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# E-governance, land rights, and community mobilisation in Bihar, India: A randomised controlled trial

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# <u>E-Governance, Land Rights, and Community Mobilization in Bihar, India: A Randomized</u> <u>Controlled Trial</u>

#### <u>Abstract</u>

Can digital literacy training and village-level community mobilization improve the effectiveness of e-governance platforms? The present study explores this question through a mixed-methods, randomized field experiment evaluating a digital literacy program with a focus on enabling usage of the land rights e-governance system in Bihar, India. While the COVID-19 pandemic constrained both the level of treatment intensity and research activities, the program increased reported internet use and led to several modest shifts in reported use of government programs and civic activities. We conclude with three policy recommendations: integrating digital literacy training with curricula that synthesize access to e-governance, business opportunities, and other livelihood resources targeted toward specific populations; leveraging existing within-village and within-household expertise to increase access to e-governance; and government sponsorship of community auditing and deliberation sessions to increase the legitimacy and accuracy of the egovernance land administration system. The study contributes to academic and policy debates at the intersection of governance, social protection, and digitization.

#### **Introduction**

Across much of the world, governments have embraced information and communications technology (ICT) as a central modality of governance. Policies leveraging ICT to improve governance and service delivery are broadly referred to as *e-governance*. Justifications for e-governance rest on both efficiency and equity motivations. Supporters expect that, by developing digital platforms and accompanying administrative systems that increase transparency and/or citizen voice, government accountability will improve. Technological platforms can serve as conduits through which citizens can provide feedback to government actors. Frontline government officials and other officers mandated to serve the public may improve their performance in response to the increased accountability offered by the platforms.

Yet the theory of change underlying e-governance depends critically on the extent to which e-governance platforms are accessible to citizens. User-directed e-governance programs only work insofar as potential users have access to a device that can connect to internet, access to a more or less reliable internet network, and sufficient digital skills and knowledge of particular government platforms and services. Most governments acknowledge the need to improve digital literacy, but in a context of tight resource constraints and already-overstretched state capacity, large-scale investment in widespread digital literacy programs rarely finds its way into policy agendas. Furthermore, even where citizens do have the skills to access digital literacy platforms, open questions remain on the extent to which these citizens will engage in self-advocacy, particularly in the absence of supportive networks. In state contexts like Bihar with constrained capacities and deeply-engrained social inequities, it may be far from clear to potential users that engaging in e-governance systems is worthwhile. In social entitlement arenas hampered by uncertainty, lack of information, and rapid change, groups of intermediaries have historically

been known to arise to fill gaps, leading to leakages that can make the difference between a transformative program and one that barely moves the needle. How can policymakers address these issues?

In the present study, we explore one stream arising from this question through a randomized field experiment evaluating a program that combines digital literacy training with community organizing in Bihar, one of India's poorest states. The program—*e-Adhikaar* (a Hindi name that can be translated as "e-Rights", referring to the protection of government-guaranteed entitlements and support systems)—focuses on the land sector, a sector that is critical to livelihood in Bihar given that the overwhelming majority of the state's poor households live in rural areas and depend heavily on agricultural income.

As a result of constraints to both program implementation and the research process created by the COVID-19 pandemic, impact estimates may represent an extreme lower bound understating the effects the intervention would have yielded in the absence of the pandemic. Nonetheless, even under unprecedented adverse conditions, the program shows signs of having influenced behaviors and perceptions. First, the program increased reported internet use in the year preceding the endline survey by a magnitude representing roughly 20 percent of the number of times internet was accessed by the control group. Second, the program ostensibly reduced use of two government programs—*Janani Suraksha Yojana* (JSY) and the Public Distribution System (PDS)—although this result is likely at least in part capturing improved information on entitlement programs rather than actual usage change. Third, although the magnitudes are small and difficult to interpret, respondents in treatment villages showed signs of greater propensity to attend a *gram sabha* session and to vote, while being slightly less likely to affiliate with a

political party. Fourth, treatment village respondents showed a slight advantage in an asset ownership index and two basic asset types relative to control group respondents.

Additionally, the qualitative semi-structured interviews in conjunction with the survey data demonstrate that internet access is relatively widespread across villages, but that the disparities tend to be greater within villages and even households. There is already widespread awareness of the Bihar government's internet-based land administration platform and appreciation of its convenience, but also many observations of inaccuracies in the system. We conclude with three main policy recommendations: strategically combining digital literacy programs with information and resources about government entitlement programs and other livelihood-related opportunities; the potential efficiency gains from leveraging the presence of existing internet skills of individuals in villages and even households; and more proactive campaigns by the government to improve the accuracy and legitimacy of the new land e-governance system by sponsoring community deliberation and feedback sessions.

