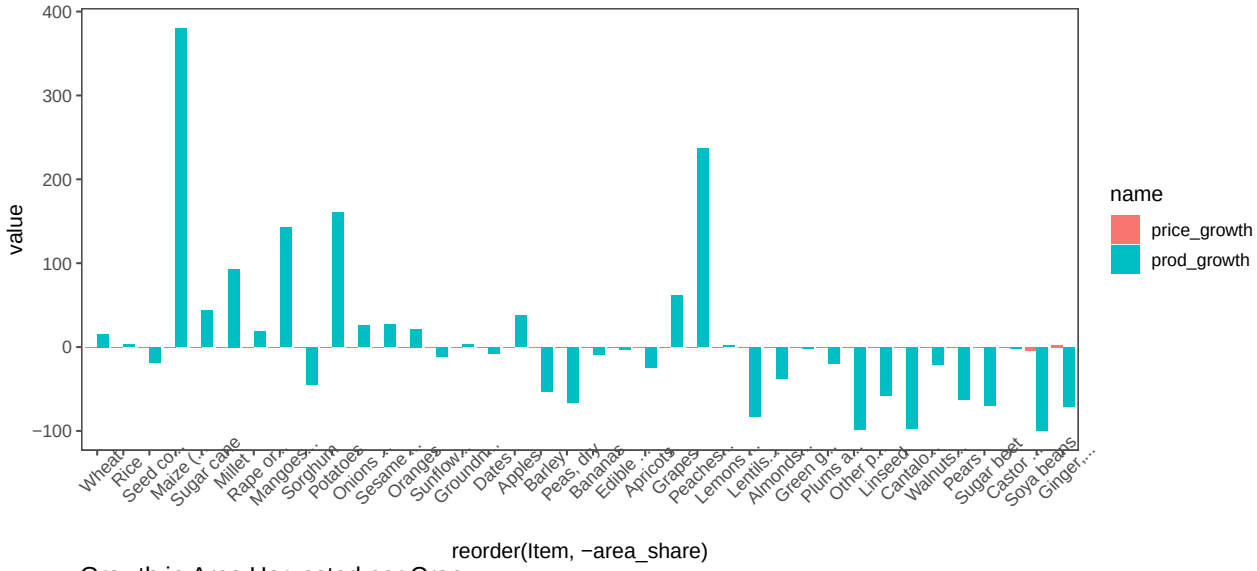


The crop data confirms that just looking at crop production, Pakistan is low gross output for its level of arable land. Growth is also not great.

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?

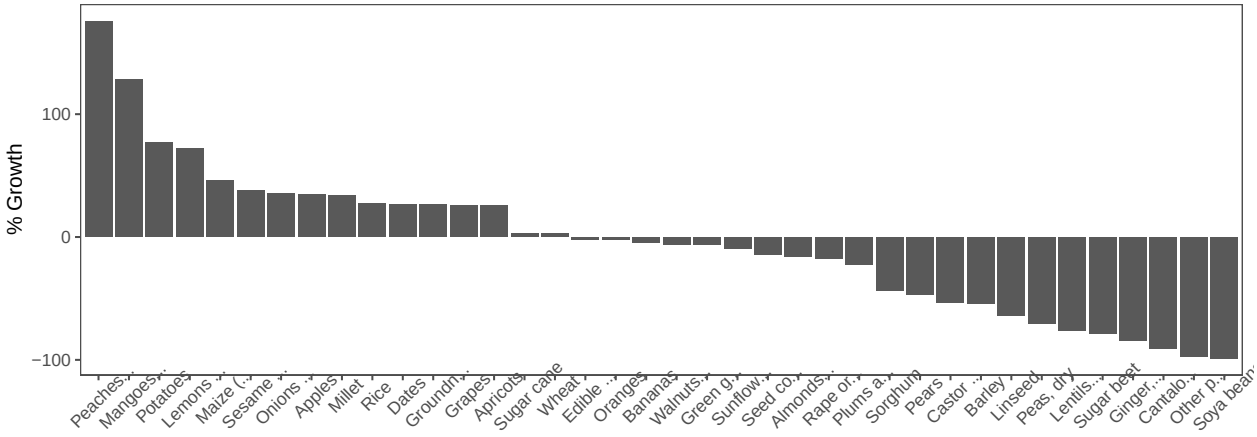
For each crop, how much of the growth was driven by price changes? Each crop has gross production, change in land, change in price.


Area and Production share for crops in Pakistan
Year: 2019
Share of Total
0.0
0.1
0.2
0.3
0.4
Wheat
Seed cotton, unginned
Rice
Sugar cane
Maize (corn)
Mangoes, guavas and mangosteens
Potatoes
Oranges
Dates
Onions and shallots, dry (excluding dehydrated)
Apples
Green garlic
Millet
Rape or colza seed
Edible roots and tubers with high starch or inulin content, n.e.c., fresh
Sunflower seed
Peaches and nectarines
Groundnuts, excluding shelled
Grapes
Almonds, in shell
Sesame seed
Sorghum
Crop
name
area_share
prod_share
Source: FAOSTAT



