Leibniz Institute of Agricultural Development
in Transition Economies

Behavioral insights for agricultural policy design

Nodir Djanibekov

Based on joint work with:
Abdusame Tadjiev, Zafar Kurbanov (both IAMO)

15 July 2020

Virtual Seminars on Applied Economics and Policy Analysis in Central Asia

Outline of the presentation

Leibniz Institute of Agricultural Development in Transition Economies

- Behavioral insights in policy design
- Problem: Social dilemma in water management in Central Asia
  - Research question
- Study settings and farmers self-assessment and perceptions
- Policy implications

Tradition of *Homo Economicus* in policy design

Leibniz Institute of Agricultural Development in Transition Economies

- To analyze policy effects and predict social outcomes
- Policies usually have results-based ambitions (crop yields, export, employment, individual contributions etc).

- Traditionally, farmers' behavior of a selfish rational actor
  - necessary organizations -> economically attractive to cooperate (water management)
  - higher economic benefits -> shit to sustainable agricultural technology
  - larger farms invest in modern technology
- Rationality assumption is statistically valid account of farmers' decisions
- Usually policies take mandates and bans approaches, or economic (dis)incentives via subsidies vs taxes

Source: Afif et al. (2019), Troussard and van Bavel (2018).

More realistic and effective policy interventions

Leibniz Institute of Agricultural Development in Transition Economies

- Consideration of behavioral factors can complement, fine-tune & enrich economic analyses of farmer decision-making

- 'Behavioral factors':
  - important in coping with social dilemmas, such as collective action in irrigation water management or in reducing coronavirus transmission.
  - decision influenced by what our social circle thinks is the "right thing to do" rather than choosing the rational option

- Incentives leveraging non-financial behavioral factors of decision choice

- Future economic theory based on a hybrid approach

Source: Afif et al. (2019), Troussard and van Bavel (2018).

Social norms

Leibniz Institute of Agricultural Development in Transition Economies

- Collective representations of acceptable behavior as well as individual perceptions of the adoption of a particular conduct by others
- Individual decisions are influenced by interpersonal relationships
- Certain decisions are made by reflecting on peer-decisions, e.g.
  - perceived societal pressure
  - (dis)aproval by neighbors, relatives, friends
- Decisions based on assessment of others engagement in behavior
  - context of own judgments and behavioral constraints

Source: Lapinski and Rimal (2005).

Source: weproject.media

Example: Behavioral insights in farmer's participation in environmental programme

Leibniz Institute of Agricultural Development in Transition Economies

- Participants of agri-environmental schemes are more likely to consider society's opinion as important (Defrancesco et al. 2008)
- Adoption of sustainable agri practices is linked to local public image and status (Willock et al. 1999)
- Engaging in sustainable practices is a signal of pro-sociality, and yields status benefits (Zahavi and Zahavi 1999).

Behavioral construct:
Relevance to Central Asia

Leibniz Institute of Agricultural Development in Transition Economies

- Long experience of centrally planned economy
- Transition to market economy institutions

- Selected self-assessment and perception items that validate behavioral construct of farmers:
  - Social norms
  - Certainty in land tenure
  - Role of local authority
  - Decision-making freedom of farmers

Social dilemma in Central Asia:
Farmers‘ cooperation in irrigation

Leibniz Institute of Agricultural Development in Transition Economies

- Situations when individual interest are at odds with group interest
  - individuals free ride, but a community (as a whole) is better off when everyone contributes

- **Trust** is a crucial factor regarding both greater individual rule adherence and more cooperative behavior in water management in **self-governed systems** (Roßner and Zikos 2018)
- **Communication** has robust positive effect on cooperation, while **high-penalty** crowds out water users’ cooperative behavior (Amirova et al. 2019)
- **Top-down promotion of coordination** among water users can be implemented by being embedded into an **in-depth understanding of the local settings** (Hamidov et al. 2015)

Research questions

Leibniz Institute of Agricultural Development in Transition Economies

- Are farmers with higher concerns about society's opinion more likely to cooperate in water management?
- Does local authority's opinion matter for promoting cooperate in water management?
- Is the reputation of water supply organization important for promoting cooperation in water management?

