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in Transition Economies

Self-sufficiency Policy Reforms and their Impact on Wheat Productivity in Armenia

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1. Introduction
1.1 Productivity of Armenian Agr.

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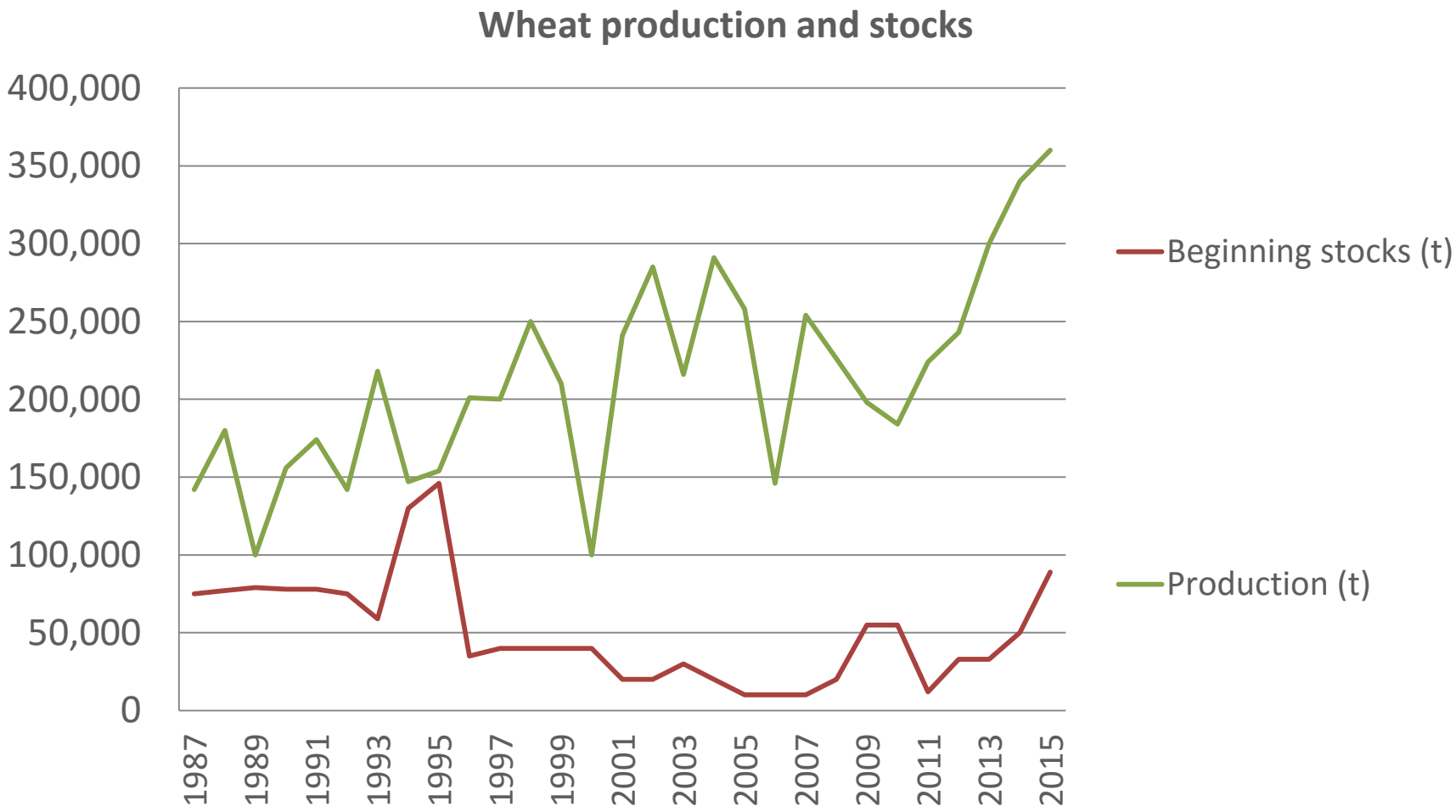