#### Literature Review: Land Administration, Social Protection, and E-Governance

Two of the most invaluable functions that governments can play in rural economic development are ensuring high-quality land administration on one hand and robust social protection systems on the other. Both of these domains are subject to a wide spectrum of challenges in many regions of the world, ranging from overburdened capacity to corruption to elite capture. Rural Bihar represents a case in point, with property rights and social protection institutions that are heavily constrained by resource shortages, clientelistic political networks, and overlapping caste, class, and communal social inequities and conflicts. As a result, even well-designed development programs can be subject to substantial leakages and breakdowns. For

example, Dutta et al. (2014, p. 16) evaluate the effects of the Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS) and estimate that the program reduced poverty by only a single percentage point whereas they project that had it been fully implemented poverty could have been reduced by 14 percentage points.

Development practitioners have employed and tested a variety of strategies with which to address such challenges. Following the explosions in digital and internet technologies during the 1990s and early 2000s, governments have increasingly turned to the use of e-governance—i.e., governance systems that rely on ICT platforms—as a central pillar of their strategies for improving governance in these sectors. While the enormous range of activities that the term egovernance covers makes overarching statements impossible, existing research suggests that egovernance programs have the potential under some circumstances to exert strong positive impacts (Gans-Morse et al., 2018).

Land administration in India is run primarily by state governments. The digitization of land registries and other applications of ICT to land administration have long been on the agenda of many major Indian states. For instance, Deininger and Goyal (2012) used a quasiexperimental design to explore the effects of land registry digitization in Andhra Pradesh on credit. Land e-governance initiatives in Bihar are more recent and have not, to our knowledge, been rigorously evaluated. However, the potential for e-governance to exert substantial impact has been established through a large-scale field experiment in which an internal government einvoicing system was introduced to the MGNREGS payout system and reduced leakages by nearly a quarter.

More broadly, while research on e-governance has flourished, most of the rigorous causal evidence has arisen from studies oriented toward the supply side—i.e., the effects of government

adoption of e-governance programs or platforms. While such effects are of course of first-order concern, adoption of large-scale programs and platforms happen rarely and depend on a wide array of political and economic contingencies that may be difficult to incorporate into policy evaluation and planning cycles. Furthermore, the effects of large-scale programs may depend heavily on contextual features which can lead to widely differing results among different subpopulations. This study instead explores whether and how a demand-side intervention can help to create the conditions—e.g., digital literacy combined with knowledge of entitlements and how to access them—within which e-governance initials are more likely to be successful. Once a largescale e-governance system like Bihar's land system has been introduced, it is unlikely to be quickly changed out. Activities by NGOs, community organizations, state agencies, and other development practitioners designed to improve the accessibility to these systems may in many cases represent the most feasible and flexible alternatives to large-scale institutional restructuring.

#### Intervention Background: e-Adhikaar

*e-Adhikaar* is run by Deshkal Society, a civil society organization based in Delhi that focuses primarily on rural development in Bihar. The program consists of two main components: community organizing and digital literacy training. These two components are integrated and are intended to be mutually reinforcing.

For the community organizing component, field organizers travel to program villages, hold public meetings informing village residents of their land rights and the existing egovernance platforms, and offer to provide assistance in forming a community-based organization (CBO) for digital literacy training and advocacy surrounding land e-governance.

Within villages that accept the offer, the field organizers then recruit members and train them on grassroots organizational operating procedures. Additionally, they train members on advocacy strategies like following up with government officials through group trips to local government offices and filing Freedom of Information Act petitions.

The second component—digital literacy training—comes in as one of the topics that field organizers focus on when explicating their advocacy strategies. In addition to teaching broadly applicable digital literacy skills that could prove beneficial to program participants in a variety of life domains, organizers zero in on the Government of Bihar's e-governance platforms. CBO members then assist eligible households in the community with their land-related e-governance claims to the extent that remaining resources permit.

#### **Research Design**

#### Survey Sample Selection

In order to test the effectiveness of this program, we selected 90 villages from two districts in Bihar: Gaya in the south and Purnia in the north. These districts were selected for reasons both of practical implementation and research design. From the implementation perspective, Deshkal Society has sufficiently robust networks and operational experience within these districts to ensure an efficient pilot. From the research design perspective, these districts differ from one another along important geographic, historical, and socioeconomic dimensions. For instance, rain and other climatic patterns (e.g., river flooding) differ between the two, leading to differences in agricultural systems. Gaya inhabits the Magadh cultural region, whereas Purnia is located within the Mithila region, representing two of Bihar's three major cultural regions (the third being Bhojpur). While sharing numerous commonalities—including elements of contemporary Bihari political culture, and legacies of the Zamindari system—the two are thought to differ in important dynamics relating to land and labor relations. For example, the Magadh region tends to be more associated than Mithila areas with open class conflict—particularly involving Scheduled Castes, given their relatively large population share within southern Bihar—whereas Mithila is thought of as having given rise to less open conflict but more intensive economic exploitation by landlords of agricultural laborers. Given that these two districts together cover the range of factors most likely to shape the program's effectiveness, findings that apply to both of these districts are likely to apply across much of the state.