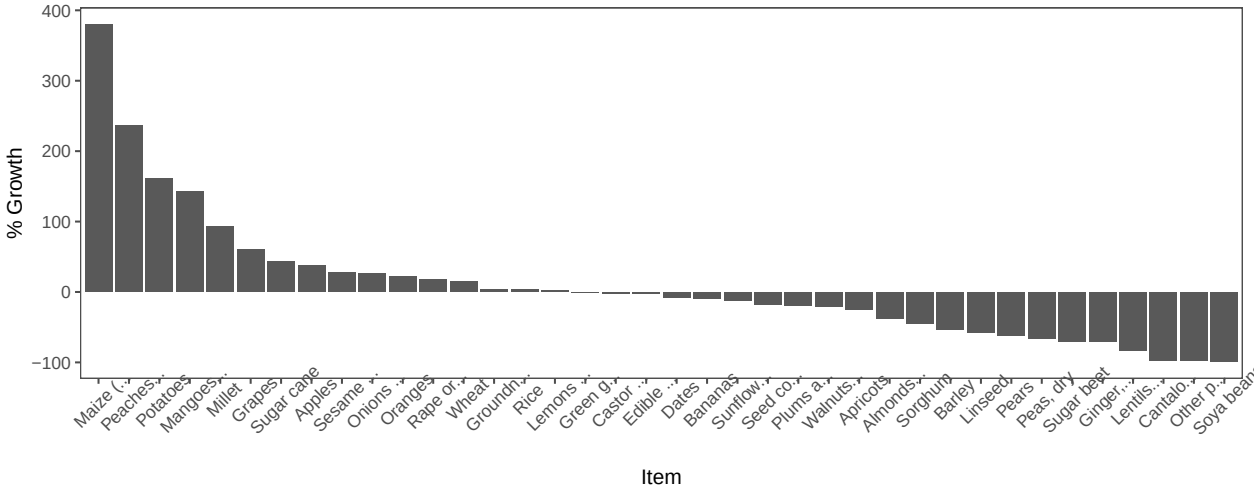
Growth in Area Harvested per Crop

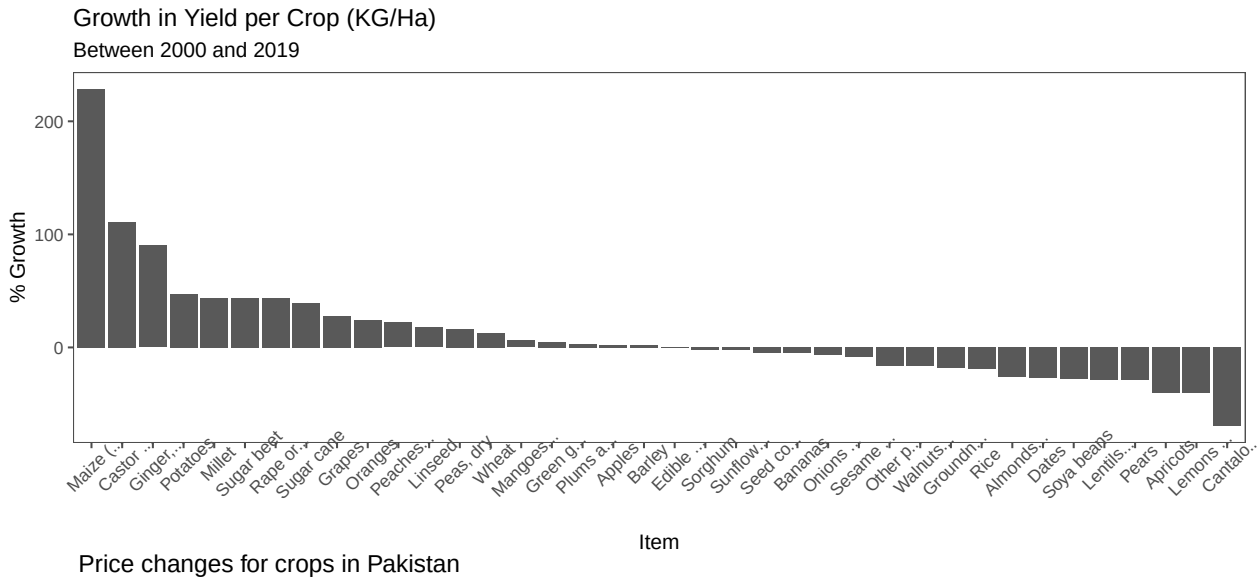
Between 2000 and 2019