Study regions

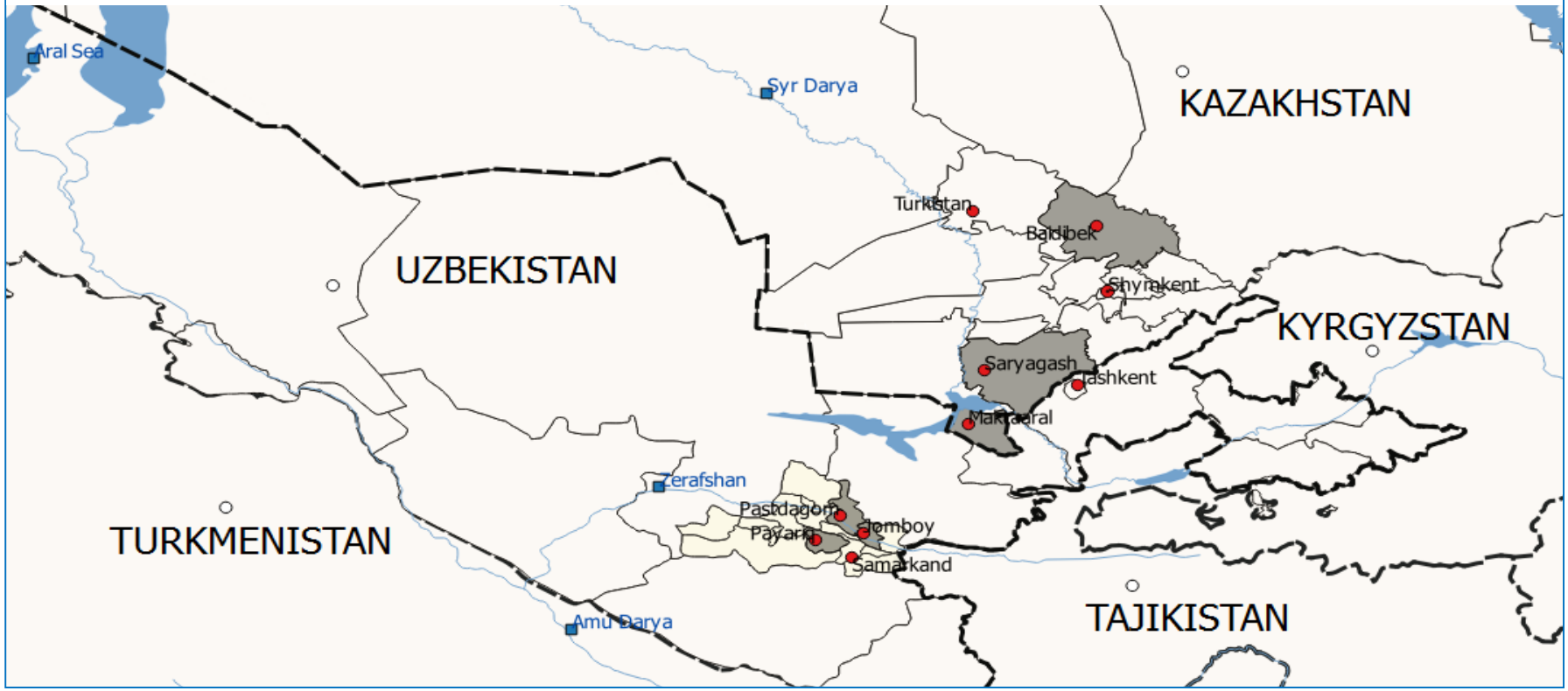
Leibniz Institute of Agricultural Development in Transition Economies

Turkistan province (Kazakhstan): N =502
Samarkand province (Uzbekistan): N =460

Agrichange

SUSADICA
Doctoral Programme on Sustainable Agricultural Development in Central Asia

AGRICHANGE – Institutional change in land and labour relations of Central Asia's irrigated agriculture www.iamo.de/en/agrichange
SUSADICA – Structured doctoral programme on Sustainable Agricultural Development in Central Asia www.iamo.de/susadica



Source: Mukhamedova and Petrick (2018).