Deshkal Society obtained a census of villages for two blocks within each district in which the project would be feasible to run given logistics and the capacity of local implementing partners. Villages were randomly selected from the block village censuses. Blocks included Bodh Gaya (22 villages) and Wazirganj (23 villages) in Gaya District and Krityanandnagar (23 villages) and Purnia East (22 villages) in Purnia District. Lists of at least ten eligible (i.e., smallholder farming) households from each village were then obtained from local offices for inclusion in the sample.

#### Survey Data Collection

Data collection began with a baseline survey in late 2019 aimed at providing a snapshot of participating households' socioeconomic status and livelihood situations, as well as allowing for balance tests and controls for the final impact regressions. Following the survey, the villages were randomized into two experimental groups: a treatment group that was designated to receive the *e-Adhikaar* program and a control group that was not designated to receive any services from Deshkal Society. The sample was randomized at the village level despite the accompanying loss in statistical power because the intervention logic is centered around building networks and knowledge resources at the level of villages—or at least the level of the *tola* (a within-village cluster or hamlet). Random assignment of the villages was stratified by two variables: the block in which the village is located, and whether it was above or below median in the share of respondents who reported previously having used the internet for reasons relating to land or government entitlements at baseline.

Over the course of 2020, Deshkal Society rolled out the program in treatment villages. An endline survey was conducted in late 2020, from which the impact estimates presented in this paper were generated. As a result of quarantine policies and other bottlenecks associated with the COVID-19 pandemic, both program implementation and the endline surveys were delayed. Uncertainty and administrative difficulties arising from this situation also led to difficulties in evenly timing endline data collection in particular villages such that the intervention had been completed before the survey commenced. However, in most treatment villages, program implementation had been completed by the time of the endline survey.

#### **Qualitative Data Collection**

The research design additionally included a qualitative component, intended to generate a richer, more nuanced, and more inductive picture of the intervention and study environment than would have been possible from the quantitative survey data alone. The original design had called for semi-structured interviews with smallholder farmers (i.e., the program's target population),

key informant and stakeholder interviews, and focus group discussions. However, qualitative data collection activities were more constrained by the pandemic than were the quantitative surveys. This was a result of the timing (the baseline survey was conducted before the pandemic, and the endline survey was conducted at a point by which social interactions had more or less stabilized temporarily in Bihar) and also an outgrowth of the nature of qualitative research (surveys can be conducted with relatively little personal contact, whereas focus group discussions involve groups of as many as a dozen participants and semi-structured interviews tend to yield the most in-depth data when circumstances are conducive to more leisurely conversation in order to gradually build up rapport). Timing difficulties also precluded using results from the qualitative data to calibrate the endline survey questionnaire as had originally been planned.

Given these limitations, qualitative data collection was constrained to 14 socially distanced semi-structured interviews with smallholder farmers from the sample, eight residing in treatment villages and six residing in control villages. Interviews focused on respondents' and their households' use of internet and the status of their land plots.

#### **Findings**

#### **Program Implementation**

The effects of the COVID-19 pandemic on this study's research design and data collection activities are discussed above. In reviewing the nature and extent of program implementation, it quickly becomes apparent that the pandemic also strongly affected implementation of the program. In the present section, we discuss these limitations based on

Deshkal Society's internal monitoring data and informal interviews and debriefing sessions with program implementers. We then go on to discuss our study's qualitative and quantitative findings respectively.

Overall, the pandemic constrained treatment intensity enormously, leading to much less frequent and more sporadic contact with host communities than had been planned. The spring and summer of 2020, when program implementation was at its height, was also the point at which India's quarantine was most restrictive. During interviews and debriefing sessions from Deshkal Society's previous CBO-based programs, field organizers have consistently maintained that cultivating the trust required from participating communities usually requires numerous and consistent trips to villages over long periods of time. Rural Bihar—like much of the rest of the world—is replete with organizations and individuals who make lofty promises that they do not deliver on. The fact that the organizers could not visit the communities during a key formative point in the intervention period meant that the program could not work as planned.

However, the program did continue, and field organizers were able to find creative ways to circumvent the barriers raised by the pandemic. For instance, field organizers kept up contact with village residents using Whatsapp groups. This enabled program staff to keep up their rapport with village residents, as well as reminding participants about key points of information and continuing with the learning process even while in-person visiting was not possible. Relying on Whatsapp and other ICT platforms for communications in the context of group-based programs in the context of rural Bihar has clear limitations. For one, the rural households most likely to benefit from rights-oriented digital literacy programs may also be least likely to have access to or decide to participate in Whatsapp groups and other forms of digital communication. Additionally, the program logic of group-based mobilization is rooted in the belief that sustained

face-to-face group interaction is a key mechanism for building within-group cohesion and solidarity that can then lead to collective advocacy.