1. Introduction:
1.1 Productivity of Armenian Agr.

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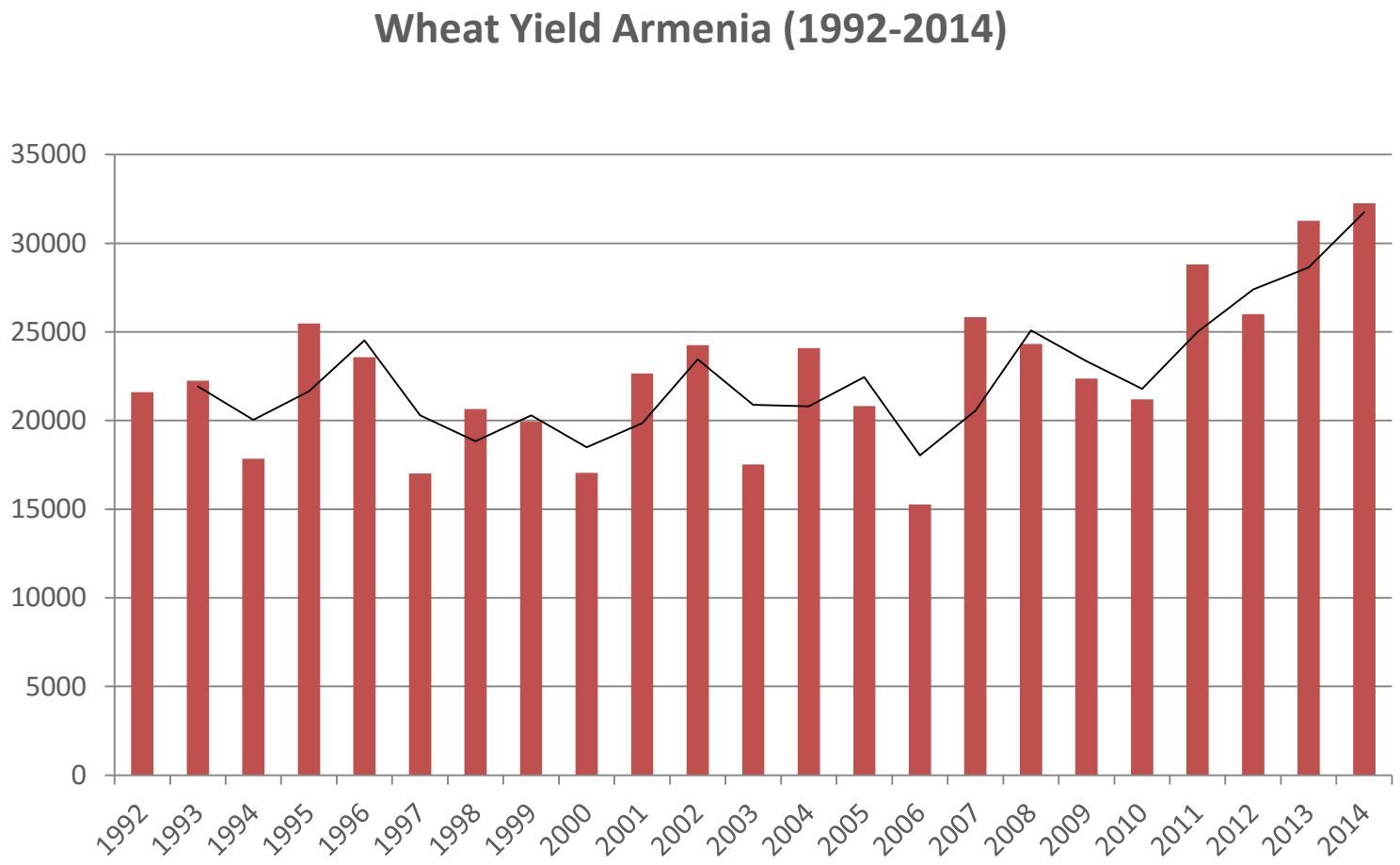

Source: FAOStat

1. Introduction
1.2 Self-Sufficiency

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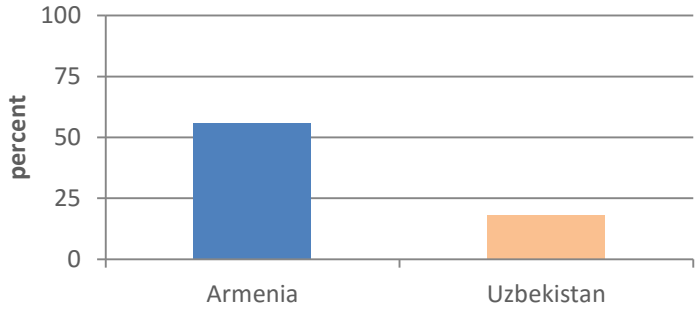
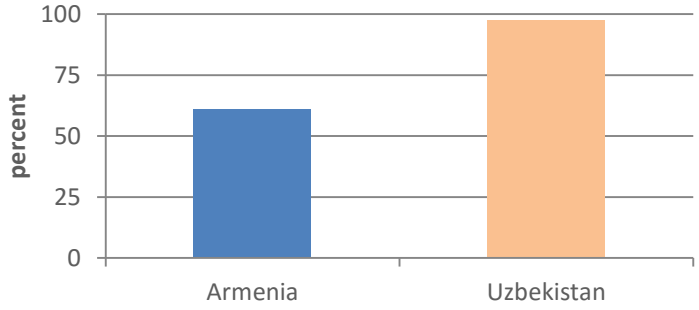
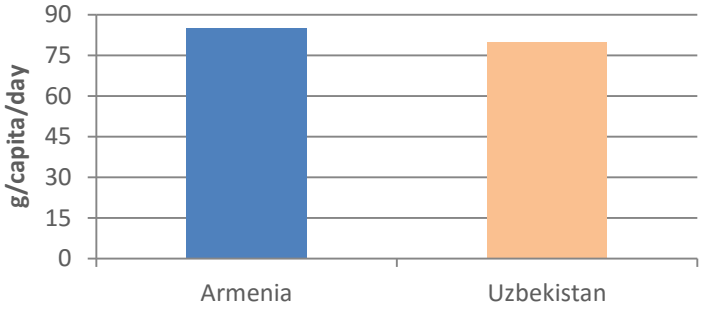
Cereal import dependency ratio (2009-2011 average)



Percentage of arable land equipped for irrigation (2009-2011 average)



Average protein supply (2009-2011 average)



Source: FAOStat

2. Self-sufficiency policies

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- Seed development program
- Support for purchasing seed at affordable prices
- Support for purchasing fuel at affordable prices
- Support for purchasing fertilizer at affordable prices

→Can agricultural subsidies increase factor input and yield in household farms

→What type of farms are benefiting from agricultural subsidies and seed programs?

