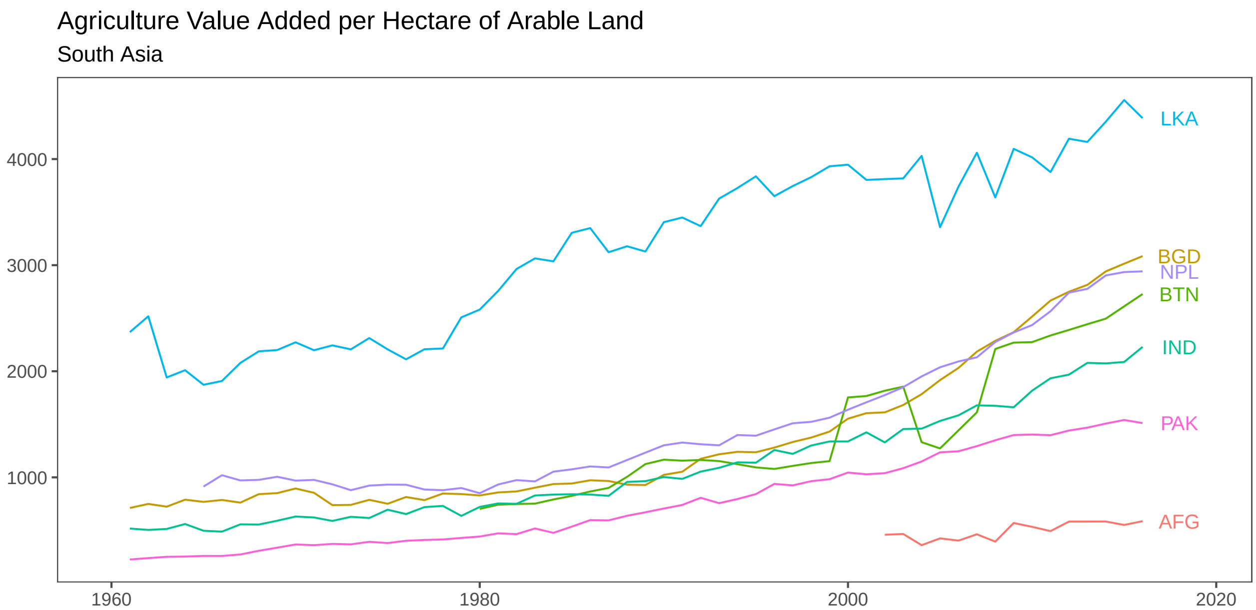
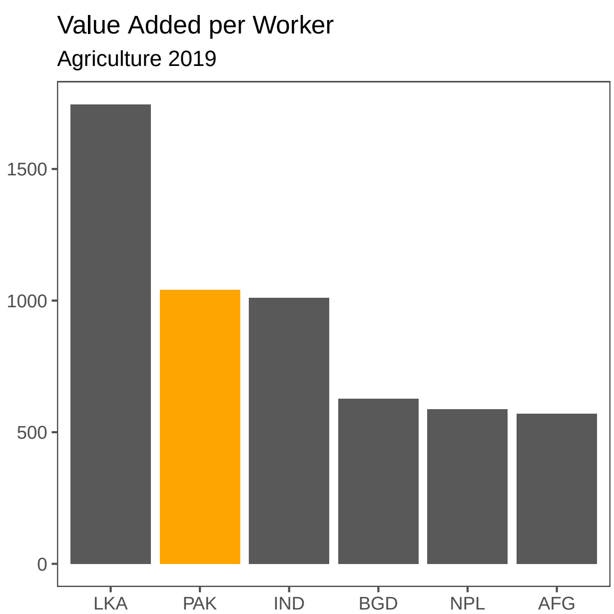
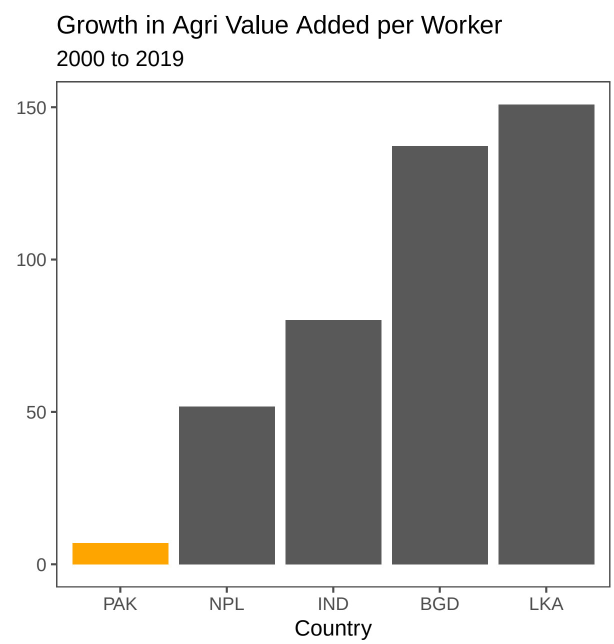
Agriculture in Pakistan

