Delivering More with Less: Subnational Service Provision in Low Capacity States

Jordan Kyle 1 · Danielle Resnick 1

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Abstract
In developing countries, low state capacity frequently is blamed for poor and uneven service delivery. Yet, since state capacity manifests unevenly across space and sectors, identifying which elements of capacity are more likely to enhance service delivery is not straightforward. We examine how subnational variation in capacity affects access to agricultural extension in rural Nepal. We explore six dimensions of state capacity using original household survey data and interviews with local bureaucrats. We find that local knowledge and motivation of bureaucrats play a significant role in shaping service access. By contrast, traditional capacity indicators—including resources, professionalization, and autonomy—matter surprisingly little. These findings suggest that bureaucrats working with fewer but more motivated staff who spend more time in a district are more likely to facilitate citizens’ access to agricultural extension. Placebo tests add confidence that relationships are not driven by unobservables. Scholarship on state capacity traditionally has been unable to measure capacity disaggregated by geography and sector, and, as a result, has struggled to link empirically different elements of capacity with service delivery. This paper begins to address this gap and in doing so, offers broader implications for the dynamics of rural development.

Keywords Bureaucratic politics · Nepal · Rural development · Service delivery · State capacity

✉ Jordan Kyle jordanckyle@gmail.com

1 Development Strategy and Governance Division, IFPRI, Washington, DC, USA
The villages of Barbote and Pyang are located in the far west region of Nepal, in neighboring districts. Both villages are heavily dependent on rice cultivation, similarly sized (around 1800 households), and equally distant to a major road (4 km). Despite similarities between the villages, citizens within them receive remarkably different levels of public services. Citizens in Barbote, who depend on rice cultivation for their livelihoods, are confident that they can find a crop extension agent if they need one, and a third of them have within the past year. Anuj, the official in charge of agricultural extension services for Barbote’s district, provides these services with shockingly few resources: a staff of only 5 crop extension agents to serve over 82,000 farmers. However, what Anuj lacks in resources, he makes up for by embedding himself in the community. Having lived in the district for 24 years, he understands local agricultural conditions and leaves the district capital for field visits at least every other week.

Pyang differs notably from Barbote in both the resources deployed to provide public services and in the levels of services provided. Bishal, the official in charge of agricultural extension services for Pyang’s district, has 26 crop extension agents to serve 187,000 farmers (though this is far too few staff to effectively serve the population, it is nonetheless more than twice the ratio as Barbote). Despite this advantage, Bishal knows little about the community he serves, having lived there for less than 2 years and not recalling his last field visit outside the district capital. When asked the best way to expand agricultural production in his district, Bishal could not name a single policy area. Though citizens in Pyang are equally dependent on rice cultivation for their livelihoods, all surveyed citizens reported that no crop extension agents serve their village.

This example, based on two real (but anonymized) villages, highlights a broader puzzle. Despite shared socio-economic characteristics and geographic proximity, rural villages are not uniformly underserved by public services. Using a combination of elite interviews and nationally representative survey data from Nepal, we explore when and how state capacity plays a role in variations in the delivery of public services.

On the surface, the answer to this question is straightforward: higher capacity results in better service delivery. Yet, state capacity is a multi-faceted concept, potentially encompassing bureaucratic quality and professionalization, monopoly on the use of force within its borders, absence of corruption, autonomy from political interference, high levels of fiscal and military resources, and, among others, the ability to extract fiscal resources. In other words, state capacity is equivalent to a “family resemblance concept” (Goertz 2006) with many constitutive elements. While these elements are often mutually reinforcing, they do not always flow together. For instance, a country like Rwanda is relatively poor but the state exerts high control over population and territory (Giraudy 2012). Whether one or more of these specific elements of capacity is more relevant for service delivery remains unclear but extremely policy-relevant. This is particularly true in developing countries where both donors and national governments devote scarce resources to improving capacity and need to prioritize interventions.

In this paper, we take into account various dimensions of state capacity and their geographic variation by focusing on Nepal, which is widely considered a uniformly

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1 The names of villages and individuals have been changed to preserve anonymity.
2 See extensive reviews by Cingolani et al. (2015) and Pepinsky et al. (2017).
“weak” state. Despite this characterization of low state capacity, we find that even in equally remote areas, access to services differs substantially. However, geographic variation in service delivery could be explained by policy choice as well as by the state’s ability to implement those policies. In order to isolate the role of capacity, we focus on a policy domain for which the public policy decision is made at the central level, but the responsibility to implement is delegated to the local level: agricultural extension. Indeed, the national level policy—“One extension agent, One Village”—reflects the intention of the central government to provide the public good uniformly across the country. Agricultural extension, which involves trained professionals sharing information on higher-yielding varieties of seeds and fertilizers, improved cultivation techniques, natural resource management, and market access opportunities (see Swanson and Davis 2014), plays a critical role in enhancing agricultural productivity growth (Fan and Zhang 2008). Agricultural productivity is central to rural livelihoods, and rural citizens in Nepal rank extension as one of the most important areas for public investment, ahead of health, education, and electricity access.3

Our empirical strategy relies on three original data sources. One is a nationally representative survey of over 1000 rural households in 48 of the country’s 75 districts. The second is a series of structured, qualitative interviews with 50 District Agricultural Development Officers (DADOs), who are the bureaucrats in charge of agricultural extension in a district. The third is a set of semi-structured interviews with high-level agricultural policymakers in Nepal.4 Drawing on this data, we capture six different dimensions of local, sectoral capacity. We find that traditional indicators of state capacity—human resources, staff professionalization, and bureaucratic autonomy—matter surprisingly little in shaping access to public services. Instead, local knowledge and intrinsic motivation of individual bureaucrats play a far greater role in shaping service access.

Any study of political geography faces identification challenges, confounded by factors which vary by district and also shape service delivery. We lend confidence to our findings by testing two alternative explanations for spatial variation in agricultural extension services—a village’s agricultural development potential and remoteness to agricultural service centers. We also probe the findings by conducting a placebo test, testing for the effects of current capacity on past levels of service delivery; we find no placebo effects.

The contributions of this paper are at least twofold. First, our unique data sources allow us to explore multiple dimensions of state capacity at the subnational level within a specific sector, which is rare for developing countries. Moreover, we do so in rural areas; whereas private sector providers may substitute for poor public services in urban areas, this is typically not an option in rural areas, making understanding state capacity in these contexts even more pressing. We show that all good things do not go together—different dimensions of state capacity do not necessarily correlate with each other—suggesting difficult trade-offs for policymakers about what to prioritize.

Secondly, the paper highlights the important role of individual bureaucrats in delivering public services in weak states. Where bureaucracies are not yet

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3 Authors’ calculations from household survey, see Appendix Figure 5.
4 While the household and the bureaucrat surveys are used for the analysis, we use the elite interviews throughout the discussion of country context.
professionalized, lack resources, and are highly politicized, individual leadership plays an outsized role in whether citizens receive services. Bureaucrats who are able to embed themselves in local communities and to maintain motivation for serving them make more of a difference in improving service access for local communities than going from being the least- to the most-resourced district in the country. Of course, this is not to say that more resources, more autonomy, and more professionalization are not needed in Nepal, or in other weak states. Yet, given a context where even the district with the most staff to deploy toward public service delivery is still woefully under-resourced overall, the abilities and motivations of individual bureaucrats carry the most weight in explaining why some villages have better access to public services.

Unpacking State Capacity and Impacts on Service Delivery

Capacity is often deemed a necessary prerequisite for states to translate policy decisions into the provision of public goods and services (Andrews et al. 2017; World Bank 2017). Yet, at least two factors complicate the seemingly straightforward link between greater capacity and improved service delivery. First, features typically associated with higher capacity are not always associated with better service delivery. For example, while a merit- and rule-based bureaucracy may produce better services than a discretionary one, an over-abundance of rules could make it difficult to render expedient decisions that are tailored to local circumstances.