2. Self-sufficiency policies
2.1 Seed production program

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- *Import of seeds from "Semena Stavropol" Limited Liability Company of Stavropol territory of Russian Federation*
- *Purchase of seed from local seed producing companies (wheat, barley, corn, alfalfa etc.)*

Main aims:

- promote the effective use of resources
- increase local production of grain crops
- raising the level of import substitution and self-sufficiency

Requirements for participating farms:

- Only farms >3 ha
- Return ratio 1:2 after harvest
- Preference shall be given to the farmers of irrigated lands
- There should be a certificate of ownership or long term lease.
- The land must have the opportunity to practice crop rotation.

2. Self-sufficiency policies
2.1 Seed production program

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Program year	Seed import	Locally procured seed
1st	950 tons	500 tons
2nd	800 tons	900 tons
3rd	600 tons	1500 tons
4th	450 tons	1950 tons
5th	0	3300 tons

Additional objectives:

- To organize reproduction of seeds purchased from specialized farm economies
- To provide the first reproduction seeds to farmers engaged in grain production

2. Self-sufficiency policies
2.2 Provision of high quality seed

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Aim: Provision of seeds at affordable prices

- Subsidization of seed by 40% through the Ministry of Agriculture to farmers
- Import of seed and procurement from local seed producing companies.
- Distribution of seeds:
  - 850 tons of spring barley
  - 11 tons of corn
  - 37 tons of alfalfa
  - 530 tons of sweet clover.

2. Self-sufficiency policies
2.3 Impacts on self-sufficiency

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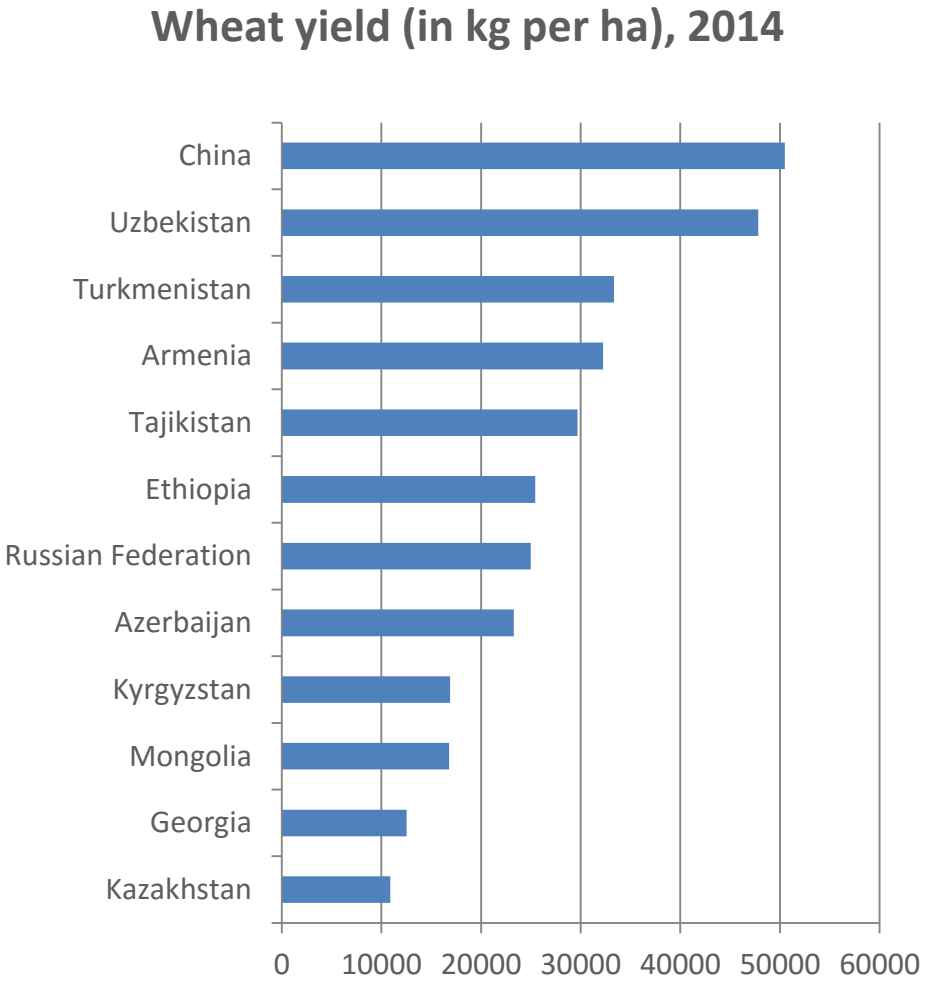
- 60% of seeds replaced by new high-quality seeds
- Wheat productivity increased by 52% (Ministry of Agriculture Armenia)
- Self-sufficiency wheat 52% (aim: 70-75%)
- Replacement of imports by national production?



