

6 The Digitalization of Anti-poverty Programs: Aadhaar and the Reform of Social Protection in India

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Introduction

The topic of digital governance is central to the study of information and communication technologies (ICTs) for development. Over the last two decades, the potential for ICTs in governance has been widely recognized. Heeks (2001), for instance, noted that e-governance can be viewed as the “ICT-enabled route to good governance,” and new technologies have been seen as practical tools to tackle institutional frailty on a world scale. In the early days of digital governance, a “tool-and-effect” logic led the debate, seeing technology as the heart of the solution to problems of effectiveness and accountability (World Bank 1999; UNDP 2001). This is especially important in developing nations, where state failure may yield severe consequences for the lives of the poor and vulnerable (Corbridge et al. 2005).

However, a tool-and-effect logic has proved unable to satisfactorily describe the effects of digitalization on the governance of development projects.¹ Over the last ten to fifteen years, the literature on failure in ICT for development (ICT4D) projects has been growing, posing theoretical problems with which research in the field has engaged directly. In particular, scholars have questioned the tool-and-effect logics of the early days. Contemporary work tends to present a different set of ICT4D hypotheses, in which technology is only as good as the policy decisions it embodies. The idea of technology as a “carrier of policy” is at the heart of this line of reasoning, stating that ICTs embody the decisions of governors, who inform the design of artifacts to advance their own agendas (Cordella and Iannacci 2010).

So devised, the vision of technology as a “carrier of policy” has loomed large in ICT4D. But to what extent does this paradigm capture the theoretical link between ICTs and governance? Compared to a “deterministic tool” view, it certainly seems to provide a more faithful representation of reality. But two key issues indicate the need for further research on the topic. First, the logic of technology as a “carrier of policy” describes how artifacts are informed by ideas of the people who govern them but says little about the reverse process, that is, how technology may in turn reshape the policies it is supposed to advance. Second, the effects of this mutual shaping on socio-economic development are unclear. As such, if we are to take Walsham’s (2012) invitation to engage in “making a better world” with ICTs, the feedback of ICT-based policy reform on development should be openly taken into account.

This chapter advances the view that technology not only *carries* anti-poverty policy but actively *reshapes* it in ways that affect development trajectories. To explore this hypothesis, I present a study of the ongoing transition to digitality in the Public Distribution System (PDS), the main food security program in India, under the aegis of the Unique ID project (Aadhaar), a central government scheme enabling the biometric identification of all citizens enrolled. The Aadhaar project aims to solve identification issues, by endowing each enrolled resident with a twelve-digit number and registered biometric details (fingerprints and an iris scan). A recent economic survey (Government of India 2015) openly recommends incorporating Aadhaar in the reform of the main social safety schemes in the country. In this chapter, I explore the rationale and dynamics of reform, based on empirics from a state (Kerala) that conducted a pilot project of biometric transformation of the PDS.

Studying Aadhaar’s role in social protection, I discover a set of mechanisms through which biometric technology affects its underlying policies, in turn reshaping the development trajectories in which it participates. At the micro level, the system leads to monitoring a specific part of the PDS supply chain, specifically *ration dealers* (last-mile retailers), on whom much of the corruption in the program is blamed. At the macro level, Indian states can appropriate the same technology, aimed at reshaping the PDS with a cash transfer program, to protect the program in its existing form and to implement reforms to minimize leakage and corruption. Aadhaar’s infrastructure hence envisages a new policy direction for the poor and

marginalized, oriented to direct cash transfers as opposed to food subsidies, which states can partially renegotiate according to local visions and priorities.

In this chapter, I first explore the logic of digital governance as a “carrier of policy,” and its implications for the study of ICT adoption and reform of social protection. I then articulate the idea that digitality may instead “reshape” policy in a deeper way, illustrated through the example of the PDS reforms advanced by Aadhaar in Kerala and in India at large. The chapter then elucidates the micro- and macro-level effects of the adoption of biometrics on anti-poverty policy, detailing its influence on the development trajectories of its adopters. On this basis, I explore the effects of digitality on users’ entitlements, arguing that these are imbued with ambiguity and may in fact lead to further exclusion rather than empowerment.