On the other hand, the push to experiment more than planned with digital communications did have the benefit of encouraging exploration of a form of communication that could serve as an efficient complement to face-to-face activities as digital communications spread. Secular trends of increases in digital communications usage—both extensive, in that increasing shares of the population access ICT platforms, and intensive in that they use it for a wider range of activities—mean that establishing communication structures drawing on ICT is likely to bring higher returns in the coming years. Additionally, resilience to shocks—whether epidemiological, socioeconomic, or climatic—typically means relying on a wider variety of channels for operations, and robust ICT communication structures can increase the range of options available whenever in-person communication becomes difficult.

#### Qualitative Findings

We next turn to a discussion of the qualitative findings in order to more concretely ground the contexts faced by participants with regard to *e-Adkhikaar's* goals to better contextualize the impact results presented below. First, internet usage was quite common and widespread among qualitative respondents. The only barrier to use that was consistently reported was the reliability of network connectivity, which varied from village to village. Respondents reported use of internet for a variety of activities, most commonly communication (e.g., through Whatsapp, Facebook, and Zoom). Several also reported using the internet for informationgathering, usually relating to farming or other livelihood issues, or to children's studies. Respondents typically did not, on their own, bring up government entitlement programs or e-

governance as a domain for which internet skills are important. While many if not most individuals of the middle and elder generations did not themselves use the internet themselves, many did so, as did virtually all members of the younger generation.

Most respondents believed that the vast majority of households in their village had at least one member who was proficient in accessing the internet. This trend highlights the potential importance of intra-household information-sharing opportunities and frictions when designing digital literacy programs. It also highlights the importance of considering the policy implications of generational time shifts as, with each passing years, more and more individuals become proficient with internet use in general.

Respondents almost universally highlighted the importance of land rights within their respective villages and expressed belief in the need for government to take additional action to ensure clear property rights. The most commonly mentioned source of land conflicts was disputes over overlapping land rights claims. Respondents reported that such disputes are generally settled internally between the parties by themselves or with help from representatives from local *panchayat* institutions. However, dispute resolution is costly in terms of finance, time, cognitive bandwidth, and emotional energy. Clear, accurate, and accessible land records could help to obviate the need for these costs and increase land security.

The vast majority of semi-structured interview respondents had not only heard of, but also accessed the Bihar online land governance portal. Of these, most felt that the system presented a great opportunity for residents of their respective villages and that the interface was efficient and easily usable. However, there was less enthusiasm about the system's accuracy and coverage at the time of the semi-structured interviews. In many cases, the village land record upload process was incomplete or had not yet begun. And among respondents who had reviewed

their villages' land allotments within the system, several had discovered inaccuracies. Finally, a few participants mentioned the possibility of states involving direct interaction with officials that appeared to them to be no less immune from corruption than the preceding system that the current e-governance system has been replacing.

#### **Baseline Description and Treatment-Control Balance**

Key results from the baseline survey are presented in Table 1. The first three rows show demographic data, revealing that around 40% of the sample report belonging to the Scheduled Castes, whereas two thirds identify as poor. The average household has between six and seven members. With regard to internet, two thirds of the sample report that at least one member has the skills needed to access the internet, while fewer than 20 percent each reported having used internet for land matters or social entitlement matters (the share is around a quarter for respondents who reported having used internet for at least one of the two). Three quarters of the sample reported having cultivated land during the past year, while under 10% had received a government entitlement relating to land.

The three entitlement indices shown in Table 1 are composed of a set of questions that are asked in reference to eight government social protection programs, which are listed and briefly described in Table 2. The indices are constructed by standardizing the variables representing responses for each of the eight programs (i.e., subtracting the mean and dividing by the standard deviation), then averaging the standardized variables, and then standardizing again. This method was proposed by Kling et al. (2007) and has become common within the experimental development economics literature (e.g., Banerjee et al. 2018). While these indices

are difficult to interpret as descriptive statistics, they are included in Table 1 to demonstrate treatment-control balance.

Turning to the variables on civic and organizational life within villages, we see that political party activity was relatively rare. On the other hand, SHG activity and attendance at *Gram Sabhas* were relatively common, with more than half of households reporting having a member in an SHG, and almost half reporting having attended a *Gram Sabha* within the past year. The conflict within tola and village questions condense a three-category Likert-style ranking into a dummy variable coded as one if the respondent reported "some conflict" or "a lot of conflict" and zero if they reported "no conflict".