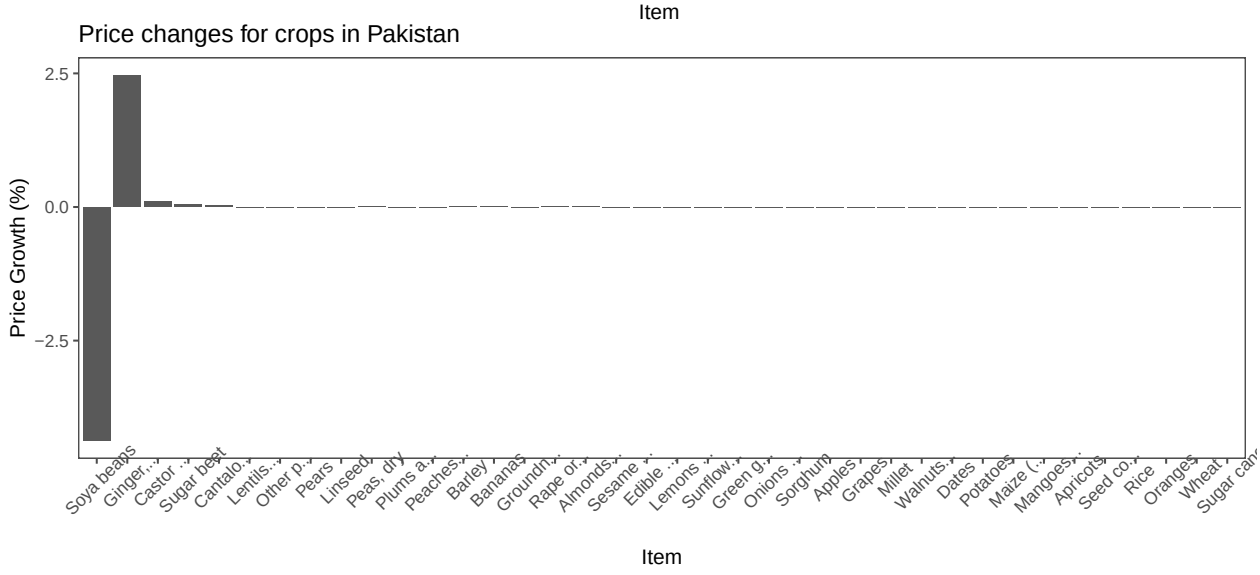


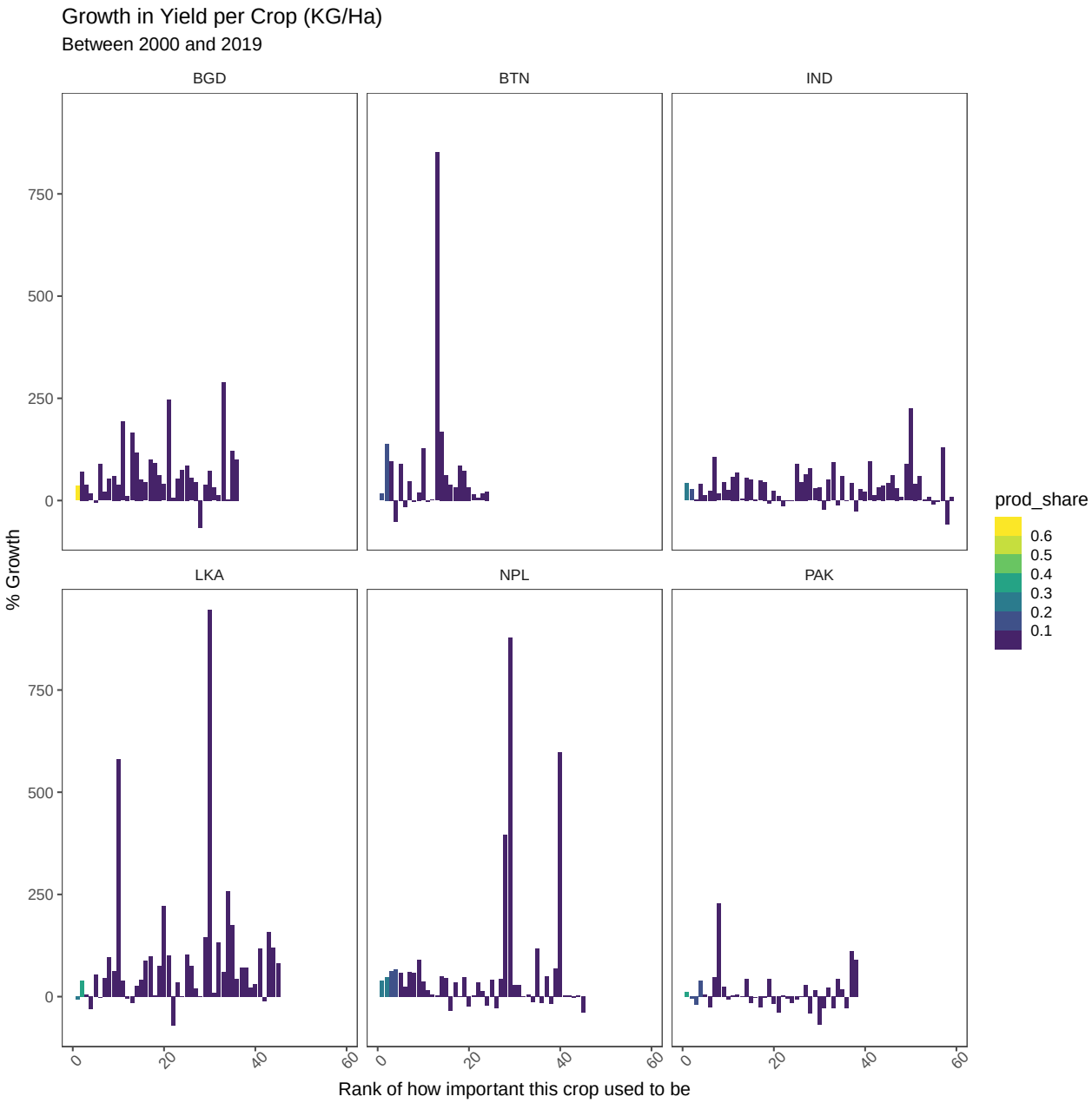
Growth in Production per Crop (KG)