Theoretical Perspective: Technology as a Shaper of Policy

The tool-and-effect logic that previously dominated the discourse on ICTs and poverty alleviation entailed little problematizing of context and conditions. E-governance found its rationale in the improvement of effectiveness and accountability of social safety nets: this deterministic logic leads, for instance, to the identification of best practice for ICTs to improve social security mechanisms. This was a “tool view” of technology for poverty reduction, depicting technology in terms of the objectives that its material features were meant to pursue (Orlikowski and Iacono 2001).

Yet, this logic soon proved suboptimal to account for the use of technology in anti-poverty programs. A “tool view” ended up neglecting relevant mechanisms instead of unpacking them, preventing the observer from making sense of the conditions under which ICT-based intervention could actually work. As noted by Richard Heeks, most projects in this area result in failure, and taking stock of this is important for designing any constructive intervention. Heeks’s explanation of failure points to gaps between reality and the perceptions held by designers, which prevent them from providing interventions tailored to the actual needs and requirements of beneficiaries (Heeks 2003).

As theorized by Wanda Orlikowski and Suzanne C. Iacono (2001), moving beyond a tool-and-effect logic leads to a vision in which technology is *embedded* in its context of action and emerges from it while influencing

its dynamics. The notion of social embeddedness, widely affirmed in the discipline of information studies, is itself predicated on an ensemble view: technology is not simply a dependent variable but generates feedback mechanisms that shape the dynamics around it. Over the last decade, social embeddedness has gained substantial ground in ICT4D, countering the notion of “technology transfer” in this domain. According to a socially embedded vision, technology is not necessarily *transferred* to the developing world but conceived according to locally relevant needs (Avgerou 2008).

In the domain of anti-poverty policy, a theory of technology as socially embedded needs to take into consideration social policy principles (which are seldom considered openly in ICT4D). Two particular social policy principles matter highly to the construction of a theoretical perspective on this topic.

First, social safety schemes are informed by an intrinsic *rationale*, that is, the core objective for which they were conceived. For example, a food security program finds its rationale in guaranteeing a people’s right to adequate nutrition, and a workfare scheme has the purpose of ensuring employment in exchange for a wage. The rationale of a program informs how the scheme is designed and what policy mechanisms it involves. As a result, the general consensus among designers of pro-poor technologies is that IT artifacts should be designed in continuity with their rationale.

Second, social safety nets are the expression of underlying *political* programs, put forward by their policymakers (Cordella and Iannacci 2010). Social policy design is a political exercise: different views will lead, for example, to more or less narrow targeting of schemes or to different propensities to rights-based approaches. Furthermore, social safety nets are often at the core of electoral promises: their making is an integral part of electoral competition and mobilizes existing party interests around them (Mooij 1999). The discourse that views technology as a “carrier of policy” hence depicts IT artifacts as the material embodiments of the policy agendas they put forward.

The logic of technology as a “carrier of policy” has become deeply entrenched in ICT4D. But the field has evolved rapidly over the last decade, leading to questions of the extent to which this logic accounts for intertwining technology and policymaking. On the one hand, it is reasonable to assume that technology embodies the objectives of the policymakers

behind it; yet, on the other hand, this logic can conceal the feedback effect that ICT systems may yield on the policies themselves. The information systems literature reminds us that technology invites human action along specific guidelines. Jannis Kallinikos (2011), for instance, notes that contemporary politics are “governed” through technology, and overlooking the feedback effects of ICTs would mean bracketing an important part of the picture.

In a world in which technology is ever more entrenched in economic development and poverty reduction, the consequences of technology uptake on the “substantial unfreedoms” that affect poorer people’s lives are paramount (Sen 2001, xii). It is hence important to consider the idea that technology, beyond carrying policy, may act as a *shaper* that directs it toward specific routes and objectives. On this basis, the hypothesis examined in this chapter is that ICT adoption may influence the course of social protection reform in a developing nation. To study this, I needed to look at the digital infrastructures that are entrenched in the making of social welfare schemes. This led specifically to a focus on the adoption of biometrics in the Public Distribution System (PDS), the largest food security net in India.