Second, despite rich literatures on the effects of state capacity on various social, economic, and political outcomes (e.g., Andersen et al. 2014; Besley and Persson 2010; Humphreys 2005), there is little consensus on how to measure it. In part, this is because state capacity is a multi-dimensional concept (Hendrix 2010). Moreover, the concept often suffers from “whole nation bias,” or, the tendency to “gravitate toward national level data and units of analysis” (Snyder 2001, p. 94). In reality, state capacity varies extensively across different parts of the same country (Gingerich 2013), with significant implications for quality of life across communities (O’Donnell 1993). These subnational differences in capacity play a significant role in explaining spatial differences in service delivery (Ziblatt 2008).

In the following, we discuss several dimensions of state capacity that may shape service delivery, and how these dimensions may vary across locations and sectors. We argue that a measure of state capacity that can vary across relevant dimensions of capacity, sectors, and space offers the highest degree of concept-measure consistency and should be used to understand how state capacity affects the political geography of service delivery.

Administrative Capacity

The archetypal view on state capacity originates from Weber ([1904–1911] 1978), articulated in his set of essays Economy and Society. Therein, Weber argues that a rational-legal bureaucracy guided by meritocracy, high levels of expertise, and respect for the law was most likely to promote prosperity. These qualities—often collectively referred to as “administrative capacity”—enable bureaucracies to implement policies through competent and skilled state employees who have incentives to pursue their
mandates. By contrast, bureaucrats that are rewarded for political loyalty rather than merit devote less effort to effective policy implementation. Similarly, bureaucrats with fewer technical skills may deliver poorer services. But, high levels of administrative capacity typically require high levels of resources and investment.

A large number of measures exist to capture administrative capacity. Since a strong bureaucracy only matters in so far as it actually performs the basic functions of governments, some measures focus on how governments are performing as an indicator of administrative capacity. For example, literacy rates (Soifer 2015), tax collection (Slater 2010), provision of basic health and sanitation services (Enriquez et al. 2017), oversight of a national census (Soifer 2015), and maintenance of cadastral records (D’Arcy and Nistotskaya 2017) have all been used as proxies of administrative capacity. While useful for understanding state performance, such outcome-based measures preclude testing how capacity actually affects outcomes (Fukuyama 2013).

Other measures capture the procedures that govern a bureaucracy—like rule-based decision-making (e.g., the Worldwide Governance Indicators’ Rule of Law) and meritocratic recruitment and career mobility (e.g., Evans and Rauch 1999). Yet, an overemphasis on procedures risks overlooking the possibility that the effect of the same rule may vary across social and political contexts. Further, concepts like “merit” can also be difficult to operationalize in practice if it is not obvious what qualities are most important for delivering a given service.

Adding to measurement challenges, administrative capacity can vary substantially across regions. A highly professionalized bureaucracy located in the state capital may not be able to project authority across distance (Herbst 2000). Moreover, a majority of countries have areas of limited statehood where they cannot fully implement or enforce national policies and regulations (Krasner and Risse 2014). In such settings, states lack “infrastructural power,” or the ability to extend the capabilities of the state across the entire territory that it de-jure administers (Mann 1984; Soifer and vom Hau 2008). Spatial variation can also emerge due to basic differences in staffing across localities. In a study on the provision of public health services across German cities in the early twentieth century, Ziblatt (2008) finds that cities with more fiscal resources and higher staff professionalization deliver more services. Indeed, many areas of policymaking fall under the jurisdictions of local governments, especially as countries continue to embrace decentralization. Thus, it is perhaps not surprising that some have found little correlation at the national level between state capacity and public goods provision (Lee et al. 2014).

Administrative capacity can also vary across government functions. A central tenet of the “islands of effectiveness” literature is that uneven sectoral development can be linked to pockets of administrative capacity within the government (Crook 2010; Leonard 2010). In other words, there may be one or more organizations within government that provide services relatively effectively despite operating in an environment broadly characterized by inefficiency and patronage. For example, Pogoson and Roll (2013) identify two well-functioning organizations in the Nigerian public service despite operating in a country better-known for endemic corruption.

**Bureaucratic Autonomy**

Bureaucratic autonomy has also been proposed as a fundamental component of good governance (Evans 1995). The concept of bureaucratic autonomy derives from the
literature on principal-agent relationships, whereby bureaucratic agencies provide services under the watchful eye of elected principals (Dixit 2002). For autonomous bureaucracies, politicians provide the broad policy goal to bureaucratic agents, who have some freedom in deciding how best to implement policy based on subject-matter expertise and local conditions.

Autonomy is believed to improve service delivery in a few ways. One way is that agents are not detracted from their main task of policy implementation by spending their time reporting to multiple principals who may have different and even conflicting priorities (Hammond and Knott 1996). Using data from India’s National Rural Employment Guarantee Scheme, Gulzar and Pasquale (2017) find that locations in which bureaucrats are accountable to more than one principal perform worse. Secondly, higher autonomy can provide bureaucrats with a greater sense of motivation and the flexibility to respond to service delivery implementation challenges (Rasul and Rogger 2015).

On the other hand, Lipsky (1980) highlights that autonomy empowers bureaucrats to exercise higher levels of discretion to provide services according to their own prerogative rather than the spirit of the relevant public policy. In the contexts of Nigeria and Pakistan, respectively, Rogger (2014) and Callen et al. (2014) have found that political oversight can be beneficial for service delivery because elected politicians, worried about being held accountable for poor services, may exert pressure on bureaucrats that citizens receive services as intended. In sum, while autonomy is a fundamental dimension of state capabilities, its relationship with service delivery is not straightforward.

**Personnel Characteristics**

While administrative capacity and bureaucratic autonomy emphasize the organizational setting in which public employees operate, the individual characteristics of public employees may also shape service delivery outcomes. While all civil servants enjoy some discretion in policy implementation, front-line service providers, like agricultural extension officers, are the last link in the chain of service provision. As such, they end up deciding who receives extension services and how (Lipsky 1980), with significant implications for welfare of rural households. Individual qualities of local service providers could thus have an outsized impact on service provision, above and beyond formal rules and procedures.

We focus on two characteristics which may play a role in the quality of service provision. First, given that the government—unlike the private sector—often cannot credibly commit to pay employees based on performance, whether or not public sector employees are intrinsically motivated to perform well at their jobs could make a significant difference in whether public sector organizations achieve their missions (Gailmard and Patty 2007; Perry and Hondegheim 2008). One question is whether mission-driven organizations like public bureaucracies are able to recruit and retain employees with a high level of prosocial motivation compared to the private sector (e.g., Banuri and Keefer 2013; Hanna and Wang 2017). For our purposes, the question is less about the differences in motivations between private and public sector personnel, but rather whether differences in intrinsic motivation among public sector personnel influence service delivery outcomes.
Second, Pepinsky et al. (2017) highlight the value of embeddedness for front-line service providers. Service providers who are socially embedded in the communities that they serve may better understand local challenges and better gather information on local solutions. Frequent interactions between service providers and communities can reduce transaction costs and increase trust. Bhavnani and Lee (2018) find that education levels exert little influence on a civil servant’s performance while local ties to the community improve public goods provision in India. Agricultural extension services in particular demand location-specific information on technology, soil fertility, and farming practices, which increases the informational complexity of the task and requires a high level of local knowledge and embeddedness.

State Capacity and Service Delivery in Nepal

The Nepali state has long struggled to project power into rural areas. Although the country has witnessed different forms of government over time, political power and decision-making have consistently been centralized in Kathmandu, with poor penetration into areas beyond the Kathmandu Valley. The country’s difficult and varied terrain has complicated state-building. The country has three main ecological zones, terai (plains), hills, and mountains, each of which pose particular challenges in projecting state power. The terai are on the southern border and are the most fertile areas of the country, and the mountains lie on the northernmost border. In between lie the hills, which serve as the home for the capital of Kathmandu but also of more remote regions in the far east and west of the country.

Projecting statehood is challenging across these diverse areas due to the long, porous border with India, as well as low road density, low population density in the mountains, high travel costs, and the need for local knowledge of the vastly different geographies and contexts across the country. However, the lack of embeddedness of the state in rural society is not solely a product of geography and the technical challenges of state-building in difficult terrain. Ruling classes legitimated themselves through the creation of myths that emphasized their divine right to rule and to subordinate much of Nepali society through caste hierarchies. These myths and caste hierarchies formed the basis of state legitimacy rather than strong territorial control or provision of public services (Riaz and Basu 2007). In other words, neglect of rural areas was long a governing strategy.