Turning to the balance tests themselves, Table 1 shows that the treatment and control groups were generally well-balanced across the variables. Only the variables for SHG presence within the village and membership of a household member in an SHG register as statistically significant, and it shows consistency that these two variables would show related distributions across the two experimental groups. Even here, coefficients are small, with nine and eleven percentage point reductions respectively in the two variables for treatment relative to control. Overall, significance patterns easily fall within ranges expected from random chance and there is no indication that the differences in the SHG variables reflect meaningful between-group differences. Additionally, lagged outcomes and other controls are used in the specifications for the endline impact models to increase precision.

#### **Endline Findings**

Before reviewing the final impact estimates, it is worth reiterating that these findings must be interpreted in light of the unprecedented circumstances that arose during the first year of

the COVID-19 pandemic. The research design—including statistical power predictions and timeline—would have been different had knowledge of the circumstances been available at the outset of the study. Nonetheless, while we do not consider the magnitude and statistical significance found in the study to represent the effects the program would have exerted if implemented as planned under non-pandemic circumstances, we believe these findings remain valuable for academic debates and policy planning through the light they shed on subtleties of the way households' characteristics, behaviors, and perceptions shift in the presence of a minimalistic (albeit, unintentionally) digital literacy and social entitlements program.

For our primary impact estimates, we rely on regressions of the form:

$$Y_{hv,t=1} = \alpha + TREAT_v + Y_{hv,t=0} + \phi * HHSIZE_{hv,t=0} + STRATA_v$$

where  $Y_{hv,t=1}$  is the outcome for household *h* in village *v* at endline, *TREAT<sub>v</sub>*, is a dummy variable for treatment status of village *v*,  $Y_{hv,t=0}$  is the lagged household outcome at baseline, *HHSIZE*<sub>*hv,t=0*</sub> is the number of household members at baseline, and *STRATA<sub>v</sub>* is a vector of village strata fixed effects, with strata determined by block and above vs. below median share of residents who reported having used the internet for land or government related issues.

The main impact estimates are reported in Tables 3-6. The rows for each table represent separate regressions on the outcome variables listed in the row heading. Table 3 shows treatment impacts on several of the variables that are in many ways closest thematically and most proximate to the treatment, i.e., those relating to internet use and land issues. The first two rows suggest a lack of significant impact on the extensivity of internet access, with internet usage nearly identical between treatment and control groups. However, the effect on the intensive margin of internet use as captured by number of times used in the past year (which roughly covers the period between intervention and endline survey) appears quite large, with the treatment households reporting an average of seven more instances of use. The impact magnitude is particularly impressive given that many households in both treatment and control groups already used the internet very regularly.

The regressions show a lack of statistically significant treatment effects for use of the internet for issues relating to land or government services. While the hope had been for the program to increase use of these services, the relatively short time frame in between the intervention and endline survey made it unlikely that such changes could have occurred during the study period. Additionally, the COVID-19 pandemic aggravated this situation by further reducing or eliminating the time between program implementation and the endline survey in some villages, and the pandemic also seems to have slowed activity relating to government entitlement programs with the exception of short-term pandemic relief measures.

Other than number of times internet was accessed, the only statistically significant treatment effect evident from Table 3 is a small increase in likelihood of the respondent choosing one of the two most negative options with regard to the possibility of being displaced from sharecropped land. This may reflect information from the intervention on land tenure risks for sharecroppers that increased awareness of these risks. However, it is important to note here that most plots discussed in the survey were owned by the respondents, and so this question in practice turned out to be hypothetical for most. The statistical significance may have been a result of chance, particularly given the small magnitude of the coefficient.

Table 4 shows effects on familiarity with and use of the eight government social protection programs listed and described in Table 2, along with responses to a question asking

whether the household would expect to need an intermediary to access the service. This latter variable was reverse coded such that 1 indicates belief that the respondent could access the service without an intermediary (as is presumably intended by the government) so that all coefficients can be interpreted such that positive values indicate more preferred outcomes for the treatment group. The treatment does not appear to have significantly impacted the familiarity variables, but this could in part be an artifact of the fact that the vast majority of all respondents in both groups were familiar with the program. Had resources been available to include more refined investigations of knowledge, significant knowledge effects may have been revealed.

Three impacts do come up as statistically significant in Table 4; all show negative treatment effects and all pertain to program use (in contrary to familiarity with the program or the expectation of being able to access the program without an intermediary). The magnitude of the coefficient for JSY (i.e., *Janani Suraksha Yojana*, a program that supports institutional childbirths) is negligible. The negative coefficients for JDHY (i.e., *Jan Dhan Yojana*, a financial inclusion program) and PDS (the public distribution system, a subsidized food program) are larger at roughly eight percentage points each. We believe that, since there is no plausible mechanism by which the program would have created barriers to these programs and it is more plausible but still unlikely that the program somehow facilitated alternative services, the effect (if not coincidental) most likely represents increased knowledge among participants of specific programs. Heterogeneity analyses (discussed further below) show that the negative coefficient for PDS was driven primarily by respondents in Purnia district.