Aadhaar and the Indian Food Security System

I began collecting data on computerization of the state-level PDS in Kerala in 2011, when the digitalization of the program was in its early stages. Since then, I have conducted multiple rounds of fieldwork to monitor the system’s evolution from back-end automatization to front-end and subsequently biometric recognition of users. This chapter draws on interviews and observations in the ration shops, telecenters, and administrative offices (known as Taluk Supply Offices) adopting the digital PDS. It uses a narrative analysis of the contents of interviews as the main tool to reconstruct causal processes (Riessman 2008). Following the case study method, I further triangulated primary data with statistics, press releases, and government documents on the PDS and its digital transformation.

The purpose of the PDS is to provide primary necessity goods (mainly rice, wheat, sugar, and kerosene) at subsidized prices to households below the poverty line, thereby improving their nutritional levels and welfare. Rather than relying on imports, the PDS uses internal redistribution

of commodities: food grains are reallocated from surplus states to food-deficit ones through a centralized redistribution system. The reallocation mechanism is governed by the Food Corporation of India (FCI), a government agency that buys goods from private producers at the minimum support price and redistributes them to states based on the theoretical requirement.

Figure 6.1 illustrates the PDS supply chain. First, goods procured from the FCI and private producers are distributed at the district level through authorized wholesale dealers. These are then lifted from the wholesale points by the ration dealers who own the fair-price shops, known as *ration shops* because goods are rationed monthly. Finally, beneficiaries buy PDS commodities from the ration dealers at subsidized prices, which make the goods affordable to the poor and vulnerable.

Launched in 1965, the PDS was initially predicated on equal entitlements for all citizens, based on the principle of a universal right to food (Mooij 1999). During the severe balance of payment crisis that affected India in the 1990s, however, international funding institutions strongly criticized the scheme's leakage to the nonpoor, as well as the high subsidy cost, which was estimated to be around 0.5 percent of the country's GDP in 1990–1991 (Ahluwalia 1993). This led to the shift to a targeted system in 1997, in which entitlement is based on poverty status and aimed specifically at the households classified as below the poverty line. While actually reducing the subsidy cost (Umali-Deininger and Deininger 2001), the policy shift also had several unintended effects, of which the Kerala case is paradigmatic.

Kerala originally operated what was widely recognized as the most effective PDS in India, serving 97 percent of the state's population (George 1979) and thus having a significant impact on beneficiaries' nutritional status. Rice and wheat produced in Kerala account for only 15 percent of the state's total consumption of food grains, which makes a well-functioning

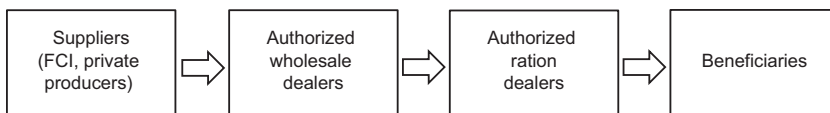


Figure 6.1

India's Public Distribution System (PDS) supply chain. *Source:* Author.



Figure 6.2

Ration shop, Trivandrum Central, Kerala. *Source:* Author.

PDS crucial to the state's nutritional security. The Keralite system, and the operational efficiency that characterized it, were based centrally on the universality of PDS and on its capacity to serve almost the whole population through ration shops (figure 6.2).

But the move to a targeted system caused deep changes in the scheme, reducing the supply of PDS goods to Kerala to less than 10 percent of the pretargeting amount (Swaminathan 2002). Users classified as above the poverty line were left with only very limited subsidies, hence their leaving the system en masse between 1997 and 2001.² Many ration shops in slum areas (figure 6.3), finding themselves with considerably fewer customers, became unviable and closed down, which also caused a wave of suicides among ration dealers (Suchitra 2004). In addition, since Kerala's poverty incidence was estimated at only 25 percent, many citizens found themselves excluded from the food security net on which they had long relied, and this put numerous households in a dire situation of exposure to food insecurity (Swaminathan 2008).