Turkistan and Samarkand provinces

Leibniz Institute of Agricultural Development in Transition Economies

	Kazakhstan (Turkistan)	Uzbekistan (Samarkand)
Land tenure	Private land ownership possible, long-term leases of state land	Long-term leases, state-mandated land allocations to strategic crops
Farm restructuring	Dissolution of state farms in early 1990s, average cotton farm has 6 ha of land	Farm consolidation (latest in 2019), average cotton farm has about 90 ha. Since 2018, cotton cultivation transferred to private textile companies called 'clusters'
Land distribution process	Farm property was distributed to directors of former state farms for 5-20 years, about 80% was given to farm members	Land distribution to individual via tender taking into account applicants' farming skills, education, assets.
Strategic role of agriculture	Crop production under market economy, subsidy	Cotton and wheat as strategic crops, until recently state-mandated delivery quotas were in place, price controls
Access to capital & inputs	Private banks, capital subsidies, input supply by ginneries	Monopolistic state bank, state-controlled input supply, informal finance; since recently input distributed by cotton 'clusters' through contract farming

Sources: Updated by Tadjiev based on Amirova et al. (2019).

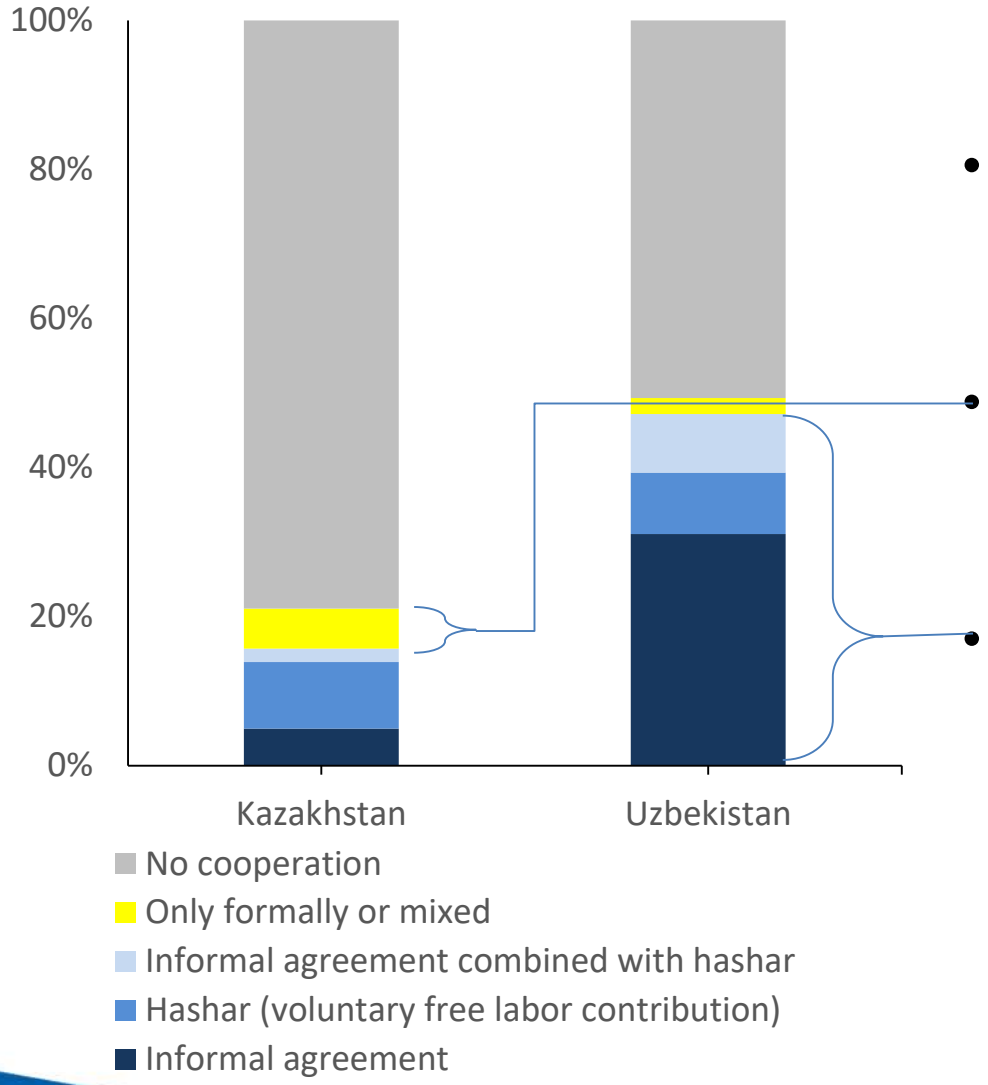
Cooperation in water management: Social dilemma