Table 5 shows results for variables pertaining to civic engagement and community life. This table contains the most consistent and promising results of the preliminary analysis, documenting an increase in reports of civic behavior and perceptions across multiple measures.

The positive and statistically significant impact on the dummy variable for respondent reporting one or more organizations active in the village on land rights can be seen as evidence of awareness of the CBO activities. The small magnitude of the coefficient demonstrates the limited treatment intensity. If this variable were conceived as the first stage of an instrumental variable specification to estimate treatment on treatment, the magnitude sizes for other outcomes would grow substantially.

More broadly, while apparently modest at face value, the coefficients could not have realistically been much larger with the present specifications, e.g., since many of the control means are already high and *gram sabhas* are held too infrequently and subject to too much orthogonal influence to provide a smooth proxy for political participation or the desire to participate. It is noteworthy that the one statistically significant impact on community perceptions that did occur was positive and occurred at the tola rather than village level.

Finally, Table 6 presents impacts on asset ownership. Few variables register as statistically significant on their own as expected since the main hope was for an overall increase in the asset bundle (not to mention the relatively short time period between the intervention and endline survey, and especially the low treatment intensity resulting from the COVID-19 pandemic). However, the coefficient on the overall index is positive and statistically significant, indicating that small positive coefficients on the majority of assets add up in favor of the treatment group. The two assets listed on the bottom rows, at least one pair of shoes and at least two sets of clothes for each household member, both showed positive and statistically significant effects from the treatment. Given the relatively short time frame relative to agricultural and most other investment timescales (as well as the low treatment intensity resulting from the pandemic), it is not likely that the positive effects arose from higher incomes brought on by the treatment. It

is possible that they arose from random chance but may have also resulted from subtly increased confidence in land rights or access to entitlements.

#### **Discussion and Policy Implications**

Within the current political climate in Bihar and India more broadly, the question of whether to take up e-governance strategies has already been answered: e-governance programs are spreading widely and there appears to be little chance that this trend will dissipate anytime soon. The policy-relevant question then becomes not whether e-governance works, but how best to optimize it for the poor. The present research has explored the potential for combining grassroots mobilization through community-based organizations with digital literacy training as a means for improving the effectiveness of e-governance for smallholder farmers. As a pilot study, the evaluation was aimed at testing proof-of-concept, exploring potential impact channels, and mapping frictions and barriers as well as potential assets and resources in attempts at improving land and social protection governance.

Despite the limitations in treatment intensity and the obstructions to the research design imposed by the COVID-19, results from the study give rise to several insights relevant for academic development economics and political economy literatures on one hand and policymakers and practitioners working to improve state service delivery on the other. The present section revisits several of the main findings to arise from the above results and expands on their implications for research and practice.

First, the fact that the intervention was successful in increasing the number of times respondents accessed the internet by roughly 20% of the control group value indicates that, where the means and motivation are available, smallholder farmers are willing to make use of e-

governance platforms. Had widespread infrastructural problems like network coverage or deepseated distrust in the government or digital technologies been influential as binding constraints, it is unlikely that an impact of such substantial magnitude would have been observed. This finding is consistent with the presence of unmet demand—albeit potentially latent—for the ability to influence state performance broadly and protect one's own entitlements specifically through engagement with e-governance.

Next, the study's quantitative and qualitative findings, taken together, reveal that digital literacy is widespread but uneven. Some respondents use the internet frequently and with great confidence, whereas others use it only rarely, for limited communication purposes, or not at all. The spread of digital literacy is robust enough that training programs specifically devoted to digital literacy seem unnecessary, but not yet sufficient that programs can be designed with the presumption that users are able to access and operate online systems with minimal supplementary information. Instead, more middle-ground strategies seem likely to be most promising at the present stage of digital literacy. Future programs may benefit from tailoring curriculum to specific populations rather than around specific e-governance programs. Whereas focus on land e-governance was necessary in the present case given that it tested a pilot program still under development, future iterations could include several of the programs or entitlements most likely to be relevant to specific segments of the target population. Economic resources—such as job-finding or small business development tools—could also be integrated into the trainings along with government programs.

One potential set of strategies would be to make use of intergenerational knowledge transfers from younger to older generations, both at the household and community levels. Community members already knowledgeable about internet could be recruited to provide

support for network connectivity and other challenges to accessing the platform. Some content may also be relevant to share with middle or secondary school children who may then share with their parents or other adults in their household as a means of civic and digital education in addition to the potential efficiency gains.

Finally, in light of the inaccuracies in the online land registry pointed out by respondents and successful legacies of related efforts elsewhere in India, we recommend that government sponsor community-level land registry audits and deliberation. This could help to improve the accuracy of the system, and also bring potentially damaging land conflicts into a potentially efficient dispute resolution mechanism. Additionally, it could help to build the system's legitimacy and encourage evenness of use across different sub-populations.