Figure 6.3

Chenkalchoola, slum area, Trivandrum, Kerala. *Source:* Author.

What targeting has left in Kerala is a collapsed system, ridden with issues that were not present at the time of universal coverage. The main one is leakage, meaning the loss of PDS goods along the supply chain due to recurrent illegal sales of these goods on the private market (Khera 2011). This phenomenon, known as the *rice mafia* (as rice is the staple commodity in the PDS), endangers the program's capacity to serve the poor, especially as illegal sales have persisted despite many reform efforts over the years. Diversion of goods from the PDS to the market is spurred by the price difference of commodities, which are more profitably sold on the nonsubsidized market system than on the heavily subsidized PDS.

In Kerala, the digitalization of PDS, delegated to the state-level section of India's National Informatics Centre based in Trivandrum (the state's capital), has been at the core of the program's reconstruction. Computerization was conceived specifically to monitor the PDS supply chain, thus allowing any diversion of goods to be detected. Government officials, and the National Informatics Centre staff that I followed during implementation, were consistently clear about the antileakage nature of the effort, and the IT-based PDS was indeed built with the explicitly declared objective of combating the *rice mafia* (Masiero 2015). To achieve this purpose, the program was reconstructed in two phases, a first one in which infrastructure was

built and a second one, still ongoing, in which it is being augmented with biometric recognition of users.

In the first phase, the National Informatics Centre developed a suite of software articulated in three modules—a front-end one involving citizens, and two back-end ones used by staff at administrative offices. The front-end interface consists of a Ration Card Management System, a workflow-based application for ration card requests. Once received through the registration counter, applications are verified by rationing inspectors, who then submit them to the local Taluk Supply Office for approval. The two administrative functions cover the district-level allocation of goods and the legal inspection of ration shops, with details recorded in a database to flag suspicious activity by ration dealers. By digitizing these key functions of the PDS, the state aimed to ensure their safe and constant monitoring.

The second phase involves integrating the PDS with a form of biometric control, to make sure that access to subsidized commodities is reserved for genuinely entitled users. A pilot project run in six ration shops in Trivandrum enabled biometric recognition through Aadhaar, the unique identification system rolled out by the Unique Identity Authority of India since 2009. While the legal system is currently being adapted to accommodate the adoption of biometrics in nationwide welfare schemes, pilot projects based on Aadhaar are already being run across the nation, with mixed results in terms of access (Bhatti, Drèze, and Khera 2016). In Kerala, a set of ration shops were endowed with point-of-sale machines, performing Aadhaar identification on users and allowing or denying transactions on that basis.

The idea of linking Aadhaar to welfare schemes is rooted in its capability to combat diversion (Government of India 2015). A frequent practice of ration dealers is that of attaching bogus ration cards to their shops to mask illegal sales on the market. Biometric recognition, by linking each user to their own biometric details, ensures that sales are made only to real beneficiaries, as all transactions need to be matched by a valid number. Point-of-sale machines, connected to the central Aadhaar database, confirm the user's identity and entitlement to access the PDS.

More recently, the National Democratic Alliance (NDA) central government voiced the intention of replacing the PDS with a cash transfer program—removing the entire system of subsidies and simply paying people to buy food in an open market—and has already envisaged operational

measures to make the transition possible. To do so, Aadhaar is being combined with a financial inclusion program (Jan Dhan Yojana) and mobile technologies. Jan Dhan Yojana, literally meaning “people’s money plan,” aims to provide each household with a bank account, to which direct benefits can be transferred.³ The combination of Jan Dhan Yojana, Aadhaar, and mobile payments, known as the “JAM trinity,” is being planned with the explicit purpose of rebuilding the nation’s anti-poverty system, converting existing subsidies into a direct transfer to those below the poverty line. This new intentionality is taking shape in the present debate and needs to be considered in analyzing the link between digitality and policymaking.