Leibniz Institute of Agricultural Development in Transition Economies

- Public good dilemmas VS Commons (resource) dilemmas
- Real-world problems are *hybrid social dilemmas*:
  - Water users are required to make active contributions (service fees) and avoid from over-consumption (distribution schedules)
- Combination of:
  - Social fences or "give some dilemmas“: Contributions to infrastructure maintenance
  - Social traps or "take some dilemmas“: Compliance to agreed rules and collective decision of water destribution

Observed cooperation in “give some” water management

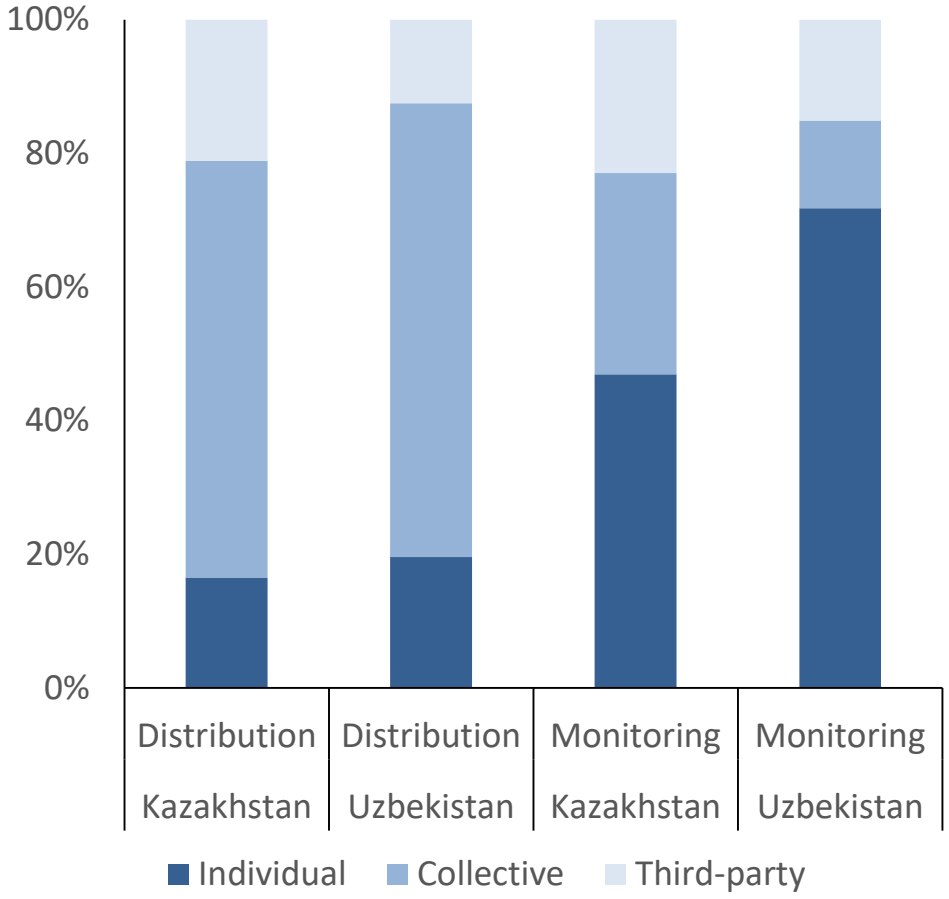
Leibniz Institute of Agricultural Development in Transition Economies



- Participations of farmers in cooperation in water management was higher in Uzbekistan
- In Kazakhstan the share of formal way of cooperation in water management was higher
- Farmers opted for informal forms of cooperating in water management

Source: Authors based on AGRICHANGE farm survey (2019).