E-governance is here to stay, and development researchers have a great deal to explore before an empirically-grounded understanding of their dynamics can be said to emerge. We hope that this study, in addition to yielding direct insights, will act as a stepping stone and motivation for designing and testing future endeavors to make e-governance work for poor and marginalized populations.

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### Table 1: Baseline Balance

Variable	Cntrl Mean	Treatment Coef	Stnd Err	P-Value	Sample Size	Min	Max
Identifies as Scheduled Caste	0.42	-0.04	0.05	0.34	900	0	1
Identifies as nonpoor	0.34	-0.01	0.04	0.83	900	0	1
Number of HH members	6.50	-0.16	0.21	0.47	900	1	18
At least 1 HH mem can access internet	0.66	0.01	0.03	0.68	900	0	1
Internet used for land issues, past year	0.16	0.02	0.01	0.30	900	0	1
Internet used for entitlement issues	0.18	-0.02	0.01	0.12	900	0	1
Land cultivated, past year	0.75	0.02	0.03	0.55	900	0	1
Entitlement received for land, past year	0.08	0.01	0.02	0.65	900	0	1
Entitlement familiarity index	0.06	0.08	0.06	0.18	900	-2.70	0.33
Entitlement use index	-0.01	-0.09	0.08	0.27	900	-1.44	2.10
Entitlement intermediary index	0.00	0.00	0.07	0.96	900	-0.91	2.53
Political party active in village	0.15	-0.01	0.03	0.83	900	0	1
SHG active in village	0.64	-0.09	0.04	0.04	900	0	1
HH member part of an SHG	0.58	-0.11	0.04	0.01	900	0	1
Attended Gram Sabha in past year	0.46	0.00	0.04	0.98	900	0	1
Conflict within tola	0.37	-0.03	0.04	0.39	900	0	1
Conflict witthin village	0.38	-0.04	0.04	0.36	900	0	1

Rows contain results from separate regressions of the outcomes indicated in the leftmost column on treatment status with strata fixed effects. Standard errors are cluster-robust at the village level. \*\*\* p<0.01, \*\*p<0.05, \*p<0.10

# Table 2: Government Social Protection Programs

Program Name	Abbreviation	Description
Pradhan Mantri Gramin Awaas Yojana	PMGAY	Provides support for rural below-poverty-line households to construct, repair, or upgrade housing
Mahatma Gandhi National Rural Employment Guarantee Scheme	MGNREGS	Guarantees minimum of 100 days per year of manual work at minimum wage
Janani Suraksha Yojana	JSY	Provides assistance for institutional childbirth
Jan Dhan Yojana	JDHY	Financial inclusion program, opens bank accounts for citizens
Bihar Rural Livelihoods Project	Jeevika	Creates and provides some support for rural women's livelihood collectives
Public Distribution System	PDS	Provides subsidized foodstuffs through specialized shops
Fasal Bima Yojana	FBY	Government-sponsored crop insurance scheme
Ujjwala Yojana	Ujjwala	Liquified petroleum gas distribution program for women in below- poverty-line households

Variable	Cntrl Mean	Treatment Coef	Stnd Err	Sample Size
At least 1 HH member can access internet	0.62	-0.01	0.01	900
# times used internet, past year	34.98	7.03 ***	2.05	900
Internet used for land issues, past year	0.15	-0.01	0.01	900
Internet used for entitlement issues	0.14	0.00	0.01	900
Internet used for land or entitlement issues	0.22	-0.01	0.01	900
Someone available to help with internet if needed	0.26	0.00	0.00	900
Land cultivated, past year	0.74	0.01	0.02	900
Gov entitlement received for land, past year	0.05	0.00	0.01	900
Land insecurity - Ownership	0.11	-0.01	0.02	900
Land insecurity - Sharecrop	0.12	0.04 *	0.02	900

# **Table 3: Internet and Land Access**

# Table 4: Government Social Protection Programs Knowledge and Access Impacts

Program	Variable	Cntrl Mean	Treatment Coef	Stnd Err	Sample Size
Index	Familiar with this program?	-0.01	0.00	0.00	900
	HH members used program?	-0.06	0.00	0.00	662
	Need intermediary?	0.04	0.00	0.00	900
IAY	Familiar with this program?	0.99	0.00	0.00	900
	HH members used program?	0.30	0.06	0.04	890
	Need intermediary?	0.73	-0.04	0.03	900
MGNREGA	Familiar with this program?	0.96	0.00	0.00	900
	HH members used program?	0.10	-0.01	0.01	865
	Need intermediary?	0.97	-0.02	0.02	900
JSY	Familiar with this program?	0.94	0.00	0.00	900
	HH members used program?	0.22	-0.01 ***	0.01	900
	Need intermediary?	0.95	0.01	0.02	900
JDHY	Familiar with this program?	0.90	0.00	0.00	900
	HH members used program?	0.30	-0.08 **	0.03	799
	Need intermediary?	0.99	0.01	0.01	900
Jeevika	Familiar with this program?	0.97	0.00	0.00	900
	HH members used program?	0.46	0.01	0.01	860
	Need intermediary?	0.97	0.01	0.01	900
PDS	Familiar with this program?	0.99	0.00	0.00	900
	HH members used program?	0.60	-0.08 **	0.03	880
	Need intermediary?	0.94	-0.01	0.02	900