Analysis: Two Perspectives on Aadhaar

As mentioned, digitality in the PDS can be observed through two complementary paradigms, seeing technology as a *carrier* or as a *shaper* of social policy. The former paradigm details the rationale and policy agenda embodied in Aadhaar’s inscription in the PDS. The latter explains the feedback effects of Aadhaar’s adoption on food security policy, demonstrating its actual and potential effects on the development trajectory in which it participates.

Technology as a Carrier of Policy

The rationale for using Aadhaar in the PDS is stated clearly by policymakers and lies in a problem-solution nexus between the root cause of PDS leakage and the biometric technology devised to fight it. Government staff have been explicit about the presence of leakage, which is uniformly seen as due to the ubiquity of the rice mafia within the state. While losses in transportation and storage are acknowledged, they are almost never cited as a reason for leakage: this is blamed on the black market networks on which rice is sold for much higher prices.

Although PDS supply chains can be long, attribution of blame falls almost entirely on the ration dealers, who are frequently reported to turn down beneficiaries with the excuse of having “run out” of food grains or even keeping their village shops closed for many days. A senior official in Trivandrum clarified the problem: “In Kerala there are a lot of bogus cards, which copy existing ones or make up households that do not exist. ... It is the ration dealers that fabricate bogus cards, not the customers, so they can

pretend having sold goods to the BPL, when instead they have sold them elsewhere" (rationing inspector, Trivandrum).

If the problem is depicted as such, the solution is embodied in the integration of biometric recognition in the PDS and is grounded in a link between technology and the nature of diversion. This link is in turn articulated into three mechanisms, all embedded in the functioning of the Aadhaar system.

The first mechanism ensures that users are securely identified because the main means for ration dealers to divert food grains is based on bogus cards, registered in the shops to mask illegal sales to the black market. By linking each card to the owner's data, biometrics will make such identity fraud virtually impossible, since point-of-sale machines require recognition of customers' fingerprints to allow transactions. As reported by a senior member of staff at the Kerala State IT Mission (KSITM), "Ration cards have barcodes. ... Often they are copied, and ration dealers claim false sales as a result. With Aadhaar, there is no risk of this, because control will be biometric."

In parallel, the second mechanism ensures that *all* transactions are led through point-of-sale machines, so that commodities are not diverted to nonentitled users. The monthly bill, summing up all transactions conducted through Aadhaar, is the basis for the subsequent month's allocation and needs to be presented by ration dealers to receive their monthly stock of commodities from the wholesale point. This leaves no room for "inventing" sales, as noted by another senior official at KSITM: "The system will reveal what goods are sold, and to whom. Ration dealers ... claim that stocks have finished and sell them on the market. But now, the system will be able to track exactly who buys what."

A third mechanism aims to reduce the incentive of ration dealers to cheat their customers by pretending to have run out of goods or selling them at higher prices. At present, all households are registered with a ration shop and cannot decide to opt out of it in case of suspected deception by the owner. But Aadhaar-based biometric authentication can be performed anywhere, so that citizens can access the system from any ration shop. As a National Informatics Centre officer said, "Ration dealers will be unable to count on their usual customers, because people will be able to buy [PDS] food from everywhere. ... They [ration dealers] won't be able to compete if they continue their cheating."

The two elements characterizing the logic of technology as a carrier of policy are evident in these narratives. The rationale is to combat leakage in the program by targeting the last mile, represented by transactions in the ration shops. The policy agenda behind this rationale embodies specific assumptions and priorities: it depicts the ration dealers as the guilty party and informs a system that monitors them specifically, as opposed to monitoring the supply chain as a whole.

Technology as a Shaper of Policy

We have seen how policy decisions are embodied in ICT infrastructures, but a holistic perspective on the implications of this for marginalized communities should include a focus on the reverse mechanism, namely the feedback effect of digitalization on the food security policies in which it participates. I observe this at the micro (intrastate) and macro (national) level of operation.