Consequently, for much of Nepal’s history, the state provided little in the way of public services in rural areas. Even as recently as 1971, the state relied exclusively on communities to provide education services (Baird 2010). Over the past 30 to 40 years, the state has begun to assume formal responsibility for delivering essential public services in rural areas. However, it has failed to deliver on these responsibilities in large swathes of the country, resulting in significant geographic inequalities. Adult literacy is 83% in Kathmandu Valley compared with 49% in the far western mountains (UNDP 2014). Other measures of welfare, such as stunting and food insecurity, follow a similar pattern (Haslett et al. 2014). Evidence of low levels of state capacity and poor projection of the state into remote areas is especially pronounced in the wake of large-scale disasters, such as the 2015 earthquake (Jones et al. 2014) or the 2010 Dengue fever outbreak (Griffiths et al. 2013).
Economic, spatial, and ethnic inequalities contributed to the outbreak of civil war in 1996 when members of the Communist Party of Nepal-Maoist (CPN-M) attacked a police post in the midwestern part of Nepal (Do and Iyer 2010; Murshed and Gates 2005). Founded in 1994, the CPN-M viewed armed insurrection as a means of achieving its goals of abolishing the monarchy and creating a people’s republic with an elected constituent assembly to draft a new constitution (Do and Iyer 2010). The absence of the state in many rural areas enabled the Maoists to gain rapid control of rural areas in a short span of time. The war ended in 2006 with the signing of the Comprehensive Peace Agreement. The CPN-M party won the 2008 constituent assembly elections and the leader of the party and former insurgent, Pushpa Kamal Dahal, became prime minister. As one indication of the country’s political fragility, Nepal had nine prime ministers between 2008 and 2016. The changes in government contributed substantially to high levels of ministerial turnover and disruptions to policy continuity. For instance, there were seven ministers of agriculture during this period.5

As with other policy domains, agricultural policymaking in Nepal long has been centralized—though service delivery often was delegated to deconcentrated units of central line ministries at the district level—and highly politicized. Agricultural service delivery is key to the government’s efforts to regain legitimacy in rural areas through public services. In the absence of a sizeable manufacturing sector, agriculture provides a livelihood for approximately two-thirds of Nepal’s population and contributes one-third to the country’s GDP (USAID 2013). Due to the size of the sector, agriculture can be highly politicized in the country. Farmers’ cooperatives, for example, often include representation from the wings of various political parties.6

Nepal has a pluralistic agricultural extension system, with public, private sector, and non-governmental actors. The focus of this paper is on the public agricultural extension system, which predominates in Nepal. Public agricultural extension is overseen by the Ministry of Agricultural Development (MoAD) and executed through deconcentrated district offices (see Fig. 1). In turn, MoAD district offices oversee agricultural service centers at the Ilaka level (sub-district).7 Extension agents are based in the service centers and are accountable to District Agricultural Development Officers (DADOs), who manage the deconcentrated district offices (Kyle and Resnick 2017). Although DADOs are formally accountable to MoAD in Kathmandu, weak monitoring gives them wide latitude in deciding how to deploy the resources and staff that they oversee.8

In theory, all agricultural extension agents are recruited from the national civil service, known as the Public Service Commission (FAO 2010).9 In practice, however, Nepal struggles to recruit sufficient civil servants through this mechanism. Therefore, a

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5 This was calculated from the CIA’s online directory of Chiefs of State and Cabinet Members of Foreign Governments, which is available at https://www.cia.gov/library/publications/world-leaders-1/.

6 Interviews with the Ministry of Livestock and with the Center for Environmental and Agricultural Policy Research, Extension, and Development, Kathmandu, Nepal, January 2016.

7 Geographically, the country is divided into more than 3000 Village Development Committees (VDCs), more than 900 Ilakas that comprise about 4 to 5 VDCs each, and 75 districts. These demarcations are set to change in the transition to the new constitution passed in 2015.

8 Monitoring by MoAD focuses on whether expenditures match disbursements rather than on service delivery outcomes (Personal Interview, Department of Agriculture, 2016).

9 With the new Constitution, which is still in the midst of being implemented at the time of writing, the authority for hiring may devolve to new provincial public service commissions.
junior technician position, which does not require a university degree and which can be recruited locally, was created in order to fill staffing gaps.

Agricultural extension services involve trained professionals sharing information with households that pursue a livelihood in the farming, fishing, forestry, or livestock sectors, with the long-term intention of encouraging behavioral change. Extension agents may share, for example, information on higher-yielding varieties of seeds and fertilizers, improved cultivation techniques, natural resource management, price data, opportunities for increasing market access, and provide veterinary medicines, pesticides, and herbicides (see Swanson and Davis 2014). Research from various country contexts suggests that agricultural extension, if properly implemented, can play a critical role in enhancing agricultural productivity growth (Fan and Zhang 2008). In Nepal, where rural food insecurity is high and agricultural productivity is low (GoN 2013), such services could help farmers identify methods for addressing low soil fertility, access new commodity markets, or deal with invasive pests. This is typically done through farm visits, agricultural demonstrations, and community meetings (FAO 2010).

Despite the potential for agricultural extension services to improve rural livelihoods across Nepal, its delivery is weak. On average, agricultural extension officers serve only about 15% of agricultural households nationwide (GoN 2010). Although agents cover a large area, they frequently lack resources to travel and operate with few supplies or infrastructure (Suvedi and McNamara 2012). Consequently, DADOs widely report being understaffed, with 85% reporting a lack of qualified staff to deliver services (Kyle

Fig. 1 Schematic of extension service delivery in Nepal
and Resnick 2017). Compounding staff shortages, farmers are geographically dispersed across the country, and Nepal’s poor infrastructure and diverse topographies makes it difficult, time-consuming, and costly to reach them.

Notwithstanding this overall context of low state capacity and weak extension systems, some villages in Nepal, like Barbote introduced earlier, do receive widespread governmental extension services. The following section explores which components of state capacity contribute to this unexpected outcome.

**Measuring Service Access and Subnational State Capacity in Nepal**

We use two original data sources for the analysis. First, we implemented a nationally representative survey of rural households in Nepal that was fielded in May–July 2016. To draw the survey sample, we randomly selected 75 village development committees (VDCs). Within each sampled VDC, we randomly selected two wards to be our enumeration areas and sampled seven households on average from the population of each selected ward to be interviewed for a total sample of 1054 rural households. Full information on the sampling procedure is available in Appendix A. All outcome variables are drawn from the household survey.10

Second, we measure different dimensions of subnational state capacity to deliver agricultural extension services based on a set of structured interviews with 50 (out of 75 total) DADOs from randomly selected districts in Nepal. The interviews collected information on the resources and staff devoted to agriculture extension services in each district, but also asked open-ended questions about how DADOs deploy resources and manage staff. Figure 2 indicates in gray the districts where DADO interviews and the household survey overlap (44 districts).

**Service Access**

We measure our dependent variable, access to agricultural extension services, in three ways. First, we consider whether or not citizens believe that a governmental extension agent serves their area. Even using this broad measure, Fig. 3 shows that access to extension services in Nepal is low, with only 33% of respondents reporting that a governmental agricultural technician serves their area. Second, we look at whether households actually received extension services during the past year. Although one-third of the sample believes that a governmental extension agent serves their area, only 24% of households actually received extension services from any advisory services, governmental, or otherwise, during the past year. Even fewer report receiving advisory services specifically from governmental extension agents (9%). We look at each of these access measures because some households (9%) received extension services but cannot recall the source, so focusing on governmental services alone risks undercounting access.