Between 2000 and 2019




Growth in Yield per Crop (KG/Ha)
Between 2000 and 2019
% Growth
200
100
0
Item

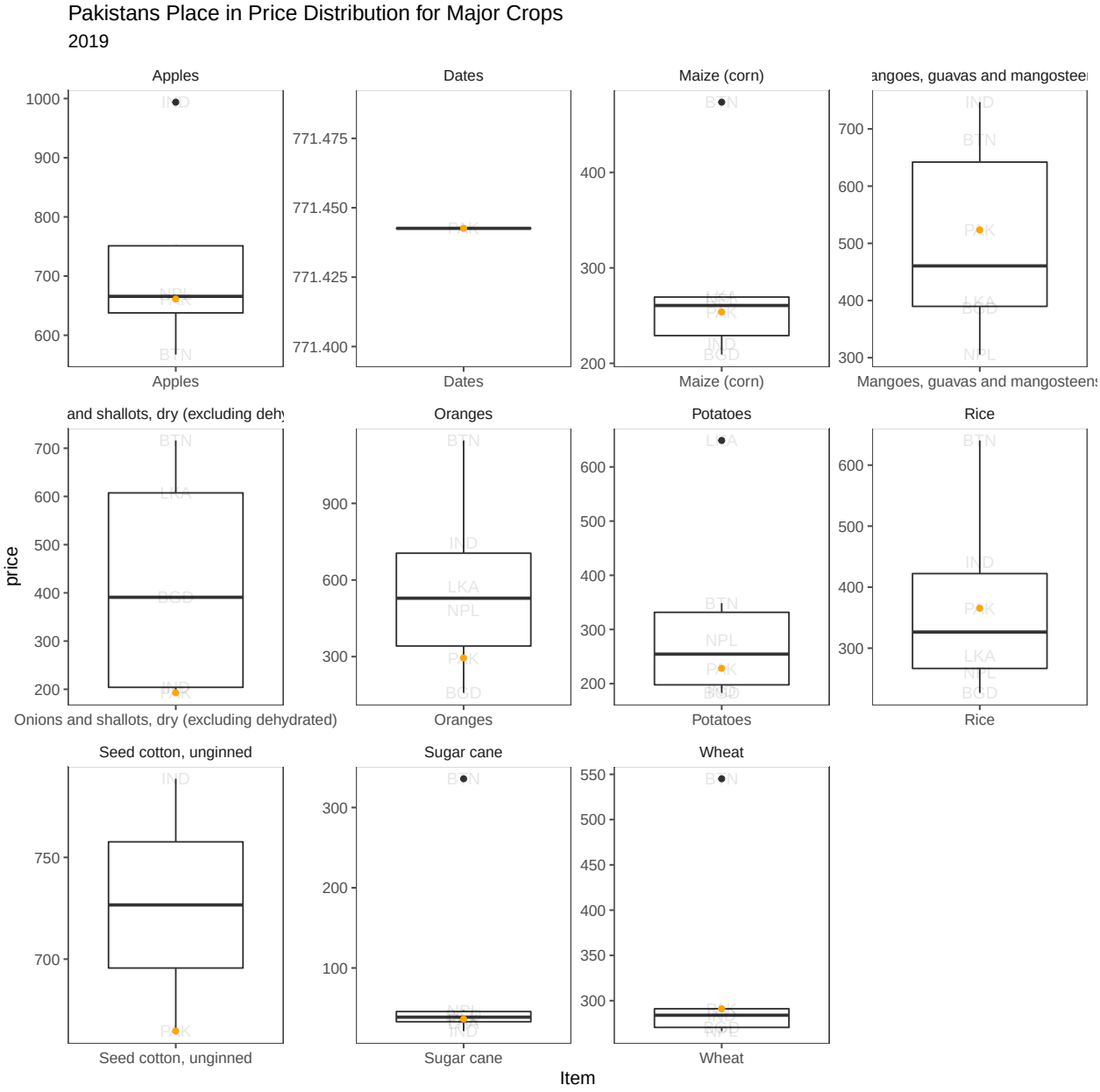

Price changes for crops in Pakistan
Price Growth (%)
2.5
0.0
−2.5
Item



Item	Production Ranking	Prod Share	Area Share	Prod Share Growth	Area Share Growth	Yield Growth	Avg Yield Growth	Rel Price	Econ Yield Growth	Prod Growth	Area Growth
Maize (corn)	5	8.9	7.3	290.2	39.7	228.6	162.3	1.0	228.6	379.7	46.0
Potatoes	7	5.0	1.0	112.0	69.3	47.2	46.9	0.9	47.2	160.6	77.1
Mangoes, guavas and mangosteens	6	5.3	1.1	96.9	118.3	6.1	6.1	1.1	6.1	142.1	128.2
Sugar cane	4	10.8	5.4	16.5	-1.5	39.1	5.2	0.9	39.1	43.3	3.0
Apples	11	1.8	0.4	11.9	28.7	2.2	33.5	1.0	2.2	37.6	34.6
Onions and shallots, dry (excluding dehydrated)	10	1.8	0.8	2.6	29.2	-6.6	58.3	0.5	-6.6	26.2	35.1

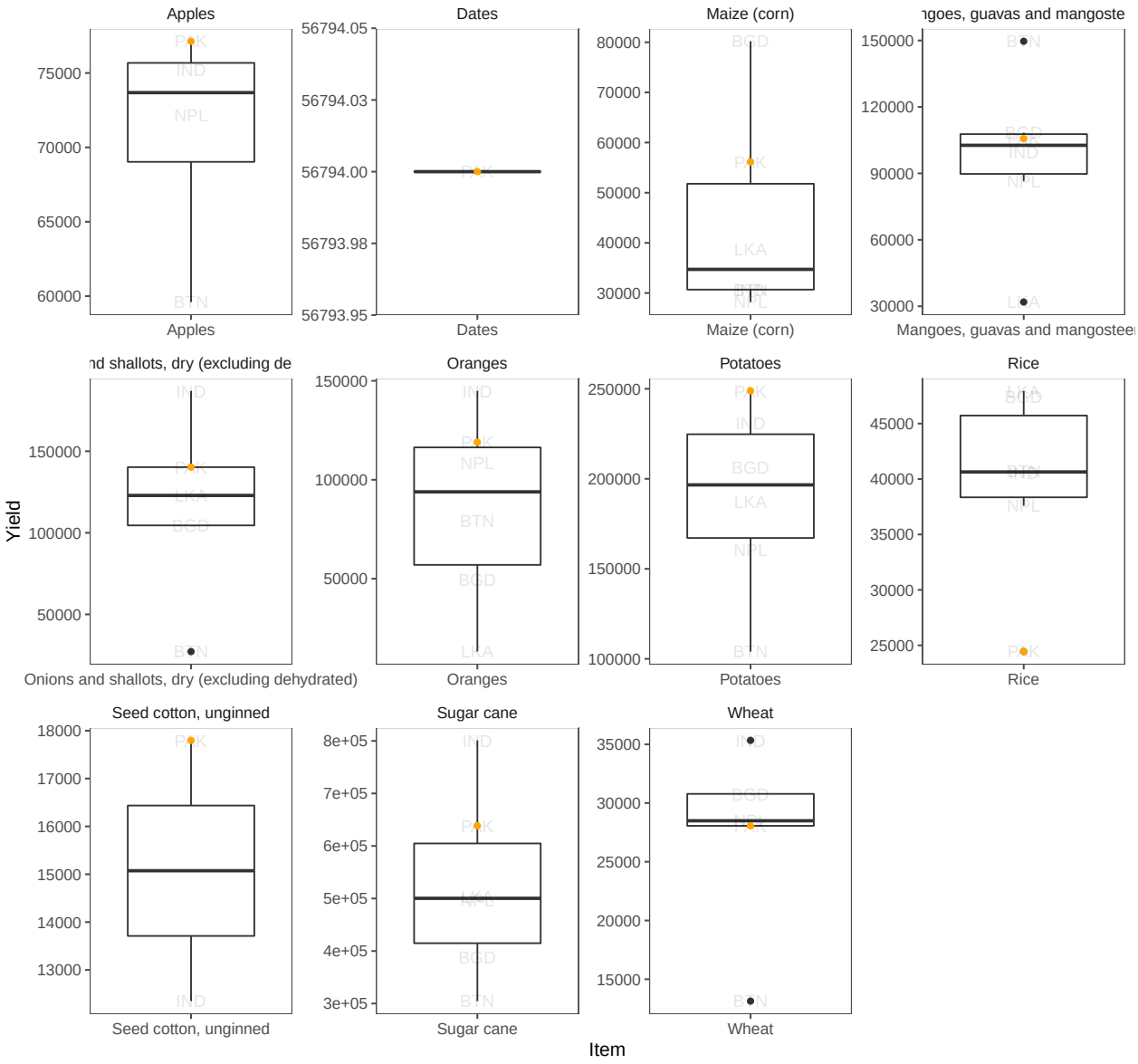
Item	Production Ranking	Prod Share	Area Share	Prod Share Growth	Area Share Growth	Yield Growth	Avg Yield Growth	Rel Price	Econ Yield Growth	Prod Growth	Area Growth
Oranges	8	2.1	0.7	-1.1	-6.6	24.6	20.5	0.6	24.6	21.6	-2.4
Wheat	1	31.6	45.3	-6.0	-1.9	12.7	38.9	1.0	12.7	15.5	2.5
Rice	3	12.1	15.9	-16.3	22.1	-19.4	39.3	1.1	-19.4	2.9	27.7
Dates	9	1.9	0.5	-25.0	21.1	-27.1	-27.1	1.0	-27.1	-7.8	26.6
Seed cotton, unginned	2	13.3	13.2	-33.4	-17.8	-4.9	50.8	0.9	-4.9	-18.2	-14.0