3. Data
3.1 Sampling description

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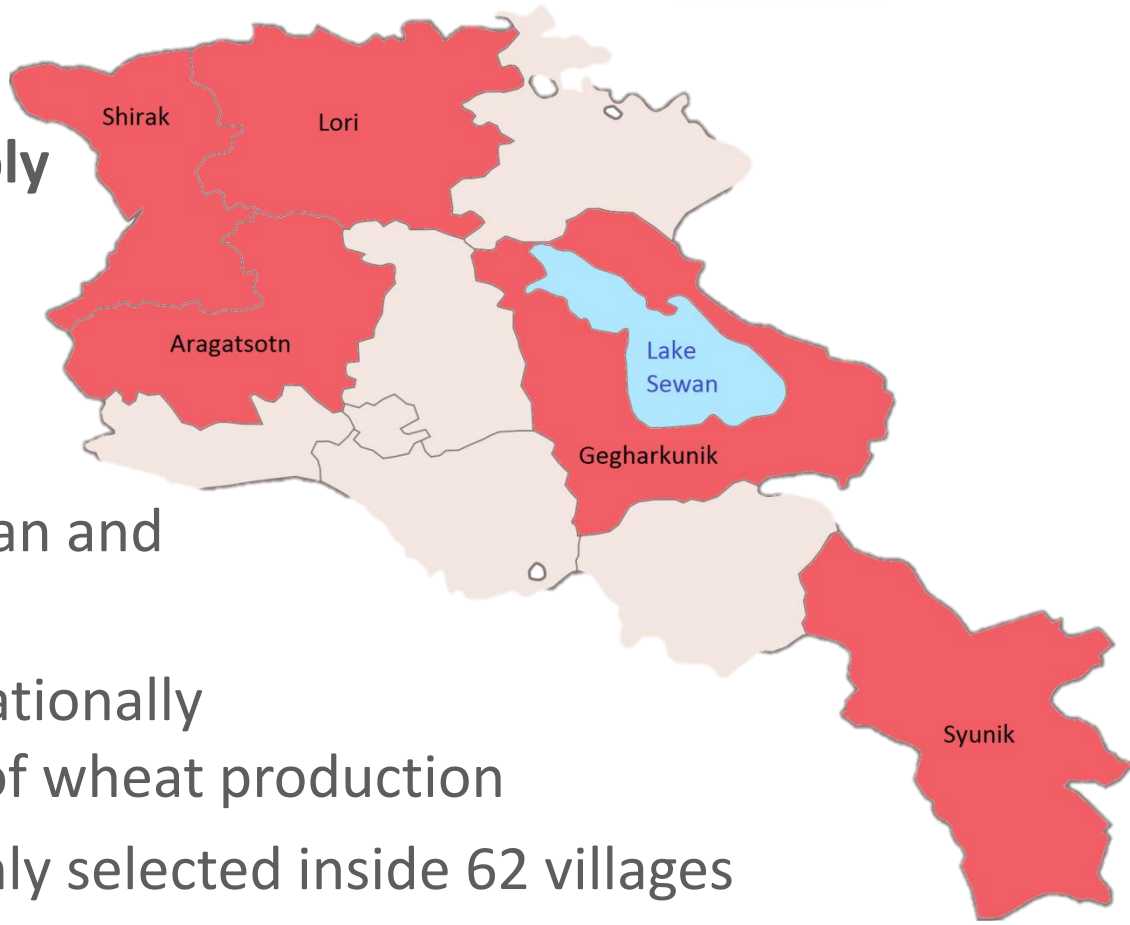
Survey on commodity supply chains in Central Asia and Caucasus (2014/2015)



- Wheat farms in Uzbekistan and Armenia
- Five Armenian regions nationally representative in terms of wheat production
- 401 wheat farms randomly selected inside 62 villages

3. Data

3.2 Descriptive Statistics

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Variable	Obs	Unique	Mean	Min	Max	Label
y1_1	401	2	0.7	0	1	Reception of subsidized fertilizer (0/1)
y1_2	401	106	535.2	0	30000	Amount of subsidized fertilizer (kg per ha)
y2_1	401	2	0.3	0	1	Reception of subsidized seed (0/1)
y2_2	399	55	87.5	0	3000	Amount of subsidized seed (kg per ha)
y3_1	401	2	0.5	0	1	Reception of subsidized fuel (0/1)
y3_2	401	78	126.2	0	2667	Amount of subsidized fuel (kg per ha)
y4	397	97	1.8	0	8	Wheat yield (kg/ha)
x1	401	46	3.3	0	17	Adult equivalent labor force in household
x2	401	18	1.8	0	90	Number of person in labor age
x3	400	5	3.6	1	5	Educational level of head of household
x4	401	2	0.1	0	1	Female head of household (0/1)
x7	401	2	0.8	0	1	Rainfed agriculture (0/1)
x8	401	2	0.2	0	1	Public irrigation agriculture (0/1)
x9_1	401	2	0.5	0	1	Water quality 2014 very bad (0/1)
x9_2	401	2	0.2	0	1	Water quality 2014 below average (0/1)
x9_3	401	2	0.1	0	1	water quality 2014 - above average or very good (0/1)
x10	401	2	0.0	0	1	Drought very important factor for agriculture (0/1)
x11	401	166	0.4	0	1	Simpson index of biodiversity
x12	258	199	10.4	4	18	Income from farm activity (log)
x13	401	2	0.1	0	1	Use of organic fertilizer (0/1)
x16	401	2	0.2	0	1	Information/advice from extension agents? (0/1)
x17	401	2	0.3	0	1	Participation in informal joint activity (0/1)
x18	401	2	0.1	0	1	Participation in formal joint activity (0/1)
x19	401	58	3.5	0	96	Cropland area total (ha)
x19_a	401	2	0.3	0	1	Cropland area > 3 ha (0/1)
x20	401	128	12.5	1	797	Farmsize total (ha)