10 We include only those households that grew crops during the past 12 months in the analysis (96% of sample).
State Capacity

The primary interest of the paper is understanding how different dimensions of state capacity—disaggregated by location and sector—influence service delivery (see Table 1). First, we measure the resources that each district can devote to service delivery as the number of agricultural extension workers in the district per farmer.11 By this account, capacity in Nepal is remarkably low: on average, each extension worker serves 4421 farmers. By comparison, the average extension worker in neighboring India serves half as many farmers (Kyle and Resnick 2017). However, there is also remarkable variation across districts. In some districts, each extension worker covers closer to 1000 farmers, while in others each is responsible for over 27,000 farmers.12

Second, following Ziblatt (2008), we measure staff professionalization based on the share of extension agents within the district with university degrees. Many districts in Nepal struggle to find staff with sufficient qualifications to serve as extension agents: on average, less than 20% of crop extension agents hold university degrees. The remaining 80% are junior technical officers or junior technical assistants who only have a high school education plus one agricultural course. While they may have access to certain training programs that would theoretically bolster their professionalization, the reality is that such trainings are offered erratically and in differing quality. As the FAO (2010: 36) observes with respect to JTOs/JTAs, “Identification of training needs

11 For these purposes, a farmer is an individual employed in agriculture as reflected on the 2011 agricultural census.
12 An alternative proxy would the level of public expenditures on agricultural extension within the district. However, there was a split in the Ministry around the time of the survey, which divided agriculture and livestock services. As such, there was some confusion about whether expenditures were purely for agricultural extension or also for livestock services. In this way, we felt the staff numbers were more precise. The results remain unchanged when expenditures are used instead (available upon request).
and impact evaluation of trainings on job performance and on the change in livelihoods of the farming community are seldom carried out.”

Third, we measure bureaucratic autonomy by asking the DADOs whether and how often politicians intervene in their district’s agricultural policy planning. As noted earlier, political involvement in agricultural policymaking tends to be high: “agricultural service delivery through the public sector is starved of resources, is neither demand driven, participatory, nor impact oriented, and is subject to high levels of political interference” (Jones 2010, p. 6). In part, this is due to the agrarian roots of Nepal’s Maoist political parties and their involvement in the formation and organization of farmers’ cooperatives across the country. From our data, 75% of district officials report that politicians interfere frequently in policy planning and implementation.

Table 1  State capacity

| Variables                  | Description                                                                 | Mean (SD) | Predicted coefficient sign |
|----------------------------|-----------------------------------------------------------------------------|-----------|---------------------------|
| Extension agents per farmer| Number of agricultural extension agents per 1000 farmers                    | 0.31 (0.19) | +                         |
| Staff professionalization  | Share of crop extension agents with university degrees                      | 19.3 (14.8) | +                         |
| Political interference     | DADO reports that local politicians are highly involved in agricultural policy planning / implementation | 0.75 (0.44) | −/+                       |
| Local knowledge            | Number of years DADO has lived in district                                 | 3.36 (5.20) | +                         |
|                            | Majority of extension officers are local to district (1 = yes, 0 = no)     | 0.39 (0.49) | +                         |
| DADO intrinsic motivation  | 3-level coding of whether DADO can describe a development project that would benefit his district | 1.11 (0.81) | +                         |
While administrative capacity and bureaucratic autonomy emphasize the organizational setting in which representatives of the state operate, the qualities and skills of local bureaucrats themselves may contribute to capabilities for policy implementation. Knowledge of local context and communities may enhance DADOs’ abilities to deliver services since farmers’ needs vary with local agroecological conditions like soil conditions, elevation, and moisture availability. Indeed, one of the primary arguments in favor of local control over policy implementation is that it enables local actors to tailor public services to local conditions. Yet, their ability to do so depends on whether or not they have knowledge of local conditions in the first place.

As a proxy for this local knowledge, we ask how long each DADO has worked in the district in his current position and in any previous job position. Due to the prevalence of bureaucratic re-assignments as a means of rewarding (sanctioning) political (dis)loyalty, there is wide variation in the length of years that DADOs have worked in the district. In fact, 70% of surveyed bureaucrats have lived in their assigned districts for less than 2 years at the time of the survey. However, there are also bureaucrats with more years in their assigned districts, and around 16% of respondents have worked in their districts for more than 5 years. Yet, years in the district could affect service delivery through other channels as well. Length of bureaucratic tenures is sometimes described as one component of the professionalization of the bureaucracy (Evans 1995). More time spent in the district can also enable deeper embeddedness within local communities.

For the same reasons, local knowledge of extension agents can matter as well. Extension agents who understand the local agroecological conditions as well as the languages, customs, and cultures of local communities will be better positioned to deliver useful and accurate information and to gain the trust of farmers. We therefore asked DADOs whether the majority of the extension agents serving in agricultural service centers in their districts are recruited from the district. Thirty-eight percent of DADOs report that the majority of their staff are local.

Finally, as the overseer of agricultural policy implementation in the district, a DADOs’ motivation is important as well. Given that they all have to grapple with limited staff and resources, differences in intrinsic motivation could shape whether and how thoughtfully an individual DADO deploys resources within his district. The concept of intrinsic motivation has a long history, and has featured across economics, the social and behavioral sciences, public administration, and organizational literatures. At its root, it suggests that employees are strongly motivated to make a major difference in the lives of those they were hired to serve (Paarlberg and Lavigna 2010; Prendergast 2008). Measurements to capture this notion are numerous. Perry’s (1996) public service motivation scale has been one of the most commonly used; it assesses civil servants’ commitment to the public interest, policymaking, social justice, civic duty, compassion, and self-sacrifice. The approach, however, was developed in the

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13 Why are some DADOs in districts longer than others in the first place? While we did not directly ask why DADOs were assigned to their current location, we did ask where they preferred to serve. Eighty percent of DADOs wished that they were serving in another district, and this did not vary based on how long they have been in their current district. Also, there is no relationship between whether a DADO is originally from a particular district and how long they have served in their current district ($r = 0.01$), so it is not the case that it is local DADOs who necessarily serve longer.

14 For a review, see Perry et al. (2010).
USA and international applications show that these constituent measures can vary depending on cultural, historical, and institutional particularities of countries (Vandenabeele and Van de Walle 2008).

Rasul and Rogger (2015) measure intrinsic motivation based on asking bureaucrats which factors originally influenced them to enter the civil service. Those who claim a commitment to the national interest, rather than income, prestige, or other narrow personal benefits, are classified as having more intrinsic motivation. Yet, this assumes that the same factors that motivated a bureaucrat to enter the civil service persist throughout that individual’s tenure, even as job circumstances, supervisors, and postings may change.

Dewett (2007) suggests that intrinsic motivation is reflected by an employee’s creativity and uses supervisors’ rankings of employees’ creativity based their ability to derive “novel and practical work-related ideas.” We draw on the latter conceptualization because it allows for context specificity depending on both the country as well as the type of job, especially given that intrinsic motivation can vary across the tasks and missions of specific sectors (Wright 2007). Specifically, if DADOs are motivated to improve the lives of those rural citizens they were hired to serve, then they should demonstrate some creativity in trying to address their client’s main constraints to improved incomes and poverty reduction.

To capture this, we use an open-ended question that asked the DADO to describe any agricultural development project that he believed would make a difference in their district, if they were given an additional budget of Rp. 5 million (about $47,000 USD) to implement it. Resource-constrained bureaucrats who are motivated to address the problems of farmers in their district should have at least one idea for what they would want to do for local farmers if given more resources.

We coded their responses into three groups: (0) those that could not come up with any project at all that they thought would contribute to local agricultural development; (1) those that gave a generic answer, perhaps referencing a commodity or a goal (e.g., increase cardamom production), but giving no ideas about how they would do so; and (2) those that offered a discussion of a policy (i.e., what and whom to target), even if still in general terms (e.g., help youth get involved in dairy production). While 38% of DADOs did offer a discussion of a policy during the interview, 27% said that they did not have any ideas for how to spend additional resources in their district.