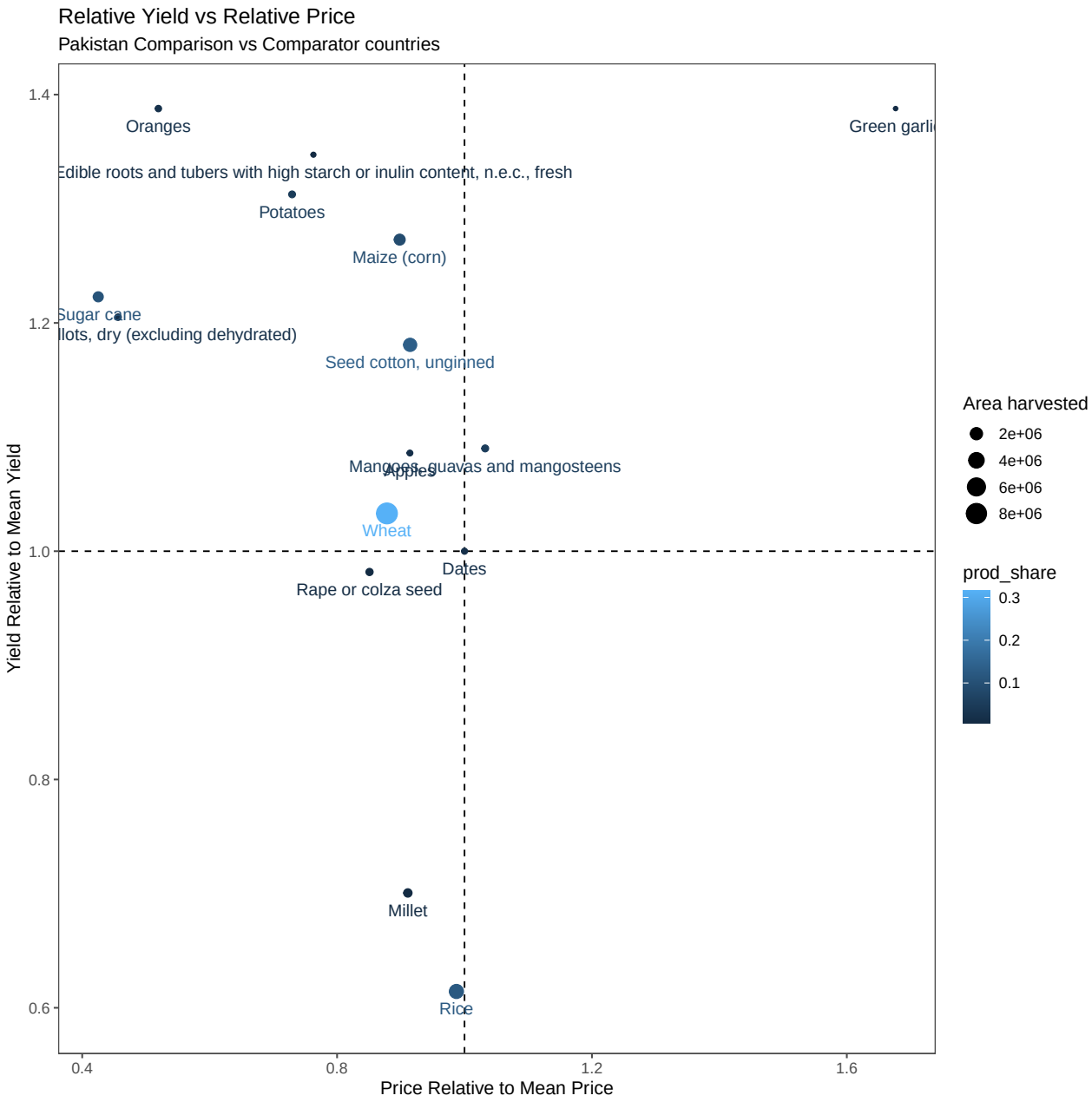
Lets look at prices of crops relative to others.