Pakistan produces less value add per hectare of Arable land than all of South Asia, barring Afghanistan. Growth in total value add has been the slowest in the region, while the amount of Arable land remains constant. At the same time, growth rates in both male and female agricultural workers is the highest in the region. Ultimately this results in the lowest value added per worker growth in the region. In Pakistan, more and more people produce less and less from the ground year after year. We aim to examine the constraints to Agri productivity in the country.

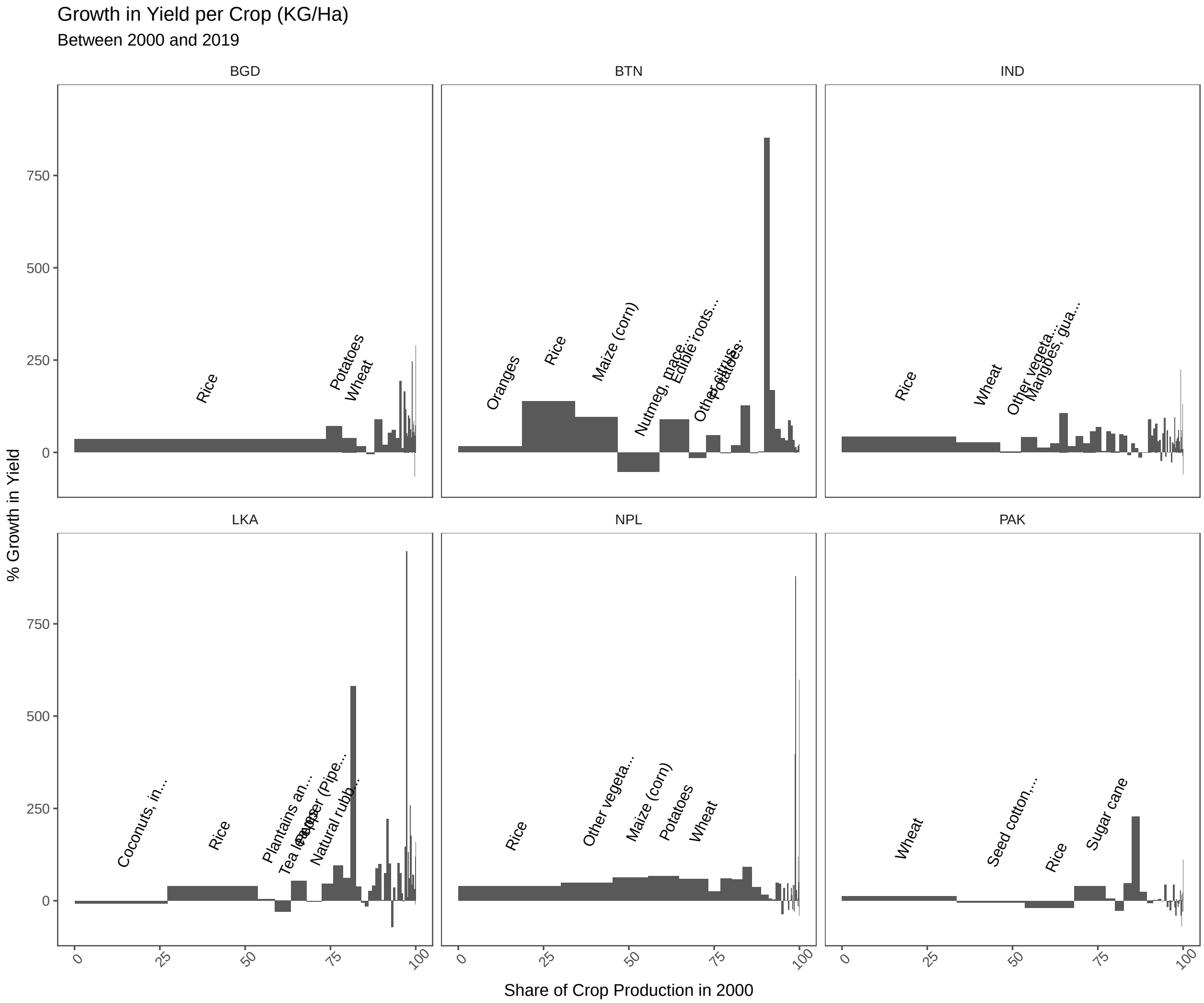




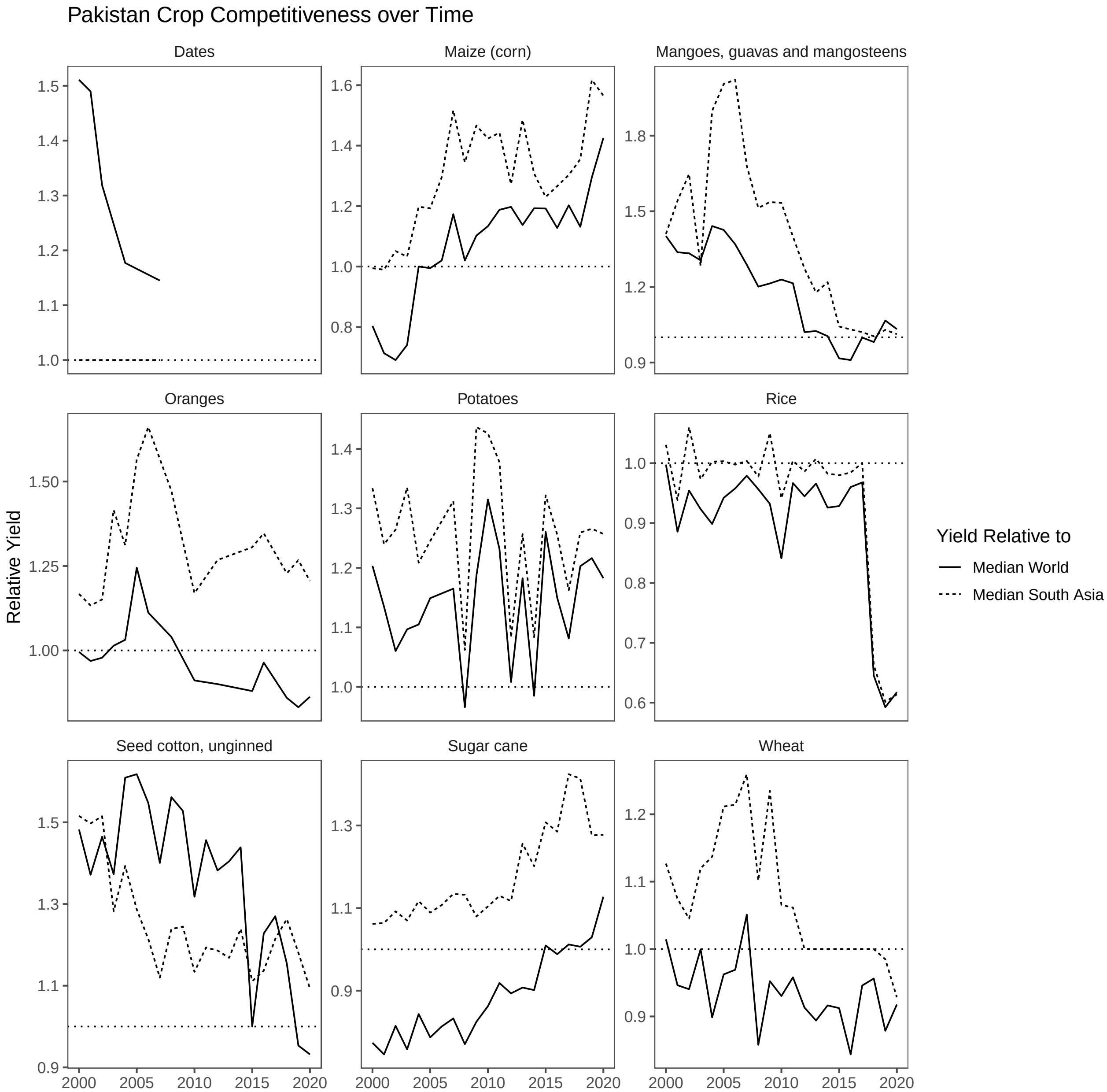


We find that the low growth in value added in Pakistan is primarily due to changes in yields per crop over time, rather than through price