Do these indicators of capacity within the agricultural sector tend to flow together, or do they exist independently from each other within districts? Figure 4 depicts the correlations between these measures. The correlations indicate that capacity—even within a single sector—is multi-faceted. Indeed, many of the measurements have weak negative correlations. Notably, there is a negative correlation between the number of extension agents per farmer and staff professionalization. This is due to the limited

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15 The use of “he” is intentional since in our survey, all the DADOs were male.
16 It is worth noting that the DADO interviews were scheduled at the convenience of the DADO. This allowed for interviews that were not rushed, enabling discussion. Failure to provide a policy idea, therefore, was more a matter of the respondent not wanting to have the conversation rather than time limitations. Moreover, those that did provide an answer did so readily and were able to convey the policy idea within 2–5 min. It is possible, however, that answering the question reflects a DADO’s articulateness, though we do not find evidence that failure to answer this question is correlated with failure to answer any of the other open-ended questions (upon request).
pool of university graduates recruited to work as extension officers: districts that have been able to increase staffing numbers have done so by hiring at the junior technician level, which does not require a university degree (FAO 2010). There are also positive correlations between how long a DADO has served in a district, his motivation, and whether the majority of the staff are local to the district. This makes intuitive sense: highly motivated DADOS with more local embeddedness are the most likely to address staffing shortages by using the local hiring mechanism and taking responsibility for training junior technicians themselves.

In a low resource environment, building capacity may involve trade-offs: investing in one dimension could mean sacrificing in another. In any case, weak correlations between dimensions suggest that in this context, capacity should not be condensed to a single measure but, rather, that dimensions should be separately measured and tested.

**Alternative Explanations**

While we are focused on the role of local capacity in shaping service delivery, there are several alternative explanations for why public service provision may vary across rural localities. We discuss two important alternative explanations for variation in rural service delivery. First, a village’s remoteness, beyond the capabilities of the institutions that govern it, may shape local bureaucrats’ ability to provide a village with services. Projecting the power of the state across varied ecological conditions and vast distances is both costly and complex. Roads in particular serve as a connecting link between state and society, and the state often struggles to maintain a physical presence in their absence (Herbst 2000). Remoteness from the state and public services is particularly acute in countries with hilly terrain, where lengthy travel times limit interactions between state institutions and remote populations (Scott 2009).
remoteness is a significant barrier to public service delivery in rural areas (e.g., Brinkerhoff et al. Forthcoming; Lee et al. 2005), there is still considerable unexplained variation in service access. Overall, a village’s remoteness from agricultural service centers explains less than 10% of the variation in access to extension services across villages in our sample.

In order to measure how far villages are from agricultural extension services, we asked households the time that it takes to travel to their nearest agricultural service center which, as noted earlier, is where extension staff are based. We measure distance in terms of travel times rather than kilometers because, particularly in areas with rough terrain and poor road networks, travel time is a more accurate reflection of the distance. The median respondent in the sample lives 45 min away from an agricultural service center, the average respondent lives 80 min away from an agricultural service center, and about 5% of respondents live more than 3 h away from one. In three of the surveyed villages, none of the respondents in the village knew where the nearest agricultural service center was located, likely an indication that the service center is quite distant. In order to not truncate the data by excluding these villages, we regress travel time to the nearest agricultural service center on distance to the nearest major road. We use this to predict travel times for villages with missing data. Results are robust to excluding these villages as well.\(^{17}\)

Second, the natural agricultural conditions in one part of the country could affect both the government’s incentive to invest resources into agriculture as well as households’ demand for agricultural services. Consequently, another alternative hypothesis we explore is whether distinct agroecological conditions explain variation in agricultural extension access. This is measured by average annual rainfall, rainfall variability, elevation, squared elevation, and population density.\(^{18}\) Rainfall is essential for agricultural productivity while altitude has important implications for soil fertility and pest control. Population density is a measure of land-to-labor ratios and therefore indicates whether there is a comparative advantage for labor intensive production (Chamberlin et al. 2006). We control for both remoteness and agricultural development potential in order to isolate the effects of capacity.\(^{19}\)

**Controls**

We also include a variety of other controls, such as district GDP per capita (UNDP 2014) since wealthy areas may be disproportionately deprived of public extension services due to greater availability of private extension options in those areas. In addition, we include the number of conflict-related deaths in the district during the civil war (Do and Iyer 2010). Rural areas that were conflict-affected may have been more likely to experience a suspension in agricultural service delivery.

\(^{17}\) Available upon request.

\(^{18}\) Data on rainfall and elevation was shared by Takeshima et al. (2017). We measure population density by calculating the area of each VDC using ArcGIS software and use population data from the 2011 census.

\(^{19}\) One question is whether staffing shortages are particularly acute in districts where the outside option of working in agriculture is higher—i.e., in districts with better agricultural conditions. We test whether districts with better agro-ecological conditions and higher per capita GDP have fewer staffing shortages and find no evidence. We thank an anonymous reviewer for making this point.
We also include a series of socio-economic control variables likely to affect whether households would be more aware of agricultural extension service availability. These include land size, irrigation, wealth index, remittance, food insecurity, education, and whether the respondent identifies as a member of a disadvantaged group within Nepal, who have faced systematically lower access to governmental services in Nepal throughout its history.20 Appendix Table 7 presents summary statistics and discusses measurement of each control variable.

Analysis and Results

In this section, we estimate a series of logit models with a binary dependent variable that codes whether a household believes that a governmental extension agent serves their village, whether a household received extension services (from any source) during the past year, and whether a household received governmental extension services during the past year. All models include the controls discussed above. Table 2 reports our main findings.

Notably, individual characteristics of the DADOs are significantly associated with higher access to extension services. One additional year in a district is associated with a 4% increase in the predicted probability that a household believes governmental services exist in the village and a 6% increase in the predicted probability that a household receives governmental extension services.21 The importance of local connections is reflected in the relationship between hiring a staff that is mostly local. When a majority of extension agents are local, there is a 33% increase in the predicted probability of receiving any extension services. Meanwhile, a DADO being able to describe what he would do with additional resources is associated with a 65% increase in the predicted probability that a household believes governmental extension services are available and a 58% increase in the predicted probability that a household receives extension services from any source, all else equal.

Appendix Table 9 reports results at the village level, and results are consistent to the household-level models reported here. Findings are also broadly consistent when fixed effects by region (Appendix Table 10) and by agroecological zone (Appendix Table 11) are included.

Yet, surprisingly, the organizational settings in which bureaucrats operate are not robustly linked with better services. Greater shares of extension workers with bachelors’ degrees are associated with lower, rather than higher, awareness of whether an extension agent serves the respondent’s village, although the effect size is negligible. Similarly, better staffing ratios and more autonomy are (mostly) negatively linked with service access, though only the relationship between having more staff and knowledge of extension services in the village is significant. This corroborates with the example of the villages of Barbote and Pyang that we introduced in the beginning of the paper. Barbote, despite having a ratio of

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20 This is indicated by whether the respondent identifies as a caste or ethnic group generally associated as Dalit or Janajati (Bennett et al. 2008).

21 We also run models using a logged version of time in district to minimize any potential influence of outliers. Results remain the same. Available upon request.
One potential explanation for these puzzling patterns is that there is no ideal organizational setting in a country of such low overall capacity. For example, districts with more educated extension agents are also those that have more agents nearing retirement, who are perhaps less motivated to go into the field. Districts with higher staffing levels are those that have hired more junior technicians, who are less educated. There seems to be a constraint on increasing both staffing ratios and staff professionalization, yielding mixed effects on service access. Political interference with policymaking may sometimes have positive effects for rural service access in this context where the dominant political parties are highly engaged with farmers’ groups.