4. Results
4.1 Reception of subsidized seed

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	Model p1		Model p2	
Reception of subsidized seed (0/1)				
Adult equivalent labor force	0.020	(0.049)	0.036	(0.049)
Number of hh members in labor age	0.007	(0.013)	0.007	(0.013)
Educational level of household head	0.100	(0.067)	0.108	(0.068)
Female head of household (0/1)	0.213	(0.250)	0.151	(0.254)
Region Lori(0/1)	-0.325	(0.291)	-0.341	(0.297)
Region Shiraz (0/1)	0.744***	(0.170)	0.669***	(0.170)
Rainfed agriculture (0/1)	0.193	(0.365)	0.078	(0.368)
Public irrigation agriculture (0/1)	0.260	(0.408)	0.173	(0.419)
Water quality very bad (0/1)	0.337	(0.222)	0.367	(0.224)
Water quality below average (0/1)	0.524**	(0.244)	0.528**	(0.244)
Water quality above average/very good (0	-0.395	(0.339)	-0.359	(0.339)
Drought very important factor (0/1)	0.202	(0.451)	0.303	(0.443)
Income from farm activity	0.000	(0.000)	0.000	(0.000)
Use of organic fertilizer (0/1)	-0.300	(0.245)	-0.227	(0.245)
Information extension agents? (0/1)	0.287	(0.183)	0.309*	(0.183)
Participation informal joint activity (0	-0.472**	(0.207)	-0.488**	(0.209)
Participation formal joint activity (0/1	0.995***	(0.309)	1.006***	(0.306)
Cropland area > 3 ha (0/1)	0.029	(0.166)	-0.003	(0.167)
Simpson index of biodiversity	1.322***	(0.397)		
Wheat cultivation (0/1)			-0.544	(0.828)
Barley cultivation (0/1)			0.434***	(0.166)
Potato cultivation (0/1)			0.132	(0.190)
Fodder cultivation (0/1)			0.330*	(0.177)
Constant	-2.386***	(0.540)	-1.639*	(0.946)
r2_p	0.153		0.151	
N	400		400	

* p<0.10, ** p<0.05, *** p<0.010

4. Results
4.2 Determinants of barley yield

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	Barley y~2	
ln_inputamount_barl_seed	0.585***	(0.152)
ln_inputamount_barl_fertilizer	0.024	(0.018)
ln_inputcost_barl_labor	-0.002	(0.031)
ln_inputcost_barl_chemicals	0.005	(0.013)
ln_inputamount_barl_organic	-0.008	(0.046)
ln_inputcost_barl_transp	0.119***	(0.045)
ln_inputcost_barl_irrigation	0.179***	(0.054)
ln_inputcost_barl_other	0.188	(0.254)
ln_inputcost_barl_machinery	-0.019	(0.048)
x1_log	-0.029	(0.094)
Information extension agents? (0/1)	-0.029	(0.108)
Participation informal joint activity (0	-0.051	(0.104)
Participation formal joint activity (0/1	0.441***	(0.162)
Constant	-3.130***	(0.854)
r2_p		
N	249	

* p<0.10, ** p<0.05, *** p<0.010

4. Results
4.3 Determinants of Seed input

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	Seed(kg/ha)		Seed(AMD/ha)	
Reception of subsidized seed	-0.002	(0.041)	0.283	(0.213)
Adult equivalent labor force	-0.005	(0.013)	-0.073	(0.067)
Number of hh members in labor age	0.002	(0.004)	-0.024	(0.021)
Educational level of household head	-0.001	(0.016)	0.061	(0.082)
Female head of household (0/1)	0.019	(0.064)	0.169	(0.328)
Region Lori(0/1)	0.095	(0.074)	0.163	(0.382)
Region Shiraz (0/1)	-0.008	(0.042)	0.386*	(0.218)
Rainfed agriculture (0/1)	-0.006	(0.049)	-0.682***	(0.254)
Water quality very bad (0/1)	-0.037	(0.051)	-0.108	(0.261)
Water quality below average (0/1)	-0.009	(0.057)	-0.172	(0.295)
Water quality above average/very good (0	-0.019	(0.074)	-0.900**	(0.382)
Simpson index of biodiversity	-0.169	(0.165)	-0.004	(0.850)
Information extension agents? (0/1)	0.100**	(0.046)	0.229	(0.235)
Participation informal joint activity (0	-0.014	(0.046)	-0.283	(0.235)
Participation formal joint activity (0/1	-0.025	(0.073)	0.008	(0.377)
Cropland area total (ha)	-0.001	(0.003)	0.003	(0.013)
Constant	5.607***	(0.159)	3.969***	(0.821)
r2_p				
N	251		251	

* p<0.10, ** p<0.05, *** p<0.010

5. Discussion

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- Seed subsidy does not increase the absolute amount of input
- Maybe impact on the quality of seed→ increased yield
- Impact on self-sufficiency, but rather via increase of quality of inputs rather than quantity of inputs