At the micro level, I have described the action of Aadhaar-enabled monitoring of ration dealers. But at least three issues arise in the logic underlying its implementation. First, the technology is predicated on the ration dealers' guilt in terms of diversion; however, recipients often claim that agents *before* ration shops, along the PDS supply chain, are also guilty. In particular, citizens are concerned with a border mafia that subtracts commodities before they even reach the shops, as reported by a PDS user: "A lot of goods are stolen at the border. ... The goods that get to the shop, and are not sold somewhere else, are just a small share. It is easy to say, the ration dealers are causing the system not to work, but we should talk more about goods being stolen during transportation" (Ayesha, PDS user).⁴

These concerns are augmented by the discussion often found in the media of border mafia and diversion happening before the ration shops. Early stage diversion is reported by many ration dealers, who claim to be unable to procure the amount of food grains they need to serve all users: "When I go to the godown [for the monthly collection of food grains], I never get enough rice for all households registered in the shop. So in the first ten days of the month, a lot of people come to the shop. ... After that if there are more people, I may have run out" (Chaitram, ration dealer).

While it is hard to verify these assertions, recent field observation revealed that the back-end modules of the e-PDS are still in an early stage of development, and in several administrative offices, they are not at all

used or known by the staff. Investing in back-end modules would probably be comparatively less popular with citizens, as these modules do not transform the ration shop directly—hence they do not affect people's *direct* access to the system. Still, the current strategy trades visibility for effectiveness, as it focuses on the last mile alone rather than on holistic monitoring of the PDS.

The second issue with Aadhaar implementation is that it doesn't take into account the *root cause* of corruption. Ration dealers' narratives establish a close relation between market diversion and the reasons for it. The main reason they identify is the shift to a targeted PDS: this has put the shops at serious risk of unviability, taking away a large share of their customers and the financial sustainability that was previously assured. As noted, this happened after the system classified most Kerala households as above the poverty line because of relatively low estimates of poverty incidence. Given the low subsidies, these households have massively moved to the private market, leaving ration dealers with a limited customer base, as a ration dealer explained: "We get a commission on the goods we sell, but that is not enough to make a living. If we were allowed to sell other goods, other than just PDS, that would help a lot, but the government has not yet authorized us to do so. This is why many shops close down, and people do not trust us anymore" (Pratap, ration dealer).

The need to resort to market diversion to survive strongly emerges from the narratives of PDS actors, including the Taluk supply officers. The loss of customers that followed the move to a targeted system still conditions ration dealers' activity, and narratives of PDS beneficiaries cluster strongly around this point: leading a ration shop business, and preserving its viability, means indulging in a certain amount of exchange with the private market. This is the only way for many ration dealers to survive the threat of unviability that led to the closure of many ration shops.

Aadhaar controls ration dealers' behavior and detects illegal transactions, or at least it is designed to do so. Yet, its limitations are the core of the matter: as the system is constructed, it does not act on the root cause of the problem, namely the perverse consequences of targeting (Masiero and Prakash 2015). With Aadhaar, the invitation for shop owners to comply with the law will be technologically enforced, but the system does not offer them an alternative such as a credit concession or other means to make a living without resorting to market diversion. In this way, technology comes

across as both partial and mistargeted: partial because it targets only the ration dealers and not the other actors in the supply chain, and mistargeted because it addresses the effect of the problem and not its root cause.

Third, Aadhaar's infrastructure enforces another policy decision, that of defending and sustaining a narrowly targeted PDS. Kerala has indeed opted for a targeted system with narrow criteria for below-poverty-line status and reservation of food subsidies. Advocates of the opposite policy (a universal PDS) remark that the right to food is universal, and that abolishing the duality of prices would also reduce incentives to market diversion (Sen and Himanshu 2011). Nonetheless, two subsequent state governments preferred a targeted PDS, in which the entitlements of the poor would be preserved.

