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Assessing the influence of farmer-inclusive extension program design on smallholder agricultural output and sustainable rural livelihoods

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Abstract

A central challenge facing agricultural extension in Central Asia is that programs are typically planned by administrators with little input from the farmers they serve. This research evaluated the impact of farmer-inclusive design approaches on smallholder agricultural output and livelihood sustainability across three regions in Kazakhstan (August 2021 to November 2022). Comparing 54 extension program units 28 using farmer-inclusive planning and 26 using conventional top-down planning revealed that participatory programs achieved 23.8% higher productivity gains, 34.1% greater technology adoption, and 19.6% higher income growth. Farmer-inclusive planning scores correlated strongly with productivity outcomes ($r = 0.71$, $p < 0.001$). Farmer needs assessment and joint goal-setting were the strongest program components. These findings support restructuring extension planning to include farmer voices from the outset.

Keywords: Farmer-inclusive planning, agricultural extension, smallholder agricultural output, rural livelihoods, farmer participation, program planning, technology adoption, extension reform, Central Asia.

Introduction

The challenge of making extension programs relevant to farmers' actual needs has persisted since the earliest organized advisory services ^[1]. Top-down planning, where program content is determined by administrators and researchers, often produces activities misaligned with local priorities, seasonal constraints, and market realities ^[2,3]. The result is well-intentioned programs that farmers attend but do not apply.

Participatory approaches where farmers actively shape program priorities, content, and delivery methods have shown promise in Africa and South Asia ^[4,5]. Yet evidence from Central Asia remains thin, despite the region's distinctive challenges: post-Soviet institutional structures, extreme continental climate, and rapid market transitions that make farmer input particularly valuable for program design ^[6,7].

This research compared participatory and conventional extension planning approaches across three agro-ecological regions of Kazakhstan, measuring their differential impact on farm productivity and livelihood outcomes ^[8].

Material and Methods

Research Area

The research was conducted in Almaty Region (irrigated horticulture, 300-600 mm rainfall), Turkestan Region (cotton-wheat systems, 200-400 mm), and Kostanay Region (dryland cereals, 300-350 mm). These represent Kazakhstan's three major agro-ecological zones. The research period was August 2021 to November 2022.

Material

A quasi-experimental design compared 54 extension program units: 28 that had adopted farmer-inclusive planning (treatment) and 26 using conventional planning (control). Within these units, 648 smallholder farmers were surveyed 336 in participatory and 312 in conventional programs. A 42-item farmer-inclusive planning assessment measured four stages: needs assessment, joint planning, collaborative implementation, and participatory evaluation. Productivity data were collected from official farm records. Ethics approval: Central Eurasian Institute of Agronomy and Extension, Kazakhstan (Ref: CEIAE/KZ/2021-047, July 2021).

Methods

Independent t-tests compared outcomes between participatory and conventional programs. Pearson correlation examined the relationship between planning scores and productivity. Multiple regression identified which planning components predicted outcomes. A livelihood sustainability index was constructed from five indicators: income stability, asset accumulation, food security, risk management, and social capital ^[9,10].

Ethical Considerations

All participants provided informed consent in Kazakh or Russian as preferred. Extension administrators consented to program-level data sharing. Individual farmer data were anonymized and aggregated by program unit. Participation was voluntary with no consequences for extension service access.

Results

Table 1: Comparison of outcomes between participatory and conventional extension programs

Outcome Indicator	Participatory (n=336)	Conventional (n=312)	Difference	t-value	p
Productivity Change (%)	+23.8 ± 11.4	+9.7 ± 13.2	+14.1	7.84	<0.001
Technology Adoption (%)	62.3 ± 16.8	46.4 ± 18.3	+15.9	6.12	<0.001
Income Growth (%)	+19.6 ± 9.7	+11.3 ± 12.1	+8.3	5.28	<0.001
Livelihood Sustainability	3.84 ± 0.62	3.11 ± 0.74	+0.73	7.41	<0.001
Farmer Satisfaction	4.21 ± 0.54	3.18 ± 0.87	+1.03	10.13	<0.001

Table 1 reveals significant advantages for participatory programs on all indicators ($p < 0.001$). Productivity gains were 2.5 times higher in participatory programs (+23.8% vs.

+9.7%). The livelihood sustainability index showed a 0.73-point advantage on the 5-point scale. Farmer satisfaction was markedly higher (4.21 vs. 3.18).