Program	Variable	Cntrl Mean	Treatment Coef	Stnd Err	Sample Size
Insurance Scheme	Familiar with this program?	0.80	0.00	0.00	900
	HH members used program?	0.09	0.00	0.01	702
	Need intermediary?	0.99	0.00	0.00	900
Ujjwala	Familiar with this program?	0.95	0.00	0.00	900
	HH members used program?	0.44	0.00	0.00	853
	Need intermediary?	0.77	-0.04	0.04	900

### Table 4: Government Social Protection Programs Knowledge and Access Impacts

# Table 5: Civic Engagement

Variable	Cntrl Mean	Treatment Coef	Stnd Err	Sample Size
Org.s active in village, dmy	0.79	0.04 ***	0.01	900
HH mem Belongs to SHG	0.57	0.00	0.00	900
HH mem Involved with political party	0.08	-0.01 *	0.01	900
Gram sabha, attended any, past yr	0.47	0.01 **	0.01	900
Gram sabha, how many, past yr	1.64	0.00	0.01	895
Voted, last election	0.97	0.00	0.00	900
Plans to vote, next election	0.98	0.02 ***	0.00	900
Conflict within tola	0.61	0.00	0.00	900
Conflict within village	0.55	0.01	0.01	900
Cooperation within tola	0.96	0.00 ***	0.00	891
Cooperation within village	0.95	0.00	0.00	893
# people tola, would lend in emergency	4.57	0.00	0.31	898
# people vlg, would lend in emergency	4.23	0.11	0.21	900

Variable	Cntrl Mean	Treatment Coef	Stnd Err	Sample Size
Index	-0.05	0.03 **	0.01	900
Bicycle	0.74	0.00	0.00	900
Sewing Machine	0.19	0.00	0.00	900
Generator	0.02	0.00	0.00	900
Mixer/Grinder	0.06	0.00	0.00	900
Motorcycle/Scooter	0.32	0.00	0.00	900
Television	0.34	0.00	0.00	900
Cooler	0.05	0.00	0.00	900
Clock/Watch	0.64	0.03	0.02	900
Electric Fan	0.88	0.00	0.01	900
Chair/Table	0.84	0.01	0.01	900
Cot	0.93	0.00	0.00	900
Mobile Phone	0.95	0.01	0.01	900
Refrigerator	0.05	0.00	0.00	900
Pressure Cooker	0.32	0.02	0.01	900
Car/Truck	0.01	0.00	0.00	900
Computer/Tablet	0.02	0.00	0.00	900
Microwave	0.01	0.00	0.00	900
At least 2 pairs of clothes for ea	0.94	0.01 *	0.01	900
Shoes for each hh mem	0.95	0.02 ***	0.01	900

### Table 1: Baseline Balance

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Internet used for entitlement issues	0.18	-0.02	0.01	0.12	900	0	1
Land cultivated, past year	0.75	0.02	0.03	0.55	900	0	1
Entitlement received for land, past year	0.08	0.01	0.02	0.65	900	0	1
Entitlement familiarity index	0.06	0.08	0.06	0.18	900	-2.70	0.33
Entitlement use index	-0.01	-0.09	0.08	0.27	900	-1.44	2.10
Entitlement intermediary index	0.00	0.00	0.07	0.96	900	-0.91	2.53
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SHG active in village	0.64	-0.09	0.04	0.04	900	0	1
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Attended Gram Sabha in past year	0.46	0.00	0.04	0.98	900	0	1
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	HH members used program?	0.10	-0.01	0.01	865
	Need intermediary?	0.97	-0.02	0.02	900
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Cooler	0.05	0.00	0.00	900
Clock/Watch	0.64	0.03	0.02	900
Electric Fan	0.88	0.00	0.01	900
Chair/Table	0.84	0.01	0.01	900
Cot	0.93	0.00	0.00	900
Mobile Phone	0.95	0.01	0.01	900
Refrigerator	0.05	0.00	0.00	900
Pressure Cooker	0.32	0.02	0.01	900
Car/Truck	0.01	0.00	0.00	900
Computer/Tablet	0.02	0.00	0.00	900
Microwave	0.01	0.00	0.00	900
At least 2 pairs clothes/hh mem	0.94	0.01 *	0.01	900
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