Kerala's choice of narrow targeting emerges in the design of the biometric PDS. In targeted systems, determination of beneficiaries can incur two types of errors: inclusion errors, incorporating nonentitled citizens, and exclusion errors, rejecting genuinely entitled ones. The biometric PDS is designed to prevent the inclusion error, but no mechanism has been put into place for the opposite problem, even though exclusion errors do occur, as explained by a community volunteer: "In Karimadom [Trivandrum's main slum], still a lot of families have pink cards [above poverty line]. People in abject poverty still fail to be recognized as poor. ... Aadhaar will make it worse, because it will add one more layer of exclusion" (Vijaya, community volunteer).

Technology designed for the Kerala PDS focuses on last-mile monitoring and targets the system narrowly to the poor, leading to the feedback effect of technology on policymaking: by putting responsibilities on the shoulders of specific actors, and enforcing a system that tackles the inclusion error as its top priority, Aadhaar's infrastructure directly participates in the development trajectory of the state. It leads to a more selective PDS and shapes monitoring mechanisms in a way that implicitly blames the ration dealers for corruption. At the micro level of everyday access, technology already works as an active shaper rather than a passive carrier of policy decisions.

At the macro level, the policy choices of the central government should be considered. The last economic survey presents an open argument for dismantling the PDS (Government of India 2015), claiming that moving to cash transfers would eliminate distortions and minimize opportunities

for leakage. But beneficiaries, ration dealers, and civic activists interviewed across Kerala present a more complex picture, influenced by the effect that a transition to cash transfers would have on their entitlements: “Aadhaar is not at all inclusive; in fact it excludes the poor ... because it excludes all those that are not registered, and many poorer citizens are among these” (Julian, PDS user); “Aadhaar will make cash transfers mandatory for everyone. This is very difficult for the poor, who may have never used a bank at all” (Swetha, right-to-food activist); “The real problem with Aadhaar ... will be in the long term. Since people can use every ration shop, ration dealers will not know how many customers they have, and so they will not be able to require the right amount [of food grains]. The only way is giving licenses to grocery shops. ... The PDS will disappear, and people will have to use the market” (Rajesh, right-to-food activist).

Exclusion of the poor, lack of protection from inflation, and vulnerable groups’ unfamiliarity with banking systems are the main practical concerns surrounding a potential shift to cash transfers. These need to be added to political understandings of the shift, based on the unwanted involvement of the market in a system that was isolated from it since the beginning. Crucially, political readings of the move to cash transfers have been found recurrently among respondents and are by no means confined to activists and volunteers. As long-term work in the field has revealed, users with a range of political affiliations are concerned about the effects that the demise of the PDS would have on their entitlements.

In September 2013, an order by the Supreme Court of India forbade states from making enrollment in social programs conditional on Aadhaar registration. In March 2016, however, the central government passed the Targeted Delivery of Financial and Other Subsidies, Benefits and Services bill, most commonly known as the Aadhaar bill, providing legal backing to the use of Aadhaar in social welfare schemes. Crucially, the order was passed as a money bill, which allowed it to be enforced without needing approval from the upper house of Parliament, a move that generated vivid criticism from the public.⁵ Legitimizing Aadhaar-enabled schemes, the bill paves the way for the transition to cash transfers, which is supposed to mark the beginning of an effective anti-poverty system, hence “wiping every tear from every eye” (Government of India 2015, 52).

Such a rosy picture, however, is problematized by ground reports from states that have already adopted Aadhaar-based recognition of PDS users.

In Rajasthan, where Aadhaar has been extended to all ration shops, civic unrest recently culminated in a group of construction workers smashing a biometric machine, having lost their food entitlements after Aadhaar identification was made mandatory for PDS (Yadav 2016). Reports of malfunctioning machines pervade the states that have adopted the system (Bhatti, Drèze, and Khera 2016), turning a technical problem into a political one: the very same machines that should empower recipients end up disempowering them, denying access to the entitlements that the technology should guarantee. The short-term issues implied by the advent of digitality coexist, in the long run, with fixations on transition to a market-led system of direct benefits.