Observed cooperation in “take some” water management



Most farmers arrange collective water distribution (schedules to follow)

Low collective approach for monitoring of compliance to agreed distribution rules

Source: Authors based on AGRICHANGE farm survey (2019).

Farmers' preferences

Leibniz Institute of Agricultural Development in Transition Economies

A set of preferences drives decision-making of individual agents

Parameter (1…5)	Turkistan	Samarkand	Mean diff
Risk preference	4.189 (0.922)	3.496 (0.884)	0.693***
Time patience	3.573 (1.025)	3.289 (0.894)	0.283***
Punishment for unfair behavior	3.215 (1.260)	3.283 (0.88)	-0.068
Reciprocity	4.338 (0.847)	4.154 (0.640)	0.184***

Notes: Standard errors are in parentheses. *** indicates p<0.01; ** indicates p<0.05; * indicates p<0.10.

Source: Authors based on AGRICHANGE farm survey (2019).

Social norm

- Farmers are influenced by what they think others expect from them (social approval)
  - E.g., adopters of soil conservation practices are more likely than non-adopters to consider opinion of their relatives and neighbors (Wauters et al. 2010).

Parameter	Turkistan	Samarkand	Mean diff
Importance of taking part in social activities for farm business (1/0)	0.889 (0.315)	0.898 (0.303)	-0.009
Caring about opinions of neighbors and relatives (1…5)	3.748 (0.740)	3.189 (0.804)	0.558***
Caring about opinions of other farmers (1…5)	3.594 (0.885)	3.226 (0.773)	0.368***
Caring about opinions of local authority (1…5)	3.241 (1.265)	3.985 (0.684)	-0.744***

Notes: Standard errors are in parentheses. *** indicates p<0.01; ** indicates p<0.05; * indicates p<0.10.

Source: Authors based on AGRICHANGE farm survey (2019).

Trust in institutions

Leibniz Institute of Agricultural Development in Transition Economies

People who positively evaluate the certainty and functioning of institutions (e.g., land tenure and water supply organization) also more likely to cooperate

Parameter	Turkistan	Samarkand	Mean diff
Interest in a successor of farm business (1/0)	0.942 (0.233)	0.922 (0.269)	0.021
Expects > 10 years of farm business (1/0)	0.789 (0.408)	0.761 (0.427)	0.028
Losing land lease within next 3 years (1…5)	1.624 (0.930)	2.752 (0.956)	-1.128***
Importance of land certificate to protect tenure rights (1…5)	4.618 (0.843)	4.180 (0.871)	0.438***
Opinion about water supply organization (1…3)	2.427 (0.630)	2.098 (0.661)	0.330***

Notes: Standard errors are in parentheses. *** indicates p<0.01; ** indicates p<0.05; * indicates p<0.10.

Source: Authors based on AGRICHANGE farm survey (2019).

Trust in courts in disputes with…

Parameter (1…5)	Turkistan	Samarkand	Mean diff
…other farmers	3.905 (1.096)	3.943 (0.804)	-0.0389
…state authorities	3.410 (1.194)	2.246 (1.088)	1.164***

Decision-making freedom in…

Parameter (1…5)	Turkistan	Samarkand	Mean diff
…crop choice	4.763 (0.600)	1.576 (1.017)	3.187***
…marketing channel	4.732 (0.580)	1.572 (0.964)	3.160***

Notes: Standard errors are in parentheses. *** indicates p<0.01; ** indicates p<0.05; * indicates p<0.10.

Source: Authors based on AGRICHANGE farm survey (2019).