Table 2  Effects of capacity and distance on access to extension services

| Variables                              | Model 1: Ext. agent in area | Model 2: HH received ext. | Model 3: HH received gov’t ext. |
|----------------------------------------|----------------------------|---------------------------|---------------------------------|
| Capacity                               |                            |                           |                                 |
| Ext. workers per farmer                | $-2.387 (1.406)^+$         | $-1.312 (0.936)$          | $-2.053 (1.596)$                |
| Staff professionalization              | $-0.020 (0.008)^*$         | $-0.003 (0.009)$          | $0.002 (0.009)$                 |
| Political interference                 | $-0.555 (0.355)$           | $-0.149 (0.236)$          | $0.068 (0.363)$                 |
| Years in district                      | $0.049 (0.020)^*$          | $0.040 (0.013)^*$         | $0.049 (0.020)^*$               |
| Local staff                            | $-0.331 (0.337)$           | $0.384 (0.229)^+$         | $0.833 (0.359)^*$               |
| Motivation                             | $0.614 (0.206)^*$          | $0.477 (0.183)^*$         | $0.139 (0.222)$                 |
| Distance                               |                            |                           |                                 |
| Distance to ag. service center (hrs.)  | $-1.798 (0.371)^{**}$      | $-0.669 (0.204)^{**}$     | $-0.253 (0.172)$                |
| Ag. dev. potential                    |                            |                           |                                 |
| Average annual rainfall (cm)           | $-0.159 (0.072)^*$         | $-0.042 (0.054)$          | $-1.123 (0.516)$                |
| St. dev. annual rainfall               | $1.600 (0.498)^{**}$       | $0.622 (0.339)^+$         | $1.230 (0.516)^*$               |
| Elevation (km)                         | $2.735 (0.553)^{**}$       | $2.856 (0.787)^{**}$      | $3.807 (0.995)^{**}$            |
| Elevation, squared                     | $-0.613 (0.227)^{**}$      | $-1.156 (0.423)^{**}$     | $-1.659 (0.559)^{**}$           |
| Population density (‘000s/km2)         | $0.295 (0.299)$            | $-0.217 (0.284)$          | $-0.291 (0.263)$                |
| District controls                      |                            |                           |                                 |
| District GDP per capita (‘000s Rps)    | $0.039 (0.018)^*$          | $0.035 (0.010)^{**}$      | $0.030 (0.014)^*$               |
| District civil war deaths (#)          | $0.487 (0.268)$            | $0.329 (0.240)$           | $0.324 (0.198)$                 |
| Household controls                     |                            |                           |                                 |
| Land size (acres)                      | $-0.058 (0.036)$           | $0.066 (0.024)^{**}$      | $0.071 (0.031)^*$               |
| Land is irrigated                      | $0.446 (0.351)$            | $0.680 (0.306)^*$         | $0.717 (0.260)^{**}$            |
| Wealth factor index                    | $0.096 (0.064)$            | $-0.079 (0.130)$          | $0.174 (0.069)^*$               |
| Received remittance                    | $-0.150 (0.303)$           | $0.496 (0.279)^{**}$      | $0.442 (0.316)$                 |
| Food insecurity                        | $0.020 (0.178)$            | $0.240 (0.159)$           | $0.272 (0.391)$                 |
| Education                              | $0.120 (0.081)$            | $0.384 (0.106)^{**}$      | $0.296 (0.097)^{**}$            |
| Member of disadvantaged caste           | $0.088 (0.363)$            | $0.356 (0.190)^{**}$      | $0.009 (0.255)$                 |
| N                                      | 937                        | 937                       | 937                             |

** $p<0.01$; * $p<0.05$, $+p<0.10$. Standard errors are clustered by district.
Irrespective of the organizational setting, local knowledge and the motivation that DADOs can deploy toward service delivery seems to matter most. Other explanations for service delivery matter as well. For one, distance significantly reduces access: living an hour further away from the nearest agricultural service center reduces the predicted probability of receiving extension services by 6 percentage points, a 32% increase from the mean. A bit counterintuitively, elevation increases access to services, though this effect diminishes as elevation rises. In the Nepali context, this is likely explained by the historical preference for establishing more agricultural service centers in the hills region, rather than in the mountains or plains (see FAO 2010). Other factors matter as well; namely, more educated households and those in richer districts are more likely to receive services, as are those that receive remittances, and those with larger, irrigated plots. This suggests that these better-off households either have more resources to demand services or a greater awareness of where to locate them.

**Placebo Test**

Any study of political geography faces identification challenges. An ideal research design would isolate the effects of subnational state capacity from other factors which vary by district. We can control for observable factors which vary by district and shape service delivery. However, unobservables can still confound findings. One way to probe the findings is by conducting placebo tests: specifically, we test whether current capacity has an effect on past service delivery. Future capacity cannot have a causal impact on past outcomes, especially factors like the current DADO’s motivation and time employed in the district, given how often DADOs transfer; however, if relationships are driven by unobservables, apparent counterfactual effects could appear in this test.

Table 3 utilizes data from the Nepal Living Standards Survey (NLSS) III collected in 2010/11. This nationally representative survey asks households whether they received governmental extension services during the past year. Current capacity indicators do...
not predict past governmental performance, as expected. This lends confidence that
district unobservables are not driving results.
Overall, these findings suggest that disparate dimensions of state capacity exert
differential effects on service delivery. Surprisingly, administrative capacity and bu-
reaucratic autonomy had little overall influence over access to extension services.
Instead, DADOs’ time employed in the district, whether their staff are local, and their
ability to describe how they would spend additional resources in their district are more
influential in explaining service delivery outcomes. Collectively, this suggests that
efforts to improve capacity should place more emphasis on reducing excessive use of
rotation, hiring local staff, and gaining an understanding of why some DADOs are
more motivated than others.

Conclusions

Unpacking state capacity is critical for many developing countries, which strive to
deliver traditional services to citizens and to find innovative ways to implement cash
transfer programs, scale up pension schemes, design smart subsidies, and collect tax
revenue. However, weak state capacity is frequently identified as the culprit for poor
program implementation. In turn, capacity building is a major area of investment by the
international development community (see Andrews et al. 2017).

While there has been scholarly awareness of the importance of good governance,
there have been few attempts to examine whether different components of the concept
may exert disparate influences. Consequently, one contribution of this paper is to
respond to Fukuyama’s (2013) call for disaggregated measures of capacity that recog-
nize the variation of this concept across functions, levels of government, and regions
within countries. By using disaggregated indicators of capacity in the agricultural
sector, we identify which aspects of capacity are most likely to increase access to
extension services in a country that is often described as a uniformly weak state.

In doing so, we find that simply improving the ratio of extension agents to
agricultural workers is insufficient for increasing extension access. Instead, those
agricultural bureaucrats employed longer in a district and with greater motivation tend
to be associated with greater extension access. This is not to say that more resources
and staff education are not needed in this context—it would be hard to argue otherwise
in the face of the extremely low staffing levels. Rather, the findings suggest that doing
so is ineffective unless local bureaucrats have the skills, knowledge, and motivation to
deploy those resources productively.

The findings also contain a hopeful message for service delivery in areas of
limited statehood: even when resources are scarce, knowledgeable and motivated
bureaucrats can deliver surprisingly high levels of services with scant resources.
Where university graduates are scarce, staffing districts with junior technicians—as
long as they are local—improves outcomes as these local staff are more embedded
in local conditions and communities. Reducing the use of district transfers at both
the junior and senior levels would be an inexpensive way to improve service
outcomes and encourage greater embeddedness. However, this could mean that
the government needs more potent means of sanctioning and rewarding employee
performance.
Access to services is especially important in rural Nepal, where there are few private sector alternatives, where agricultural productivity lags, and where the government still needs to rebuild legitimacy after the civil war. Since responsiveness to citizen preferences for services plays a critical role in enhancing state legitimacy in post-conflict states (see Brinkerhoff et al. 2012; McLoughlin 2015), determining which elements of capacity should be prioritized and reinforced will remain central to the consolidation of Nepal’s still-fragile democracy.

Sampling Procedure

We first sampled villages for the household survey and then for the bureaucrats survey. For the household survey, the sample consists of 75 local government units across 48 districts in Nepal. There are four types of local government units in Nepal: village development committees (VDCs), municipalities, sub-metropolitan areas, and metropolitan areas. Because we are interested in service delivery across rural Nepal, we randomly sample from the full list of VDCs and municipalities, but exclude Nepal’s 11 sub-metropolitan and metropolitan areas from the sample. Although named municipalities, these units are not necessarily urban areas nor are they diversified away from agriculture, thus we include them in the sample.22 Selected units provide important heterogeneity in institutions, culture, and geography by being located across each of Nepal’s three agroecological zones and its five development regions.

In selecting local government units to include in the study, we take into account three factors. A first consideration was that quality data was available on local infrastructure and socio-economic conditions for the set of VDCs and municipalities that were included in the Nepal Living Standards Survey III collected in 2011 (hereafter, NLSS III). We selected our sample in order to make use of this data, assuming that the sampling for NLSS was done to ensure that NLSS and non-NLSS local government units are interchangeable in expectation.23 In practice, this meant restricting the sampling frame to those local government units which were sampled into NLSS III. Appendix Table 4 reports the actual distribution of local government units across the sampling strata and illustrates that restricting the sampling frame to the NLSS III sample does not result in any empty cells. Second, we stratified based on the boundaries of Nepal’s seven proposed provinces under its new federal structure to ensure that we had sufficient geographic variation. Finally, we stratified based on agroecological zone.