→ But: limitations of cross-sectional data

Next steps:

- Combination with GPS data on climate zones, soil quality
- Construct panel data to control for residual effects
- Collect information on the type of seed, quality…

6. Next steps

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Thank you very much for your you

5. Results:
5.1 Reception of subsidized fertilizer

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	Model p1		Model p2	
Reception of subsidized fertilizer (0/1				
Adult equivalent labor force	0.136	(0.083)	0.122	(0.084)
Number of hh members in labor age	-0.001	(0.014)	-0.007	(0.015)
Educational level of household head	0.119	(0.087)	0.101	(0.090)
Female head of household (0/1)	-0.059	(0.350)	-0.053	(0.368)
Region Lori(0/1)	1.056**	(0.454)	1.165**	(0.474)
Region Shiraz (0/1)	0.248	(0.224)	0.298	(0.235)
Rainfed agriculture (0/1)	0.684	(0.436)	0.768*	(0.447)
Public irrigation agriculture (0/1)	1.221**	(0.573)	1.275**	(0.582)
Water quality very bad (0/1)	-0.313	(0.268)	-0.324	(0.276)
Water quality below average (0/1)	-0.027	(0.307)	-0.073	(0.313)
Water quality above average/very good (0	-0.099	(0.436)	-0.192	(0.452)
Drought very important factor (0/1)	-0.031	(0.557)	-0.054	(0.563)
Simpson index of biodiversity	0.800*	(0.474)		
Income from farm activity (log)	0.011	(0.036)	0.016	(0.038)
Use of organic fertilizer (0/1)	0.001	(0.320)	-0.045	(0.328)
Information extension agents? (0/1)	0.558*	(0.292)	0.639**	(0.306)
Participation informal joint activity (0	0.163	(0.268)	0.084	(0.277)
Participation formal joint activity (0/1	-0.671*	(0.400)	-0.748*	(0.408)
Cropland area total (log)	0.130	(0.132)	0.152	(0.140)
Wheat cultivation (0/1)			1.622**	(0.819)
Barley cultivation (0/1)			0.563***	(0.218)
Potato cultivation (0/1)			0.196	(0.252)
Fodder cultivation (0/1)			-0.060	(0.232)
Constant	-1.411**	(0.715)	-3.071***	(1.094)
r2_p	0.135		0.163	
N	257		257	

5. Results
5.2 Reception of subsidized seed

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	Model p1		Model p2	
Reception of subsidized seed (0/1)				
Adult equivalent labor force	0.020	(0.049)	0.036	(0.049)
Number of hh members in labor age	0.007	(0.013)	0.007	(0.013)
Educational level of household head	0.100	(0.067)	0.108	(0.068)
Female head of household (0/1)	0.213	(0.250)	0.151	(0.254)
Region Lori(0/1)	-0.325	(0.291)	-0.341	(0.297)
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Income from farm activity	0.000	(0.000)	0.000	(0.000)
Use of organic fertilizer (0/1)	-0.300	(0.245)	-0.227	(0.245)
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Participation informal joint activity (0	-0.472**	(0.207)	-0.488**	(0.209)
Participation formal joint activity (0/1	0.995***	(0.309)	1.006***	(0.306)
Cropland area > 3 ha (0/1)	0.029	(0.166)	-0.003	(0.167)
Simpson index of biodiversity	1.322***	(0.397)		
Wheat cultivation (0/1)			-0.544	(0.828)
Barley cultivation (0/1)			0.434***	(0.166)
Potato cultivation (0/1)			0.132	(0.190)
Fodder cultivation (0/1)			0.330*	(0.177)
Constant	-2.386***	(0.540)	-1.639*	(0.946)
r2_p	0.153		0.151	
N	400		400	

* p<0.10, ** p<0.05, *** p<0.010

5. Results
5.3 Reception of subsidized fuel

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	Model p1	
Reception of subsidized fuel (0/1)		
Adult equivalent labor force	-0.013	(0.064)
Number of hh members in labor age	0.005	(0.022)
Educational level of household head	-0.055	(0.078)
Female head of household (0/1)	-0.177	(0.306)
Region Lori(0/1)	0.736**	(0.314)
Region Shiraz (0/1)	-0.242	(0.194)
Rainfed agriculture (0/1)	0.727*	(0.435)
Public irrigation agriculture (0/1)	0.947*	(0.493)
Water quality very bad (0/1)	0.050	(0.230)
Water quality below average (0/1)	-0.040	(0.261)
Water quality above average/very good (0	-0.181	(0.351)
Drought very important factor (0/1)	-0.136	(0.509)
Simpson index of biodiversity	0.658	(0.434)
Income from farm activity (log)	0.021	(0.030)
Use of organic fertilizer (0/1)	-0.193	(0.260)
Information extension agents? (0/1)	-0.055	(0.224)
Participation informal joint activity (0	0.351	(0.233)
Participation formal joint activity (0/1	-0.093	(0.364)
Cropland area total (log)	0.119	(0.119)
Agricultural machinery (asset index)	-0.015	(0.067)
Constant	-0.896	(0.648)
r2_p	0.060	
N	254	