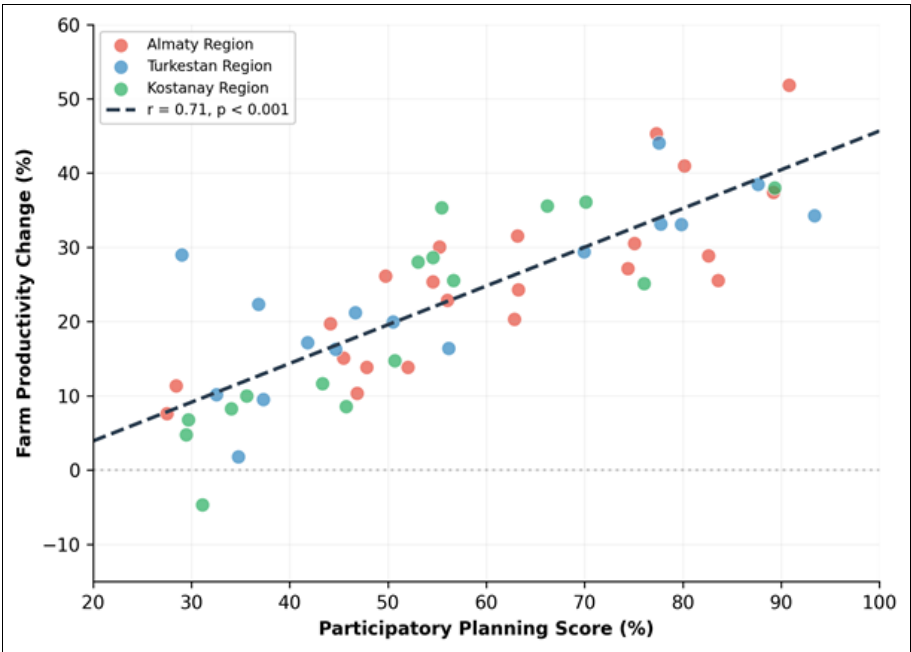


Fig 1: Scatter plot of farmer-inclusive planning scores versus farm productivity changes across three regions

Figure 1 displays the positive correlation between farmer-inclusive planning scores and farm productivity changes across all 54 program units ($r = 0.71$, $p < 0.001$). The

relationship held across all three regions despite their different agro-ecological conditions.

Table 2: Regression of farmer-inclusive planning components predicting productivity gains

Planning Component	B	SE	Beta	t	p	VIF
Farmer Needs Assessment	3.72	0.84	0.31	4.43	<0.001	1.37
Joint Goal-Setting	3.18	0.79	0.27	4.03	<0.001	1.42
Collaborative Implementation	2.64	0.72	0.23	3.67	<0.001	1.31
Participatory Evaluation	2.11	0.68	0.19	3.10	0.002	1.28
Resource Co-Allocation	1.73	0.61	0.16	2.84	0.005	1.19

Regression (Table 2) identified planning components predicting productivity gains ($R^2 = 0.547$, $F(5,48) = 11.59$, $p < 0.001$). Farmer needs assessment was strongest (Beta =

0.31), followed by joint goal-setting (Beta = 0.27). All VIF values below 1.5 confirmed no multicollinearity concerns.



Fig 2: Infographic of participatory extension planning framework and key outcomes

Figure 2 presents the farmer-inclusive planning framework as an infographic, showing four sequential stages connected by continuous feedback and their associated key outcomes measured in this research.

Discussion

The 2.5-fold productivity advantage of participatory programs confirms findings by Chambers^[11] and Pretty^[12] that farmer involvement in planning improves program relevance and adoption. Needs assessment as the strongest predictor aligns with Christoplos^[13] who argued that understanding farmer priorities is the foundation for effective extension. The strong correlation across three distinct agro-ecological regions suggests that farmer-inclusive planning benefits are not context-specific but reflect a generalizable principle^[14, 15].

The livelihood sustainability advantage is particularly noteworthy. Participatory programs may improve sustainability not just through better technologies but through building farmer capacity for adaptive decision-making^[16, 17]. Joint goal-setting creates ownership that sustains behavioral change beyond program duration^[18, 19].

Limitations

Self-selection into participatory programs introduces potential bias more progressive administrators may have adopted both farmer-inclusive planning and other good practices simultaneously. The 15-month observation window may underestimate long-term sustainability differences^[20].