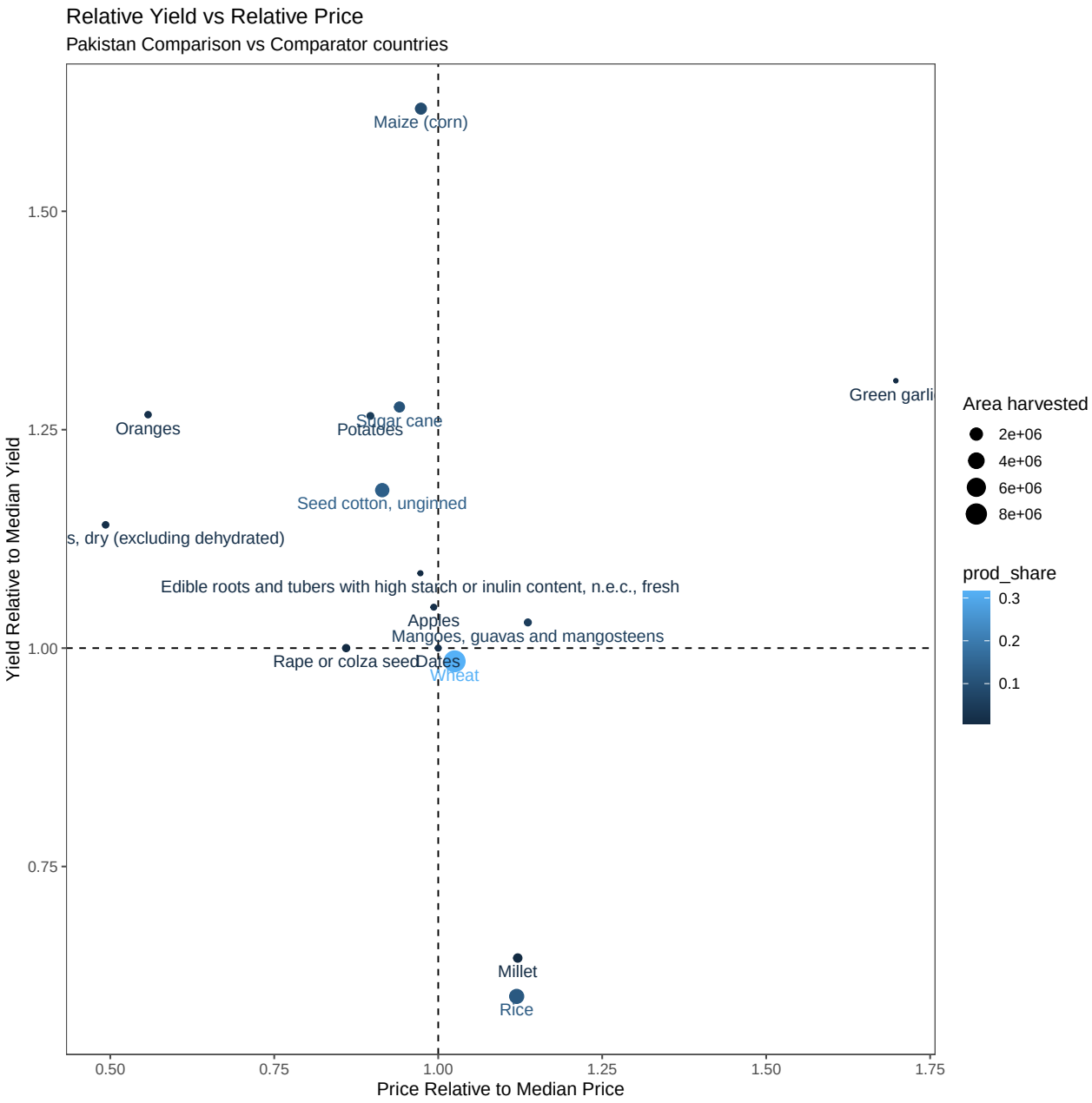


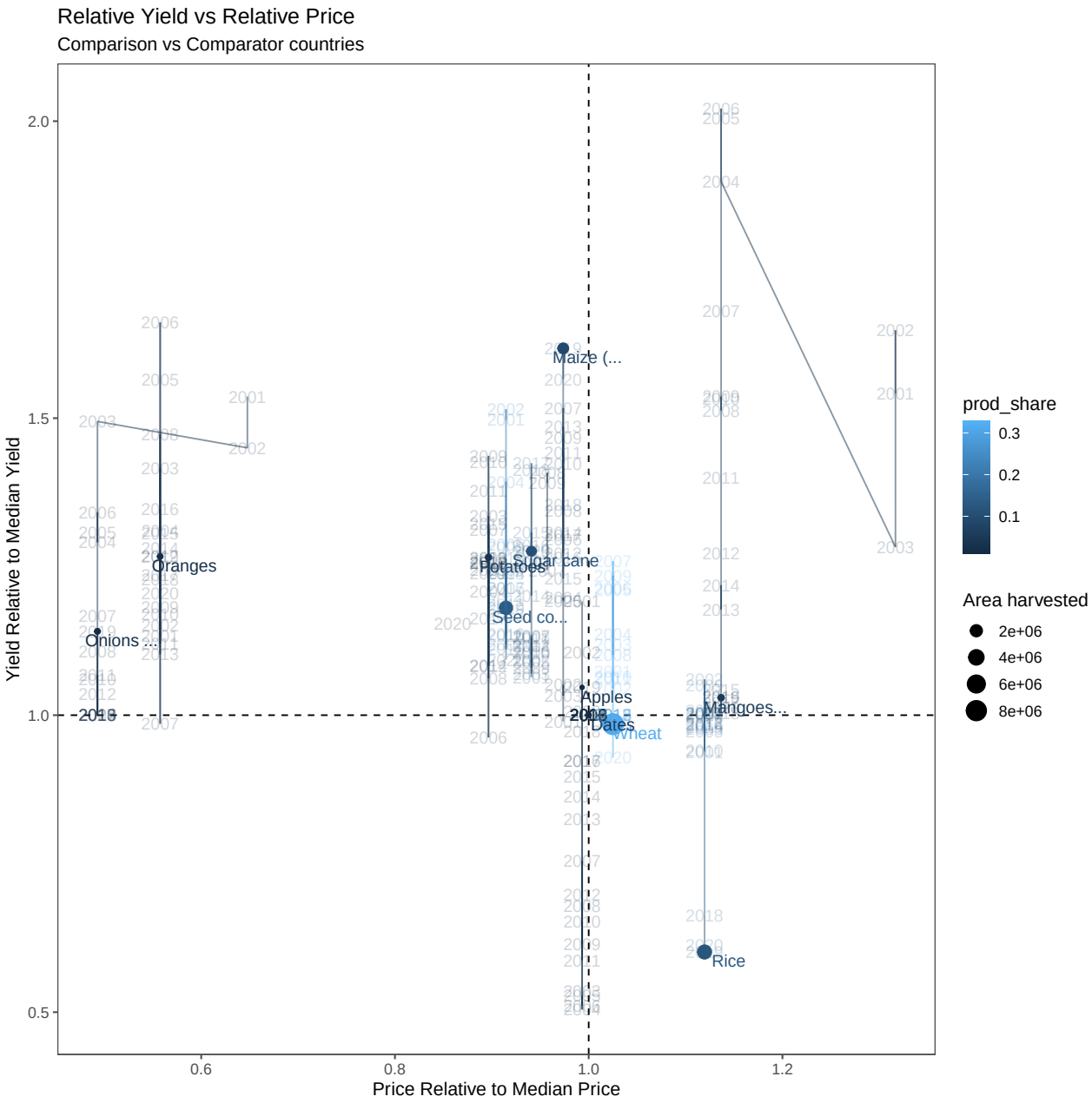
Pakistans Place in Yield Distribution for Major Crops