* p<0.10, ** p<0.05, *** p<0.010

5. Results
5.4 Determinants of machinery input

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	machinery assets determinants	
Reception of subsidized fuel	-0.044	(0.098)
Adult equivalent labor force	-0.010	(0.031)
Number of hh members in labor age	-0.004	(0.010)
Educational level of household head	0.032	(0.042)
Female head of household (0/1)	-0.014	(0.163)
Region Lori(0/1)	0.149	(0.164)
Region Shiraz (0/1)	-0.163	(0.111)
Rainfed agriculture (0/1)	-0.166	(0.128)
Water quality very bad (0/1)	-0.074	(0.131)
Water quality below average (0/1)	-0.050	(0.146)
Water quality above average/very good (0	-0.038	(0.201)
Simpson index of biodiversity	0.120	(0.361)
Information extension agents? (0/1)	0.145	(0.121)
Participation informal joint activity (0	-0.091	(0.125)
Participation formal joint activity (0/1	-0.215	(0.204)
Cropland area total (ha)	-0.000	(0.008)
Barley cultivation (0/1)	-0.104	(0.139)
Potato cultivation (0/1)	0.117	(0.130)
Fodder cultivation (0/1)	-0.238*	(0.132)
Constant	4.355***	(0.310)
r2_p		
N	400	

* p<0.10, ** p<0.05, *** p<0.010

5. Results:
5.5 Determinants of fertilizer (per ha)

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	fertilizer input determinants	
Reception of subsidized fertilizer	-1.709***	(0.218)
Adult equivalent labor force	0.000	(0.060)
Number of hh members in labor age	0.007	(0.020)
Educational level of household head	0.220***	(0.083)
Female head of household (0/1)	-0.048	(0.319)
Region Lori(0/1)	0.027	(0.326)
Region Shiraz (0/1)	0.141	(0.217)
Rainfed agriculture (0/1)	-0.073	(0.249)
Water quality very bad (0/1)	-0.353	(0.258)
Water quality below average (0/1)	-0.100	(0.287)
Water quality above average/very good (0	-0.333	(0.391)
Simpson index of biodiversity	-0.754	(0.699)
Use of organic fertilizer (0/1)	0.577**	(0.284)
Information extension agents? (0/1)	0.314	(0.237)
Participation informal joint activity (0	-0.106	(0.243)
Participation formal joint activity (0/1	0.305	(0.399)
Cropland area total (ha)	0.003	(0.015)
Barley cultivation (0/1)	0.047	(0.272)
Potato cultivation (0/1)	-0.070	(0.254)
Fodder cultivation (0/1)	-0.105	(0.258)
Constant	4.661***	(0.604)
r2_p		
N	400	

* p<0.10, ** p<0.05, *** p<0.010

5. Results:
5.6 Determinants of seed input

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	seed input determinants	
Reception of subsidized seed	0.280	(0.213)
Adult equivalent labor force	-0.075	(0.067)
Number of hh members in labor age	-0.041*	(0.023)
Educational level of household head	0.053	(0.083)
Female head of household (0/1)	0.147	(0.327)
Region Lori(0/1)	0.064	(0.385)
Region Shiraz (0/1)	0.412*	(0.218)
Rainfed agriculture (0/1)	-0.688***	(0.253)
Water quality very bad (0/1)	0.004	(0.267)
Water quality below average (0/1)	-0.118	(0.295)
Water quality above average/very good (0	-0.959**	(0.382)
Simpson index of biodiversity	-0.790	(1.035)
Information extension agents? (0/1)	0.223	(0.236)
Participation informal joint activity (0	-0.319	(0.236)
Participation formal joint activity (0/1	-0.009	(0.378)
Cropland area total (ha)	0.006	(0.013)
Barley cultivation (0/1)	0.000	(.)
Potato cultivation (0/1)	0.487*	(0.259)
Fodder cultivation (0/1)	0.103	(0.260)
Constant	4.220***	(0.845)
r2_p		
N	251	

* p<0.10, ** p<0.05, *** p<0.010

5. Results:
5.7 Determinants of transport cost

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	transport input determinants	
Reception of subsidized fuel	0.103	(0.105)
Adult equivalent labor force	-0.011	(0.033)
Number of hh members in labor age	-0.001	(0.011)
Educational level of household head	0.032	(0.045)
Female head of household (0/1)	0.114	(0.175)
Region Lori(0/1)	0.198	(0.176)
Region Shiraz (0/1)	-0.059	(0.119)
Rainfed agriculture (0/1)	0.176	(0.137)
Water quality very bad (0/1)	-0.272*	(0.141)
Water quality below average (0/1)	0.040	(0.157)
Water quality above average/very good (0	0.389*	(0.216)
Simpson index of biodiversity	0.800**	(0.387)
Information extension agents? (0/1)	0.200	(0.130)
Participation informal joint activity (0	0.352***	(0.134)
Participation formal joint activity (0/1	-0.417*	(0.219)
Cropland area total (ha)	-0.026***	(0.008)
Barley cultivation (0/1)	-0.267*	(0.149)
Potato cultivation (0/1)	0.025	(0.140)
Fodder cultivation (0/1)	-0.220	(0.142)
Constant	1.349***	(0.333)
r2_p		
N	400	

* p<0.10, ** p<0.05, *** p<0.010

5. Results
5.8 Impact on wheat yields

Leibniz Institute of Agricultural Development in Transition Economies

.