changes. (Note - price data through FAO is still suspicious, and may need to come back to it).

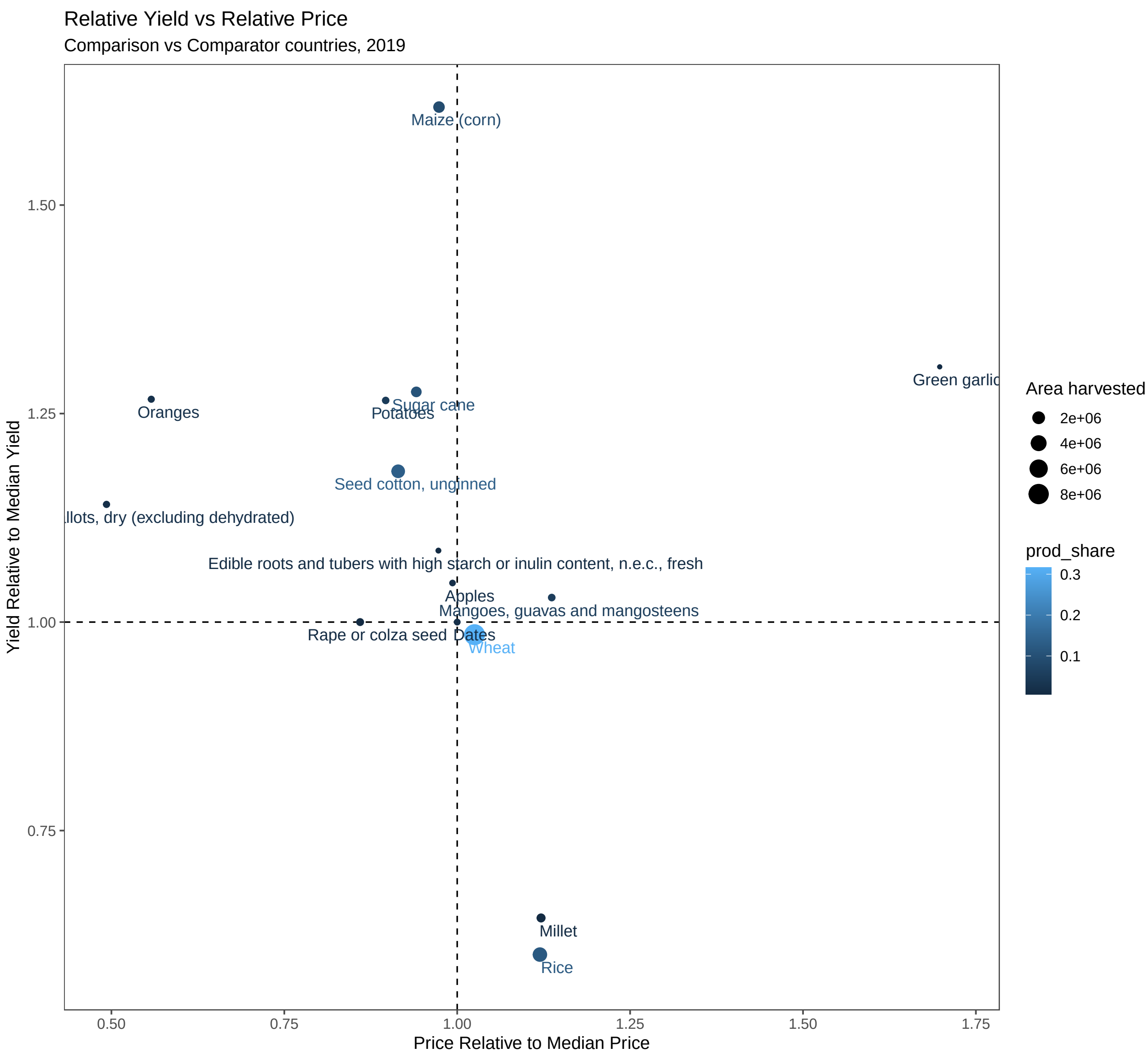
The figure below shows the percent growth in yields for crops, ranked by how much of the production share it is responsible for. It demonstrates that yield growth for the most important crops in Pakistan have been low relative to other South Asian countries.