Selected model

Leibniz Institute of Agricultural Development in Transition Economies

A binary response probit model

$$Y_i = \begin{cases} 1 & \textit{if farmer cooperates in irrigation water management} \\ 0 & \textit{otherwise} \end{cases}$$

$$Y_i^* = \delta X_i + \varepsilon_i, \quad Y_i = 1[Y_i^* > 0],$$

Regression results: Marginal effects Decisions to cooperate

Leibniz Institute of Agricultural Development in Transition Economies

	Kazakhstan			Uzbekistan		
	Irrigation cooperation "give some"	Water distribution "take some"	Water monitoring "take some"	Irrigation cooperation "give some"	Water distribution "take some"	Water monitoring "take some"
Risk preference	0.068*** (0.022)	0.041* (0.024)	0.035 (0.023)	-0.021 (0.031)	-0.047 (0.031)	-0.003 (0.023)
Time patience	-0.030* (0.018)	0.015 (0.022)	-0.041** (0.020)	0.005 (0.031)	-0.079*** (0.030)	0.015 (0.024)
Punishment for unfair behavior	-0.009 (0.014)	0.082*** (0.016)	0.041*** (0.015)	-0.004 (0.026)	0.075*** (0.023)	0.013 (0.018)
Importance of land certificate to protect tenure rights	0.024 (0.022)	-0.066** (0.028)	-0.069*** (0.023)	-0.120*** (0.025)	-0.111*** (0.025)	0.022 (0.021)

Notes: Standard errors are in parentheses. *** indicates p<0.01; ** indicates p<0.05; * indicates p<0.10.

Regression results: Marginal effects Decisions to cooperate

Leibniz Institute of Agricultural Development in Transition Economies

	Kazakhstan			Uzbekistan		
	Irrigation cooperation "give some"	Water distribution "take some"	Water monitoring "take some"	Irrigation cooperation "give some"	Water distribution "take some"	Water monitoring "take some"
Caring about opinions of neighbors and relatives	0.060** (0.024)	0.063** (0.028)	0.033 (0.029)	0.063** (0.029)	0.064** (0.026)	0.033 (0.022)
Caring about opinions of local authority	-0.024 (0.015)	-0.057*** (0.018)	-0.071*** (0.016)	0.076*** (0.029)	0.052* (0.027)	-0.011 (0.023)
Trust in courts in disputes with state authorities	-0.029* (0.016)	-0.002 (0.019)	-0.031* (0.017)	0.001 (0.022)	0.014 (0.020)	0.065*** (0.014)
Opinion about water supply organization	0.006 (0.028)	0.116*** (0.036)	-0.014 (0.032)	0.124*** (0.032)	0.130*** (0.029)	-0.043* (0.024)
Pseudo R2	0.095	0.108	0.128	0.201	0.247	0.131
Prob > chi2	0.001	0.000	0.000	0.000	0.000	0.000
N	502	502	502	460	460	460

Notes: Standard errors are in parentheses. *** indicates p<0.01; ** indicates p<0.05; * indicates p<0.10.

Conclusions

Leibniz Institute of Agricultural Development in Transition Economies

- In more integrated market settings, farmers can be considering cooperation as risky, less-rewarding over time, and requiring punishment skills
- Social norms of respect to opinion of neighbors and relatives are crucial
  - Respect to opinion of public authorities produces contrasting results on cooperation
    - In Turkistan: promote individualism
    - In Uzbekistan: promote cooperation
- More formal institutions can crowd-out (informal) cooperation in water management
- The regulatory environment which promotes farmers' more autonomous decision making (e.g., crop choice) can facilitate cooperation
- Local image of water supply organization matters in individual's decision to cooperate

Policy implications

Leibniz Institute of Agricultural Development in Transition Economies

- Improved local image of water supply organizations among farmers:

- Improved local public image & status of cooperating farmers
  - pro-social behavior has a social identity component, in that it 'says something' about farmers

1) Public recognition: Recognition of cooperating farmers through media
2) Social signaling: Cooperating farmers gain status in their community
3) Social comparison: Facilitation of informal communication and social capital among farmers for better opportunities to compare own efforts with peers