	Yield determinants Model1	
ln_inputrel_wheat_seed	0.018	(0.050)
ln_inputrel_wheat_fertilizer	0.093***	(0.034)
ln_inputrel_wheat_labor	0.008	(0.047)
ln_inputrel_wheat_chemicals	0.047***	(0.014)
ln_inputrel_wheat_organic	-0.041	(0.063)
ln_inputrel_wheat_transportation	0.096	(0.062)
ln_inputrel_wheat_irrigation	0.289***	(0.063)
ln_inputrel_wheat_other	0.304	(0.252)
ln_inputrel_wheat_machinery	-0.159**	(0.066)
x1_log	-0.000	(0.122)
Information extension agents? (0/1)	0.325**	(0.151)
Participation informal joint activity (0	-0.008	(0.155)
Participation formal joint activity (0/1	0.629**	(0.253)
Constant	1.658***	(0.354)
r2_p		
N	389	

* p<0.10, ** p<0.05, *** p<0.010

5. Results
5.8 Impact on wheat yields

Leibniz Institute of Agricultural Development in Transition Economies

.

	Yield determinants Model2	
ln_inputrel_wheat_seed	0.018	(0.050)
ln_inputrel_wheat_fertilizer	0.093***	(0.034)
ln_inputrel_wheat_labor	0.008	(0.047)
ln_inputrel_wheat_chemicals	0.047***	(0.014)
ln_inputrel_wheat_organic	-0.041	(0.063)
ln_inputrel_wheat_transportation	0.096	(0.062)
ln_inputrel_wheat_irrigation	0.289***	(0.063)
ln_inputrel_wheat_other	0.304	(0.252)
ln_inputrel_wheat_machinery	-0.159**	(0.066)
x1_log	-0.000	(0.122)
Information extension agents? (0/1)	0.325**	(0.151)
Participation informal joint activity (0	-0.008	(0.155)
Participation formal joint activity (0/1	0.629**	(0.253)
Constant	1.658***	(0.354)
r2_p		
N	389	

* p<0.10, ** p<0.05, *** p<0.010

5. Results
5.8 Impact on wheat yields

Leibniz Institute of Agricultural Development in Transition Economies

.

	Yield determinants Model3	
ln_inputrel_seed	0.054	(0.036)
ln_inputrel_wheat_fertilizer	0.079**	(0.036)
Reception of subsidized fertilizer	-0.098	(0.152)
ln_inputrel_wheat_labor	0.007	(0.047)
ln_inputrel_wheat_chemicals	0.042***	(0.015)
ln_inputrel_wheat_organic	-0.037	(0.063)
ln_inputrel_wheat_transportation	0.095	(0.061)
ln_inputrel_wheat_irrigation	0.280***	(0.063)
ln_inputrel_wheat_other	0.300	(0.251)
ln_inputrel_wheat_machinery	-0.149**	(0.066)
x1_log	0.001	(0.122)
Information extension agents? (0/1)	0.316**	(0.151)
Participation informal joint activity (0	-0.014	(0.155)
Participation formal joint activity (0/1	0.635**	(0.251)
Constant	1.635***	(0.425)
r2_p		
N	389	

* p<0.10, ** p<0.05, *** p<0.010

5. Results
5.8 Impact on wheat yields

Leibniz Institute of Agricultural Development in Transition Economies

.

	Yield determinants Model4	
ln_inputrel_wheat_seed	0.018	(0.051)
ln_inputrel_wheat_fertilizer	0.092***	(0.034)
ln_inputrel_wheat_labor	0.007	(0.047)
ln_inputrel_wheat_chemicals	0.047***	(0.015)
ln_inputrel_wheat_organic	-0.041	(0.063)
ln_inputrel_wheat_transportation	0.096	(0.062)
ln_inputrel_wheat_irrigation	0.291***	(0.064)
ln_inputrel_wheat_other	0.304	(0.252)
ln_inputrel_wheat_machinery	-0.159**	(0.066)
Reception of subsidized fuel	-0.022	(0.122)
x1_log	-0.001	(0.123)
Information extension agents? (0/1)	0.326**	(0.152)
Participation informal joint activity (0	-0.011	(0.156)
Participation formal joint activity (0/1	0.627**	(0.253)
Constant	1.695***	(0.409)
r2_p		
N	389	

* p<0.10, ** p<0.05, *** p<0.010

5. Results
5.8 Impact on wheat yields

Leibniz Institute of Agricultural Development in Transition Economies

.

	Yield determinants Model5	
Reception of subsidized seed	0.152	(0.136)
Reception of subsidized fertilizer	-0.301**	(0.151)
Reception of subsidized fuel	0.026	(0.127)
ln_inputrel_labor	0.008	(0.028)
ln_inputrel_chemicals	0.015	(0.015)
ln_inputrel_organic	0.007	(0.053)
ln_inputrel_transportation	0.009	(0.060)
ln_inputrel_irrigation	0.320***	(0.057)
ln_inputrel_other	0.095	(0.161)
x1_log	-0.046	(0.120)
Information extension agents? (0/1)	0.398***	(0.152)
Participation informal joint activity (0	-0.013	(0.154)
Participation formal joint activity (0/1	0.702***	(0.251)
Constant	1.580***	(0.358)
r2_p		
N	396	

* p<0.10, ** p<0.05, *** p<0.010