The following figure demonstrates this through a different metric. We can observe Pakistans competitiveness in its top crops against the median south asian performance. With few exceptions, we see relative yields declining from 2000 to 2020.



Important exceptions are corn and sugarcane. A look at the relative yields and relative prices tells us a bit more about the positioning of these crops, using price as a proxy for quality. (The price data is a bit susipicious still, but think it is signalling that markets need to be looked at).



Pakistan has become increasingly uncompetitive in wheat, cotton and rice production, while it has increased its competitiveness in corn and sugarcane. Wheat and rice are of relatively higher quality than in the rest of south asia - using price as a proxy - while cotton, sugar and maize are less. There appears to be a tradeoff between higher yields and lower quality.

The analysis should then examine what has happened with these crops over time. Using farm-level data on Wheat and cotton, we can begin to get a picture.

Some takeaways, focusing on Wheat and Cotton.

- The more land allocated for the crop, the less the yield.
- Wheat responds to increased workers, while cotton does not.
- Cotton Yields respond to increased use of own seed. Wheat Yield decreases with increase of purchased seed
- Cotton yields appear to respond to increased usage of fertilizer, while Wheat does not.
- Use of land leveler on a larger proportion of land appears to decrease Cotton yields

- Use of harvester on a large proportion of land is associated with higher Wheat yields
- Use of Organic Manure is associated with lower cotton yields
- Use of micronutrients is associated with higher wheat yields
- Both Furrow and Bed and Furrow irrigation methods are associated with higher cotton yields compard to flooding.
- No noticeable distinction in yield for Wheat based on irrigation method
- Both cotton and wheat prefer Clay soil types
- Farmers ranking of soil fertility is positively correlated with higher yields
- Flat land is associated with higher wheat yields
- Access to canal water is associated with lower wheat and cotton yields
- Owning a tubewell is associated with higher wheat yields.
- Cotton yields are higher when land is not waterlogged
- Wheat yields are higher when there is no salinity
- Mildly eroded land is apparently associated with higher cotton yields
- Farmers appear to have a good sense of their soil quality

Table 1:

	Dependent variable:			
	yield			
	Wheat	Cotton	Rice	Corn
	(1)	(2)	(3)	(4)
land_worked_acre	0.00002 (0.0003)	−0.001* (0.0003)	0.001 (0.002)	−0.005 (0.112)
land_cultvd	−0.003*** (0.0004)	−0.001*** (0.0004)	−0.015** (0.007)	−0.388 (0.493)
fmly_wrkr_numb	0.043*** (0.013)	0.018 (0.013)	−0.104 (0.089)	−4.534 (3.717)
hired_wrkr_numb	0.011*** (0.002)	0.001 (0.002)	0.012 (0.011)	0.531 (0.527)
seed_acreB	−0.002 (0.002)	0.021*** (0.005)	−0.006 (0.013)	
seed_acreC	−0.004** (0.002)	−0.002 (0.005)	0.004 (0.005)	−0.848 (0.553)
kg_fert_acrea	0.001 (0.001)	0.003*** (0.001)	−0.007* (0.004)	−0.302 (0.200)
kg_fert_acreb	−0.0004 (0.0005)	0.003*** (0.0004)	−0.002 (0.002)	−0.051 (0.098)
kg_fert_acrec	0.0003 (0.001)	0.001 (0.001)	0.008** (0.004)	−0.057 (0.249)
rel_area_tractor	0.018 (0.085)	0.060 (0.058)	0.157 (2.798)	6.135 (52.303)
rel_area_landlevel	−0.066 (0.045)	−0.343*** (0.049)	0.170 (0.268)	−20.231 (13.922)
rel_area_harvester	0.396** (0.159)	0.370 (0.255)	0.385 (0.250)	−28.373 (34.801)
D_orgnc_mnreNo	0.030 (0.038)	0.093** (0.042)	−0.513** (0.233)	−7.879 (13.981)
D_micro_ntrntsNo	−0.172** (0.076)	−0.045 (0.072)	−0.326 (0.253)	0.201 (14.078)
irr_methdFurrow	0.177 (0.229)	0.246*** (0.044)	−0.429 (0.651)	−5.341 (13.874)
irr_methdBed and furrow	0.184 (0.126)	0.295*** (0.062)	0.030 (0.647)	−34.534* (18.144)
irr_methdOther (Specify)	−1.827 (1.130)			
soil_qualModerate	0.224*** (0.055)	0.231*** (0.063)	0.353 (0.497)	5.243 (17.036)
soil_qualLoam	0.249*** (0.068)	0.250*** (0.078)	0.276 (0.558)	−4.141 (19.054)
soil_qualClay loam	0.238*** (0.067)	0.350*** (0.077)	0.663 (0.516)	31.023 (21.291)
soil_qualClay	0.446*** (0.065)	0.452*** (0.074)	0.819 (0.533)	15.700 (19.935)
soil_qualOther (Specify)	0.049 (0.171)	0.250 (0.192)	−0.955 (0.989)	
soil_fert_rank	0.059*** (0.013)	0.075*** (0.014)	0.077 (0.076)	2.532 (4.352)
land_steep_typeSlight slope	−0.002 (0.061)	0.038 (0.067)	0.380 (0.406)	−24.432 (16.134)
land_steep_typeModerate slop	−0.227** (0.089)	−0.120 (0.092)	0.827 (0.711)	−30.521 (39.395)
land_steep_typeSteep Slope	0.196 (0.192)	0.056 (0.233)	−0.199 (1.465)	−16.714 (28.351)
access_canal_waterNo	0.172*** (0.041)	0.436*** (0.047)	0.400 (0.304)	27.397** (12.454)
access_tubewellDo not own a tubewell but have access to tubewell water	−0.139*** (0.039)	0.085* (0.044)	−0.034 (0.222)	8.366 (12.555)
access_tubewellNeither own nor have access to a tubewell water	−0.177* (0.105)	0.077 (0.106)	−0.761 (0.590)	
land_suffer_waterlogNo	−0.023 (0.062)	0.175** (0.075)	−0.117 (0.284)	−15.003 (37.360)
land_suffer_salinityNo	0.213*** (0.060)	0.107 (0.072)	−0.497* (0.295)	14.345 (37.960)
land_suffer_erosionMild Erosion	0.037 (0.045)	0.135*** (0.049)	0.356 (0.313)	−11.232 (15.041)
land_suffer_erosionSevere Erosion	−0.018 (0.114)	−0.089 (0.156)	−0.607 (0.710)	15.343 (37.494)
D_more_fert_qtyNo	0.116*** (0.039)	0.150*** (0.043)	−0.070 (0.218)	−5.356 (11.811)
soil_cmprd_othersSame	−0.229*** (0.064)	−0.277*** (0.069)	0.319 (0.373)	−15.569 (34.388)
soil_cmprd_othersWorse	−0.532*** (0.099)	−0.401*** (0.113)	0.128 (0.669)	−8.605 (39.587)
Constant	3.428*** (0.234)	0.520*** (0.181)	5.040* (2.873)	72.132 (77.538)
Observations	4,314	3,150	227	49
R^2	0.076	0.173	0.211	0.731
Adjusted R^2	0.068	0.164	0.067	0.193
Residual Std. Error	1.127 (df = 4277)	1.041 (df = 3114)	1.416 (df = 191)	26.010 (df = 16)
Note:				*p<0.1; **p<0.05; ***p<0.01

Copied selected text to selection clipboard: ndlevel −0.066 (0.045) −0.343*** (0.049) 0.170 (0.268) −20.231 (13.922) rel_area_harvester 0.396** (0.159) 0.370 (0.255) 0.385 (0.250) −28.373 (34.801) D_orgnc_mnreNo 0.030 (0.038) 0.093** (0.04

Figure 1: regression