References

Afif, Z., Islan, W., Gonzalez, C., Dalton, A. (2019) Behavioral Science Around the World: Profiles of 10 Countries. eMBeD brief. Washington, D.C.: World Bank Group. https://documents.worldbank.org/curated/en/710771543609067500/pdf/132610-REVISED-00-COUNTRY-PROFILES-dig.pdf

Amirova, I., Petrick, M., Djanibekov, N. (2019) Long- and short-term determinants of water user cooperation: Experimental evidence from Central Asia. World Development, 113, 10-25. https://doi.org/10.1016/j.worlddev.2018.08.014

Defrancesco, E., Gatto, P., Runge, F., Trestini, S. (2008) Factors affecting farmers' participation in agri-environmental measures: a Northern Italian perspective. Journal of Agricultural Economics 59 (1), 114–131. http://doi.org/10.1111/j.1477-9552.2007.00134.x.

Hamidov, A, Thiel, A., Zikos, D. (2015) Institutional design in transformation: A comparative study of local irrigation governance in Uzbekistan. Environmental Science & Policy, 53B, 175–191. https://doi.org/10.1016/j.envsci.2015.06.012.

Lapinski, M., Rimal, R. (2005) An explication of social norms. Communication Theory 15 (2), 127-147. http://dx.doi.org/10.1111/j.1468-2885.2005.tb00329.x.

OECD (2019) Tools and Ethics for Applied Behavioural Insights: The BASIC Toolkit. https://doi.org/10.1787/9ea76a8f-en.

Roßner, R., Zikos, D. (2018) The role of homogeneity and heterogeneity among resource users on water governance: Lessons learnt from an economic field experiment on irrigation in Uzbekistan. Water Economics and Policy 04 (03), 1850008. https://doi.org/10.1142/S2382624X1850008XC

Troussard, X. ,van Bavel, R. (2018) How can behavioural insights be used to improve EU policy? Intereconomics 53 (1), 8-12. http://doi.org/10.1007/s10272-018-0711-1.

van Dijk, W., Lokhorst, A., Berendse, F., de Snoo, G. (2016) Factors underlying farmers' intentions to perform unsubsidised agri-environmental measures. Land Use Policy 59, 207–216. http://doi.org/10.1016/j.landusepol.2016.09.003.

Van Lange, P. A., Joireman, J., Parks, C. D., Van Dijk, E. (2013) The psychology of social dilemmas: a review. Organ. Organizational Behavior and Human Decision Processes 120 (2), 125-141. https://doi.org/10.1016/j.obhdp.2012.11.003

Willock, J., Deary, I. J., Edwards-Jones, G., Gibson, G. J., McGregor, M. J., Sutherland, A., Dent, J. B., Morgan, O., Grieve, R. (1999) The role of attitudes and objectives in farmer decision making: business and environmentally-oriented behaviour in Scotland. Journal of Agricultural Economics 50 (2), 286–303. http://doi.org/10.1111/j.1477-9552.1999.tb00814.x.

Thank you for your attention!

djanibekov@iamo.de

Descriptive statistics: Non-behavioral characteristics

Leibniz Institute of Agricultural Development in Transition Economies

	Turkistan	Samarkand	Mean diff.
Age of farm manager (years)	47.199 (13.210)	43.750 (10.043)	3.449***
Farmer manager relies on own knowledge (1/0)	0.769 (0.421)	0.467 (0.499)	0.302***
Higher education level of farm manager (1/0)	0.296 (0.456)	0.335 (0.472)	-0.039
Specialized education in agriculture (1/0)	0.300 (0.458)	0.359 (0.480)	-0.058*
Farmer‘s relative has a farm (1/0)	0.771 (0.421)	0.415 (0.493)	0.356***
Total farm land area in 2018 (ha)	12.949 (23.579)	38.944 (26.535)	-26.000***
Share of land under cotton cultivation (%)	48.297 (44.164)	36.121 (27.621)	12.180***
Farmer uses irrigation pump (1/0)	0.109 (0.313)	0.228 (0.420)	-0.119***
Distance from farm fields to local market (km)	16.747 (13.503)	13.308 (6.777)	3.439***
Soil fertility index of farm fields (0-1)	0.464 (0.464)	0.646 (0.396)	-0.182***