Table 4 reports the distribution of actual VDCs and municipalities over these strata, while Table 5 reports the distribution of sampled VDCs and municipalities over these strata. We target a roughly even number of local government units across each province. Within provinces, the number of local government units targeted within each

22 The minimum threshold for creating a municipality is a population of only 10,000 in hill and mountain areas and 20,000 in terai. In the past several years, the government has been merging VDCs to meet the population requirements to create new municipalities (rather than creating municipalities as VDCs grow economically and in population).

23 Gilligan et al. (2014) make a similar assumption regarding NLSS in sampling at the VDC level in Nepal.
agroecological zone was determined based on the share of the population within each agroecological zone within the province (reported in Table 4), so that the overall share of households in the sample within each agroecological zone is roughly equal to the share of the population within these areas.

Within each sampled VDC/municipality, we randomly selected 2 wards to be our enumeration areas and sampled 7 households from the population of each selected ward to be interviewed for a total sample of 1055 rural households.24 Within every VDC, there are exactly seven wards, so it was straightforward to select the enumeration wards in advance. However, within municipalities, there is a variable number of wards and it was not possible to determine the number of wards in advance, particularly given the rapidly changing boundaries of municipalities in the past three years. In these cases, field supervisors determined the total number of wards within the municipality upon arrival. Two random numbers between 0 and 1 were drawn in advance, and the enumeration wards were selected by multiplying the random numbers by the total number of wards and rounding up. For example, a municipality with 26 total wards could be assigned the random numbers 0.6091 and 0.8287. The enumeration wards would be wards 16 (0.6091*26 = 15.84) and 22 (0.8287*26 = 21.55).

In order to sample households within wards, enumerators used a random walk procedure. Each ward was randomly-assigned one of four possible starting points for the random walk: the ward primary school, the ward health post or sub-health post, a body of water located within the ward, or a geographic landmark within the ward. The geographic landmark had to be a natural one (e.g., tallest tree, highest or lowest point of elevation, or another distinctive geographic landmark) rather than physical infrastructure. We varied the starting points for the random walk procedure to ensure that the overall sample would include houses with varying degrees of remoteness. If it was not feasible to use the randomly assigned starting point for the ward (e.g., because the ward

| Table 4 Distribution of actual VDCs/municipalities over strata |
|---------------------------------------------------------------|
| Agroecological zone (NLSS inclusion) | Prov. 1 | Prov. 2 | Prov. 3 | Prov. 4 | Prov. 5 | Prov. 6 | Prov. 7 |
| Mountain (NLSS III) | 9 | 0 | 12 | 1 | 0 | 6 | 9 |
| (Non-NLSS III) | 100 | 0 | 127 | 28 | 0 | 125 | 96 |
| Share of prov. pop. | 10% | 0% | 13% | 1% | 0% | 22% | 19% |
| Hill (NLSS III) | 35 | 0 | 45 | 33 | 25 | 21 | 15 |
| (Non-NLSS III) | 327 | 0 | 328 | 347 | 242 | 178 | 173 |
| Share of prov. pop. | 39% | 0% | 77% | 76% | 34% | 78% | 37% |
| Tarai (NLSS III) | 24 | 58 | 4 | 10 | 38 | 0 | 11 |
| (Non-NLSS III) | 117 | 577 | 13 | 53 | 183 | 0 | 34 |
| Share of prov. pop. | 51% | 100% | 9% | 23% | 66% | 0% | 44% |

Source: population data from Government of Nepal (2012)
did not contain a body of water), then a second-, third-, and fourth-choice starting point were randomly-assigned. From the starting point, enumerators were instructed to walk north and select every fifth household to be interviewed in high density areas and every third household to be interviewed in low density areas. On even-numbered dates, dwellings on the left-hand side were selected. On odd-numbered dates, dwellings on the right-hand side were selected. If a street or path ended, then enumerators turned right and repeated the appropriate sampling interval. Interviews targeted either the head of household or the spouse of the head of household. In order to be eligible to be surveyed, we required that the target respondent be at least 18 years of age and have lived continuously in the district for the past 6 months. 25

Table 6 reports demographic information on the final sample as well as population information from the 2011 Nepal Census. The table shows that the final sample matched demographic information well.

Additional Tables and Figures

To measure policy preferences of rural citizens, we ask respondents to think about how he or she would allocate resources if given the opportunity. Respondents are asked: “If your VDC was going to receive an extra five million Nepali rupees26 to spend on development in this VDC, what would be the priority to which you would want to allocate the money?” A list of 11 potential development priorities are offered, including

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24 Five extra households were sampled by accident in the field. Due to poor cellular service, enumerators could not always reach other to verify how many households had already been surveyed within the village.

25 We set this restriction because we wanted to ensure that respondents would have sufficient information on local service delivery.

26 Approximately $47,000 USD.
(1) improving health care; (2) providing primary education; (3) building and maintaining roads; (4) providing society security, like cash transfers; (5) expanding electricity access; (6) keeping fertilizer prices low; (7) keeping automotive fuel prices low; (8) providing access to clean drinking water; (9) expanding agricultural and/or livestock extension services; (10) building irrigation projects; and (11) reconstruction of earthquake-damaged buildings or infrastructure. An “other” category is also provided. To ensure that the ordering of the response items does not affect probability of selection, we randomized the order of the answer choices.

Appendix Fig. 5 below provides a summary of the variation in citizens’ preferences across the policy domains. Building and maintain roads is the most frequently selected policy domain as the priority for local development expenditures, with 43% of households choosing it as the priority area. However, agricultural and livestock extension services draw significant support, as the third most popular area for local development expenditures receiving 10% of responses.

At the household level, we include factors which may shape households’ demand for agricultural extension services. Land size is measured as the number of hectares of agricultural land owned by the household. Irrigation measures whether households report that the majority of the land that they hold is irrigated. Remittance indicates whether or not the household received any remittance transfers during the past 12 months. Food insecurity is measured using a five-point scale indicating how often during the past 12 months the household has gone without enough food to eat (1 = never, 2 = just once or twice, 3 = several times, 4 = many times, and 5 = always). Education indicates the level of education attained by the respondent and takes on a

### Table 6 Sample demographics

| Characteristics | Population | Sample |
|-----------------|------------|--------|
| Agroecological zone |  | |
| Terai | 46.6 | 46.1 |
| Hill | 46.7 | 49.0 |
| Mountain | 6.7 | 4.9 |
| Development region |  | |
| Eastern | 22.7 | 25.5 |
| Central | 36.2 | 31.4 |
| Western | 19.6 | 18.9 |
| Mid-Western | 12.8 | 13.0 |
| Far Western | 8.7 | 11.1 |
| Caste/ethnicity |  | |
| Chhetri | 16.6 | 20.8 |
| Brahman (hill) | 12.2 | 14.5 |
| Magar | 7.1 | 8.7 |
| Tharu | 6.6 | 10.1 |

Source: population data from Government of Nepal (2012)
value of 0 (no schooling), 1 (some primary schooling), 2 (completed primary), 3 (some secondary), or 4 (completed secondary). We also measure whether the respondent identifies as a member of a disadvantaged group within Nepal. This is indicated by whether the respondent identifies as a caste or ethnic group generally associated as

![Fig. 5 Rural policy preferences](image)