Surveys of citizens, conducted across India, generally reveal strong preference for the current PDS over a hypothetical move to cash transfers (Aggarwal 2011; Khera 2014; Puri 2012). What is striking in Kerala is that with the adoption of biometric technologies, the state government is building infrastructures to reduce leakage, hence attempting to improve the program without disrupting it. This entails a strong position taken by the state government: technology can be used to *protect* the system, rather than to dismantle it in favor of cash transfers, as the central government would recommend.

Conclusion

Aadhaar's inclusion in the Indian PDS enables exploration of the diverse feedback effects that digital infrastructures yield on anti-poverty policies. At the micro level, technology shapes the functioning of the PDS: closely monitoring ration dealers and enforcing a targeted system. At the macro level, ICT infrastructures sustain the decisions of policymakers on the program, tailoring it toward cash transfers on a national scale. Aadhaar's infrastructure hence envisages a new direction for social policy, which can be partially renegotiated at the state level, as the government of Kerala is doing to reinforce existing anti-poverty mechanisms.

Drawing on the data collected, the broader argument I make here is twofold. First, the role of technology goes beyond that of simply "carrying" policy as digitalization reshapes the anti-poverty system in ways that affect existing development trajectories. This is important when considering digital economies at the global margins as it reveals that ICT infrastructures

may have long-term effects on the governance of social safety nets and their beneficiaries.

Second, digitality has ambiguous consequences on users' entitlements under anti-poverty schemes. This problematizes a techno-rational logic, which uniformly advocates the benefits of digitalization. As observed here, transition to digitality may result in exclusionary outcomes, which further marginalize the poor and vulnerable instead of leading to empowerment, such as how the Rajasthani construction workers were marginalized. Aadhaar is used to combat the erroneous inclusion of beneficiaries without tackling exclusion and to support a program of cash transfers conditional on biometric registration. The effects of digitalization should thus be monitored in ways that problematize the implications of intervention and minimize the risk of illicit exclusion.

Walsham's invitation to contribute to "making a better world" with ICTs implies a focus on how development theories inform practice on a global scale (Walsham 2012). If technology adoption yields effects on policymaking, it is crucial to manage the governance of development accordingly. For social safety schemes, this means achieving open integration between ICTs and policy design: the Indian government has devised the JAM trinity as an integral part of its social policy, rather than as a self-standing technological intervention. As integration is achieved, a focus on guaranteeing access to benefits is a prerequisite for the effectiveness of ICT-enabled social safety schemes.

At present, digital technologies are being adopted in anti-poverty programs around the world. These technologies are fundamental in reconstructing development policies and play a major role in adapting them to the needs of beneficiaries within social welfare schemes. In doing so, however, digitalization runs the risk of resulting in the perverse effects of exclusion and disempowerment. It is important that designers be mindful of these effects, and protect the entitlements on which the livelihoods of marginalized communities are predicated.

Notes

1. The notion of digitalization is used here as "a sociotechnical process of applying digitizing techniques to broader social and institutional contexts that render digital technologies infrastructural" (Tilson, Lyytinen, and Sorensen 2010, 749).

2. Per Reetika Khera's estimates, statewide purchases of food grains from the PDS dropped from 4.64 tons in 1997 to 1.71 in 2001, largely because many above-poverty-line households abandoned the system (Khera 2011).
3. According to the World Bank's Global Findex database, currently 53 percent of Indians have a bank account, but the share drops to roughly 30 percent in rural areas (Tiwari 2016).
4. The term *border mafia* refers to diversion that occurs at the border between two states, when commodities are redistributed across the country. In Kerala, a border mafia is widely reported to divert goods as they pass the borders with Tamil Nadu and Karnataka.
5. As noted by Tiwari (2016), the ruling party of India (Bharatiya Janata Party, BJP) holds the majority of seats in the lower house of Parliament (Lok Sabha), but not in the upper house (Rajya Sabha), which was bypassed by framing the order as a money bill.

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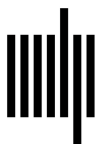
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