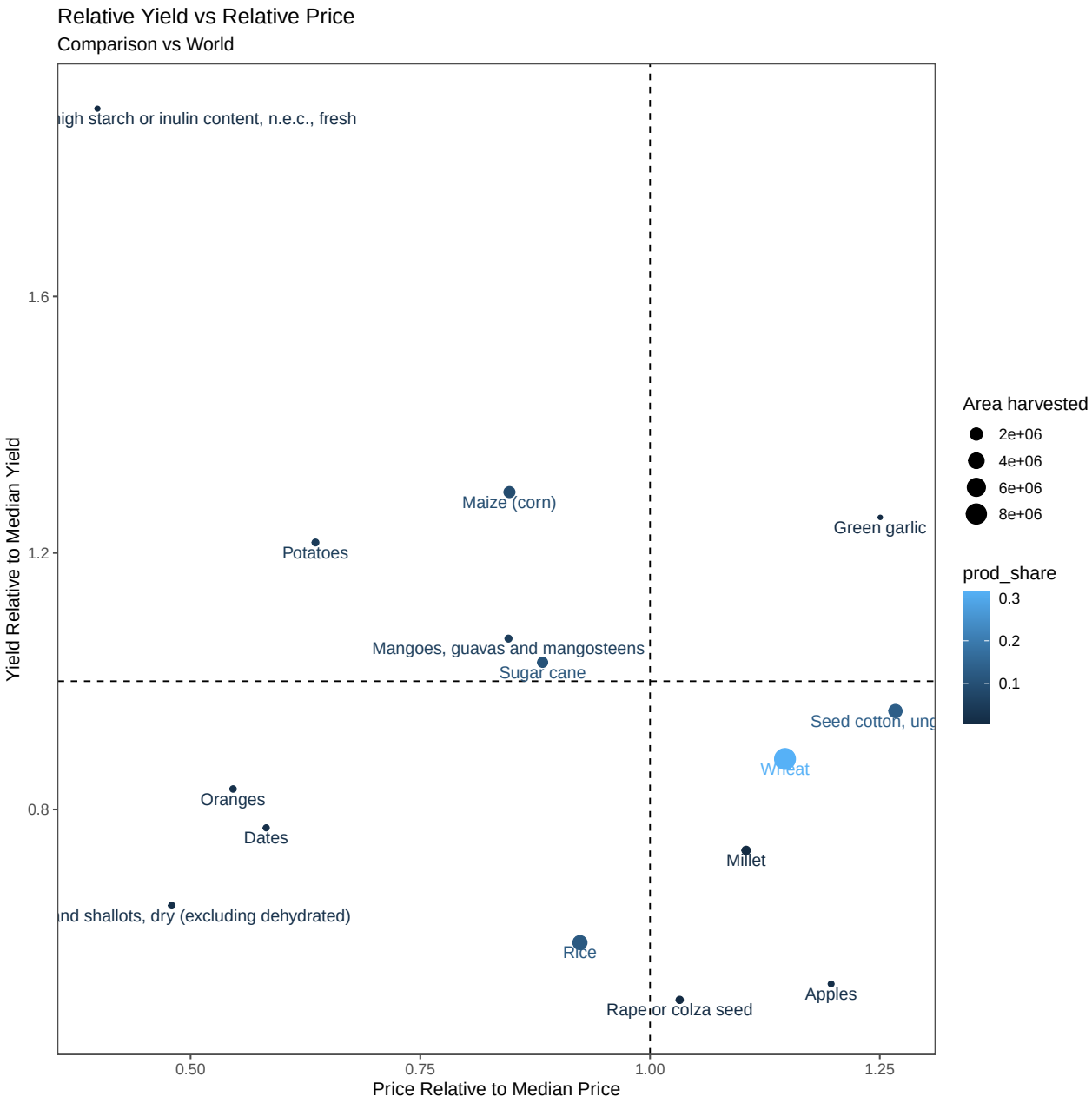
2019




Relative Yield vs Relative Price
Pakistan Comparison vs Comparator countries
Yield Relative to Mean Yield
Price Relative to Mean Price
1.4
1.2
1.0
0.8
0.6
0.4
0.8
1.2
1.6
Oranges
Green garli
Edible roots and tubers with high starch or inulin content, n.e.c., fresh
Potatoes
Maize (corn)
Sugar cane
llots, 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