Table 7 Summary statistics for control variables

| Variables                                | Mean (SD)  | Min   | Max   | Source                        |
|------------------------------------------|------------|-------|-------|-------------------------------|
| District controls                        |            |       |       |                               |
| District per capita GDP (‘000s of Rps.)  | 47.87 (11.91) | 23.41 | 84.71 | UNDP (2014)                   |
| # civil war deaths per 1000 population  | 0.79 (0.84) | 0.13  | 5.76  | Do and Iyer (2010)            |
| Ag. dev. potential                      |            |       |       |                               |
| Rainfall, annual total (mm)             | 1642 (307) | 1032  | 2213  | Takeshima et al. (2017)       |
| Rainfall, std. deviation                | 259 (43.5) | 168   | 371   | Takeshima et al. (2017)       |
| Elevation, median (km)                  | 0.74 (0.80) | 0.06  | 3.92  | Takeshima et al. (2017)       |
| Population density (1000 persons/km²)   | 0.67 (1.03) | 0.004 | 4.51  | 2011 Census                   |
| Household controls                      |            |       |       |                               |
| Land size (hectares)                    | 1.93 (2.90) | 0     | 50.2  | Household survey              |
| Land is irrigated                       | 0.23 (0.42) | 0     | 1     | Household survey              |
| Wealth index                            | 0.24 (1.80) | −3.39 | 5.38  | Calculated from household survey |
| Received remittance, past 12 mos        | 0.39 (0.49) | 0     | 1     | Household survey              |
| Food insecurity                         | 0.32 (0.75) | 0     | 4     | Household survey              |
| Education level                         | 2.08 (1.47) | 0     | 4     | Household survey              |
| Member of a disadvantaged group or caste| 0.46 (0.50) | 0     | 1     | Household survey              |
Dalit or Janajati based on demographic analysis by Bennett, Dahal, and Govindasamy (2008).

Finally, we construct a household *wealth index* which combines indicators of ownership of consumer durables and dwelling characteristics. Often, wealth indices are created by transforming components from categorical to separate dichotomous indicators. Then, principal components analysis (PCA) can be performed on the set of dichotomous indicators, and the first principal component is used as a measure of household wealth (Filmer and Pritchett 2001). However, one cost of this procedure is that it loses all ordinal information, such as whether certain types of roof materials are “better” than others. Retaining this ordinal information generally results in improved PCA in which the first factor explains a greater proportion of the overall variance and in which there are fewer instances of counter-intuitive weights (Kolenikov and Angeles 2009). We use dichotomous indicators for ownership of durable goods, including whether the household owns a vehicle, a television, a motorcycle or motorbike, a bicycle, a refrigerator or freezer, a mobile phone, a computer, or an LPG cylinder. However, we use ordinal information when we can. Dwelling characteristics are measured based on whether the main flooring material is soil (0), or wood/tile/concrete (1); whether the main roofing material is straw or thatch (0), earth or mud (1), wood or planks (2), or iron/concrete/cement/tiles/slate (3); and whether the main wall material is bamboo/leaves/no walls (0), mud-bonded bricks or stones (1), or wood/cement-bonded bricks or stones (2). Appendix Table 8 reports the summary statistics for the included variables as well as the factor score for the first component of the PCA. The first component of the PCA is used as the overall wealth index.

| Variable                                      | Mean | SD   | Factor score |
|------------------------------------------------|------|------|--------------|
| Motor car or other vehicle                    | 0.02 | 0.14 | 0.16         |
| Television                                    | 0.62 | 0.49 | 0.35         |
| Motorcycle/scooter                            | 0.25 | 0.43 | 0.34         |
| Bicycle                                       | 0.48 | 0.50 | 0.09         |
| Refrigerator or freezer                       | 0.12 | 0.33 | 0.35         |
| Mobile phone                                  | 0.96 | 0.19 | 0.09         |
| Computer/laptop/tablet                       | 0.15 | 0.36 | 0.35         |
| LPG cylinder                                  | 0.38 | 0.48 | 0.39         |
| Flooring material (0 = soil, 1 = wood/tile/concrete) | 0.31 | 0.46 | 0.39         |
| Roof material (0 = straw/thatch/no roof, 1 = earth/mud, 2 = wood/planks, 3 = iron/concrete/tiles/slate) | 2.68 | 0.90 | 0.20         |
| Wall material (0 = no walls/bamboo/leaves, 1 = mud-bonded bricks or stones/ unbaked bricks, 2 = wood/cement-bonded bricks or stones) | 1.29 | 0.66 | 0.36         |

Factor score for first component of principle component analysis
Table 9  Village-level results

| Variables              | Model 1: share of HH received ext. | Model 2: share of HH received gov’t ext. |
|------------------------|-----------------------------------|-----------------------------------------|
|                       |                                  |                                          |
| Capacity               |                                  |                                          |
| Ext. workers per farmer| $-0.265 (0.106)^*$              | $-0.285 (0.102)^{**}$                  |
| Staff professionalization| $0.002 (0.002)$                   | $-0.001 (0.001)$                       |
| Political interference | $-0.096 (0.044)^*$              | $-0.053 (0.039)$                       |
| Years in district      | $0.006 (0.003)^{+}$              | $0.001 (0.002)$                       |
| Local staff            | $0.026 (0.046)$                   | $0.064 (0.035)^{+}$                   |
| Motivation             | $0.031 (0.035)$                   | $0.031 (0.022)$                       |
| Distance               | YES                               | YES                                     |
| Ag. dev. potential     | YES                               | YES                                     |
| District controls      | YES                               | YES                                     |
| N                      | 70                                | 70                                      |

**p < 0.01; *p < 0.05, +p < 0.10. Standard errors are clustered by district. The dependent variable in model 1 is the share of households within a village that received crop extension services from any source. The dependent variable in model 2 is the share of households within the village that received governmental extension services.

Table 10  Regional fixed effects

| Variables              | Model 1: Ext. agent in area | Model 2: HH received ext. | Model 3: HH received gov’t ext. |
|------------------------|-------------------------------|---------------------------|-------------------------------|
|                       |                               |                           |                               |
| Capacity               |                               |                           |                               |
| Ext. workers per farmer| $-2.708 (1.369)^*$            | $-1.195 (1.080)$          | $-2.223 (1.367)$              |
| Staff professionalization| $-0.021 (0.009)^*$          | $-0.000 (0.006)$          | $0.011 (0.007)$               |
| Political interference | $-0.837 (0.373)^*$           | $0.037 (0.292)$           | $-0.345 (0.301)$             |
| Years in district      | $0.007 (0.019)$               | $0.059 (0.023)^{**}$     | $0.066 (0.024)^{**}$          |
| Local staff            | $-0.036 (0.282)$              | $0.269 (0.294)$           | $0.853 (0.333)^{*}$          |
| Motivation             | $0.887 (0.283)^{**}$          | $0.336 (0.209)$           | $0.205 (0.315)$              |
| Distance               | YES                           | YES                       | YES                           |
| Ag. dev. potential     | YES                           | YES                       | YES                           |
| District controls      | YES                           | YES                       | YES                           |
| N                      | 937                           | 937                       | 937                           |

**p < 0.01; *p < 0.05, +p < 0.10. Standard errors are clustered by district. All models include a dummy for whether the household lives in the far west region, the mid-west region, the western region, or the eastern region. Living in the central development region is the omitted category.
Table 11  Agroecological zone fixed effects

| Variables                  | Model 1: Ext. agent in area | Model 2: HH received ext. | Model 3: HH received gov’t ext. |
|----------------------------|-----------------------------|---------------------------|-------------------------------|
| Capacity                   |                             |                           |                               |
| Ext. workers per farmer    | −2.398 (1.386)              | −0.987 (1.141)            | −1.951 (1.335)                |
| Staff professionalization  | −0.018 (0.009)*             | −0.004 (0.006)            | 0.002 (0.009)                 |
| Political interference     | −0.886 (0.366)*             | −0.024 (0.285)            | −0.556 (0.295)+               |
| Years in district          | 0.007 (0.020)               | 0.060 (0.022)**           | 0.063 (0.023)**               |
| Local staff                | 0.138 (0.300)               | 0.083 (0.304)             | 0.524 (0.338)                 |
| Motivation                 | 0.921 (0.319)**             | 0.477 (0.230)*            | 0.515 (0.379)                 |
| Distance                   | YES                         | YES                       | YES                           |
| Ag. dev. potential         | YES                         | YES                       | YES                           |
| District controls          | YES                         | YES                       | YES                           |
| N                          | 937                         | 937                       | 937                           |

**p<0.01; *p<0.05, +p<0.10. Standard errors are clustered by district. All models include a dummy for whether the household lives in terai or in the mountains. The mid-hills zone is the omitted category.

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