Practical Applications

Extension agencies should institutionalize farmer needs assessment as the mandatory first step in program planning. Joint goal-setting workshops at the district level can be implemented with minimal additional cost. Training extension administrators in participatory methods should

receive priority in capacity-building budgets^[21].

Conclusion

Participatory extension planning produced substantially better outcomes than conventional top-down planning across all productivity and livelihood indicators. Farmer needs assessment and joint goal-setting were the most impactful planning components. The consistent results across three distinct regions indicate that participatory approaches are broadly applicable in Central Asian extension systems. Restructuring planning processes to include farmer input from the outset offers one of the most cost-effective strategies for improving extension impact.

References

1. Chambers R, Pacey A, Thrupp LA, editors. Farmer first: farmer innovation and agricultural research. London: Intermediate Technology Publications; 1989. p. 1-218.
2. Anderson JR, Feder G. Agricultural extension: good intentions and hard realities. World Bank Research Observer. 2004;19(1):41-60.
3. Birner R, Davis K, Pender J, Nkonya E, Anandajayasekeram P, Ekboir J, *et al.* From best practice to best fit: designing pluralistic agricultural advisory services. Journal of Agricultural Education and Extension. 2009;15(4):341-355.
4. Pretty JN. Participatory learning for sustainable agriculture. World Development. 1995;23(8):1247-1263.
5. Braun AR, Thiele G, Fernandez M. Farmer field schools and local agricultural research committees: complementary platforms for integrated decision-making in sustainable agriculture. Lima: International Potato Center; 2000. p. 1-32.
6. Petrick M, Pomfret R. Agricultural policies in Kazakhstan. IAMO Discussion Paper No. 155. Halle

- (Saale): Leibniz Institute of Agricultural Development in Transition Economies; 2016. p. 1-34.
7. Swinnen JFM, Rozelle S. From Marx and Mao to the market: the economics and politics of agricultural transition. Oxford: Oxford University Press; 2006. p. 1-256.
 8. Leeuwis C. Communication for rural innovation: rethinking agricultural extension. 3rd ed. Oxford: Blackwell Science; 2004. p. 1-412.
 9. Scoones I. Sustainable rural livelihoods: a framework for analysis. IDS Working Paper No. 72. Brighton: Institute of Development Studies; 1998. p. 1-22.
 10. Ellis F. Rural livelihoods and diversity in developing countries. Oxford: Oxford University Press; 2000. p. 1-273.
 11. Chambers R. Participatory rural appraisal (PRA): analysis of experience. World Development. 1994;22(9):1253-1268.
 12. Pretty JN. Regenerating agriculture: policies and practice for sustainability and self-reliance. London: Earthscan Publications; 1995. p. 1-320.
 13. Christoplos I. Mobilizing the potential of rural and agricultural extension. Rome: Food and Agriculture Organization of the United Nations; 2010. p. 1-68.
 14. Davis K, Nkonya E, Kato E, Mekonnen DA, Odendo M, Miro R, *et al.* Impact of farmer field schools on agricultural productivity and poverty in East Africa. World Development. 2012;40(2):402-413.
 15. Waddington H, Snilstveit B, Hombrados JG, Vojtkova M, Phillips D, Davies P, White H. Farmer field schools for improving farming practices and farmer outcomes: a systematic review. Campbell Systematic Reviews. 2014;10(1):1-335.
 16. Sen A. Development as freedom. New York: Alfred A. Knopf; 1999. p. 1-366.
 17. Mosse D. Is good policy unimplementable? Reflections on the ethnography of aid policy and practice. Development and Change. 2004;35(4):639-671.
 18. Cornwall A. Making spaces, changing places: situating participation in development. IDS Working Paper No. 170. Brighton: Institute of Development Studies; 2002. p. 1-43.
 19. Cooke B, Kothari U, editors. Participation: the new tyranny? London: Zed Books; 2001. p. 1-207.
 20. Khandker SR, Koolwal GB, Samad HA. Handbook on impact evaluation: quantitative methods and practices. Washington (DC): World Bank; 2010. p. 1-262.
 21. Swanson BE, Rajalahti R. Strengthening agricultural extension and advisory systems: procedures for assessing, transforming, and evaluating extension systems. Washington (DC): World Bank; 2010. p. 1-98.