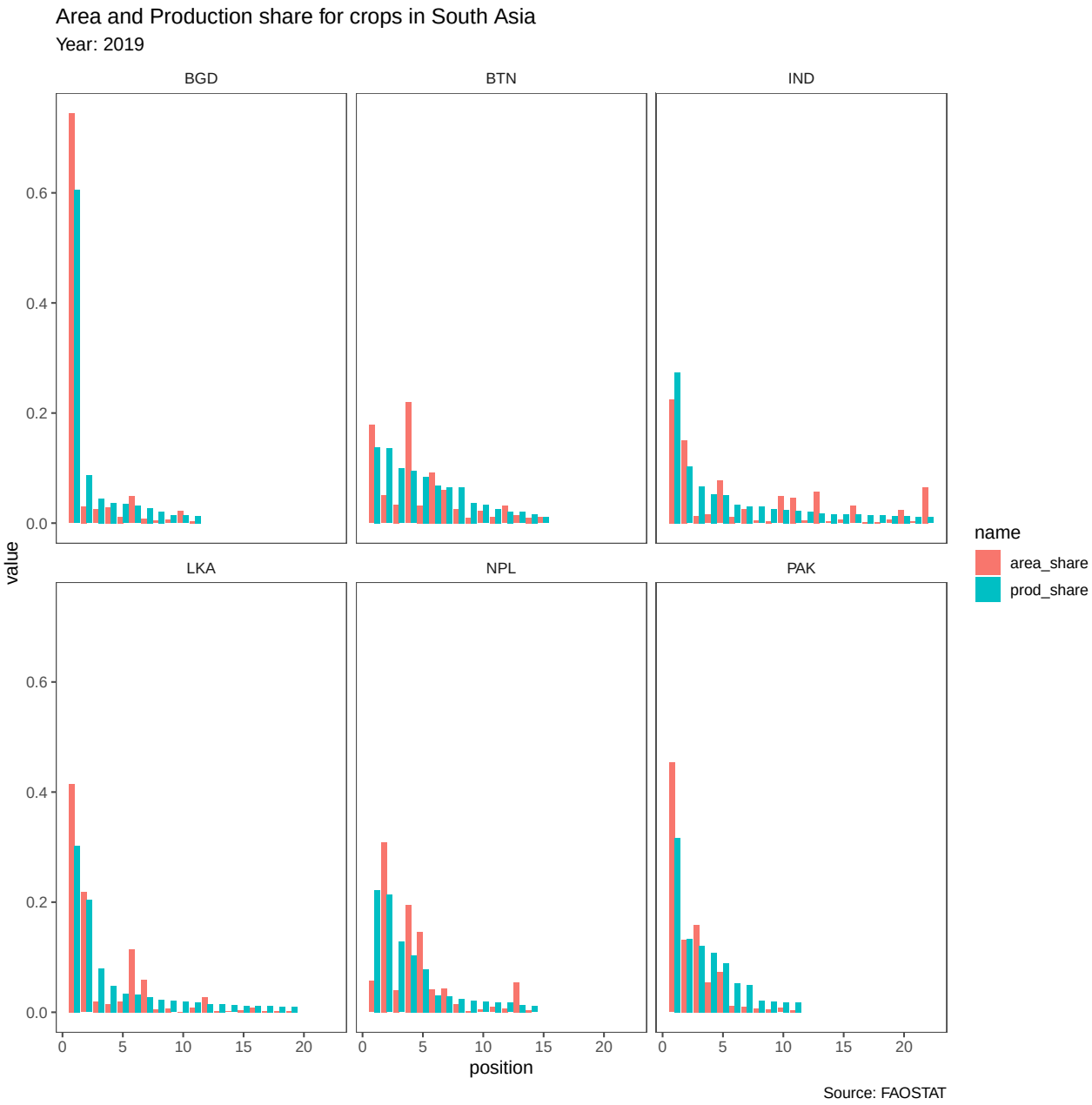

Relative Yield vs Relative Price
Pakistan Comparison vs Comparator countries
Maize (corn)
Green garli
Oranges
Sugar cane
Potatoes
Seed cotton, unginned
s, dry (excluding dehydrated)
Edible roots and tubers with high starch or inulin content, n.e.c., fresh
Apples
Mangoes, guavas and mangosteens
Rape or colza seed
Dates
Wheat
Millet
Rice
1.50
1.25
1.00
0.75
0.50
0.75
1.00
1.25
1.50
1.75
Yield Relative to Median Yield
Price Relative to Median Price
Area harvested
2e+06
4e+06
6e+06
8e+06
prod_share
0.3
0.2
0.1

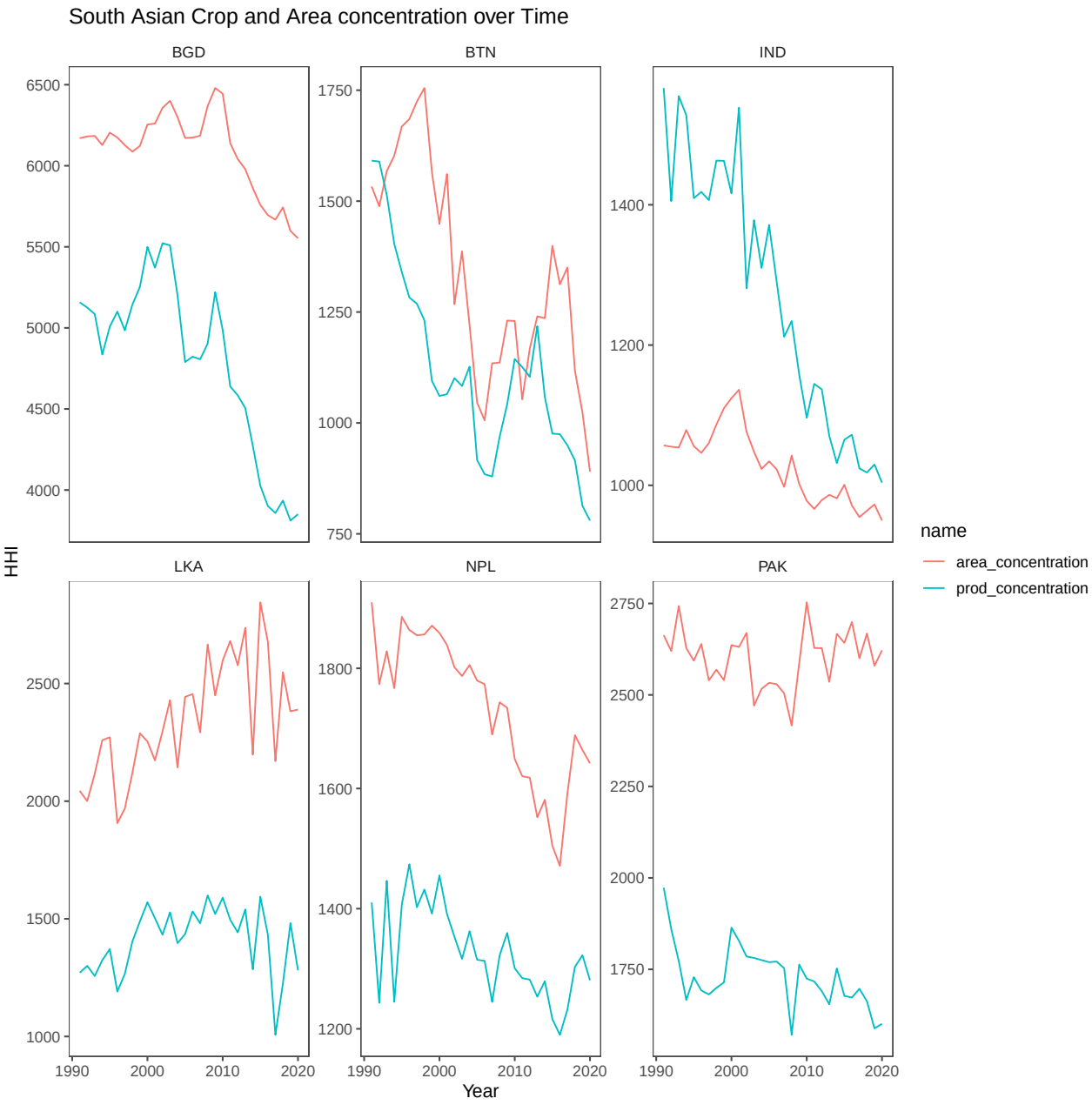

Relative Yield vs Relative Price
Comparison vs Comparator countries
Yield Relative to Median Yield
Price Relative to Median Price
2.0
1.5
1.0
0.5
0.6
0.8
1.0
1.2
Maize (...
Oranges
Potatoes
Sugar cane
Seed co...
Onions ...
Apples
Dates
Wheat
Mangoes...
Rice
prod_share
0.3
0.2
0.1
Area harvested
2e+06
4e+06
6e+06
8e+06



Appendix

Below I got curious about the relationship between concentration in crops


Area and Production share for crops in South Asia
Year: 2019
BGD
BTN
IND
LKA
NPL
PAK
value
position
name
area_share
prod_share
Source: FAOSTAT


South Asian Crop and Area concentration over Time
BGD
BTN
IND
LKA
NPL
PAK
HHI
Year
name
area_concentration
prod_concentration