

**The long road to transformation of agricultural markets in India:
Lessons from Karnataka**

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Abstract

This paper examines Karnataka's pioneering agricultural output marketing reforms with the twin goals of assessing the state and challenges of implementation and to glean lessons from Karnataka's experience for India's e-National Agricultural Market (e-NAM). Through a field study of ten mandis across the state, we find that while Karnataka has been consistently pushing through with reforms, in the context of deeply entrenched relationships between farmers, traders and commission agents, the challenges of deeper reforms are significant. We argue that Karnataka's experience suggests that agricultural market reform in India rests on three pillars - institutions that establish the rules of the game, incentives for agents to participate actively in the market and infrastructure to support the modernised trading platform. Unless reforms address all these three issues simultaneously, they are unlikely to succeed.

Keywords: eNAM, Karnataka Model, Mandi reforms, APMC

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1 Background

In the recent Union Budget of 2016-17, when the Government announced the implementation of an e-National Agriculture Market (e-NAM) to integrate 585 regulated markets across the nation through a single electronic platform, the initiative was widely hailed as a move whose time had long come, a “game changer” and a “harbinger of change”.¹ At the same time, experts were quick to draw attention to the multiple challenges of agricultural output market reform, cautioning that several necessary conditions to enable a national integrated market were as yet absent.²

To understand the significance of e-NAM, it is useful to set it in a historical context. Ever since Independence in 1947, transactions in farm commodities have been heavily regulated, notably through the Essential Commodities Act (ECA), 1955, and the Agricultural Produce Marketing Committee Act (APMC Act). The ECA imposes restrictions on storage and movement of certain “essential” commodities by private parties, mainly to protect consumers. The APMC Act, on the other hand, mandates that purchases of certain agricultural commodities occur through government-regulated markets (mandis) with the payment of designated commissions and marketing fees. The original intent of the APMC Act was to protect farmers’ interests. However, over the years, the Act turned out to be counterproductive, as the lack of supportive institutional mechanisms and infrastructural facilities left farmers dependent on middlemen for critical services such as finance, information, sale of commodity etc (Acharya, 2004). This dependency sometimes turned exploitative. Several observers maintain that the APMC Act and the ECA have probably overextended their reach and have moved the balance of the market in favour of traders and middlemen (Gulati, 2012).

It was in this context that the Model Agricultural Produce Marketing Committee (APMC) Act, 2003, was formulated. The Model Act sought to remove some of the limitations of the old APMC Act by opening up the markets to private sector and cooperatives and by allowing direct farm sales and contract farming. The Act also envisaged use of technological infrastructure for marketing and online trading of agricultural produce. The objective was to bring transparency, efficiency and to provide freedom to farmers to sell their produce to the agent of their choice - whether a contract-sponsor, a public or a private mandi. However, even after twelve years of its formulation, the extent of adoption

¹*National Agricultural Market: A Harbinger of Change*, Press Information Bureau, URL: <http://pib.nic.in/newsite/mbErel.aspx?relid=126115>, accessed July 30, 2016.

²*eNAM may become a game changer for agriculture, but states need to deliver*, Business Standard, April 15 2016.

of the Model Act by states remains variable at best (Purohit, 2016; Chand, 2016).

While several states have reportedly adopted key areas of reforms, in reality, most of the states have diluted the Model Act provisions and have only partly implemented them (Chand, 2016). Bihar, on the other hand, went so far as to abolish the APMC Act entirely, in 2006, spawning makeshift marketplaces across the state devoid of any infrastructure (Singh, 15 Feb, 2015, 08 Feb, 2015).

Despite the laudable goals of the Model Act 2003, its focus was nevertheless only on state level reforms. The Act also fell short of providing for a unified market, even within a state. Consequently, despite several reform initiatives undertaken in the past decade, agricultural marketing in India continued to suffer from severe deficiencies.³ These are manifest in high transaction costs and a wide disconnect between the prices received by producers and the prices paid by consumers (Government of India, 2013; Mookherjee, 17 Jan, 2016).

The e-NAM comes in this context as a renewed attempt to redress these persistent issues. Discussions on a national unified market date back to the mid-term appraisal for the 11th Five Year Plan, which expressed a need to bring down the barriers in agricultural markets across states. In the 12th Five Year Plan, a task group explicitly articulated the need to have a National Agricultural Market (NAM). Following successive Budget announcements of 2014 and 2015, the Department of Agriculture and Cooperation formulated the Central Sector scheme for Promotion of National Agriculture Market (NAM) through Agri-Tech Infrastructure Fund (ATIF).⁴ The Union Budget 2016-17 announcement to establish such a platform therefore marks the culmination of years of discussion and represents a significant first step towards implementing this idea (Government of India, 2015).

This paper aims to contribute to discussions on this new policy initiative by focussing on a case study of Karnataka. Karnataka has pioneered deep reforms of its mandis and offers a prototype for e-NAM. Indeed, the Economic Survey 2014-15, in its discussion of e-NAM, accords a prominent position to what is now known as the “Karnataka Model” (Government of India, 2015). In its form and scale, Karnataka’s efforts are unprecedented among Indian states and learnings from Karnataka’s experience offer compelling inputs

³These stem from poor infrastructure in mandis, non-transparent price discovery process, poor price dissemination mechanisms, fragmented marketing channels, restrictive regulations and non-transparent levies and charges on the sale of farm produce, that could be as high as 12.5%, in the Punjab for instance (Government of India, 2013).

⁴*National Agricultural Market: A Harbinger of Change*, Press Information Bureau, URL: <http://pib.nic.in/newsite/mbErel.aspx?relid=126115>, accessed July 30, 2016

for ongoing attempts to implement e-NAM. This paper has twin goals. The first is to document and assess the current state of implementation of agricultural output market reform in Karnataka. We do this using qualitative material obtained through interviews with stakeholders and detailed observations from field visits to ten mandis across the state during 2015-2016. A second goal is to use insights from Karnataka's experience to comment on the efforts to build e-NAM.

The paper is organised into four sections. Section 2 provides a brief discussion of recent policy initiatives by the Karnataka government that established the "Karnataka Model". Section 3 is devoted to an assessment of implementation status of these reforms and to a detailed discussion of stakeholder perspectives on the reforms, based on field visits. Section 3 also provides a critical perspective of Karnataka's experience outlining areas of success and highlighting the challenges of market reform. Section 4 concludes the paper with a discussion of lessons from Karnataka's experience for e-NAM.

2 The Karnataka Model

2.1 The road to reform

Karnataka has been a forerunner among states in reforming agricultural output markets. Its efforts can be understood as belonging to two phases. The first phase (2006-11) was focussed on amending the APMC Act based on the Model Act 2003 and on establishing an electronic platform to support trading. The second phase (since 2011) represents a more holistic approach that combines more substantive legal-institutional reform with automation and unification - the Karnataka Model, as we know it today.

As early as in 2007, the Karnataka Agricultural Produce Marketing (Regulation and Development) Act, 1966 was amended to allow direct purchase centres, establishment of private markets, farmers' markets, contract farming, establishment of spot exchange. However, despite these legal amendments, which were expected to encourage competition and make agricultural marketing efficient, these initiatives did not lead to meaningful changes in agricultural marketing processes.⁵ The need to build enabling infrastructure that can incentivise private participation, promote competition and efficiency in the sale

⁵See: *Karnataka Agricultural Marketing Policy*, Department of Cooperation, Government of Karnataka, 2013. URL: <http://krishimaratavahini.kar.nic.in/Downloads/ENGLISH%20KARNATAKA%20AGRICULTURAL%20MARKETING%20POLICY%202013.pdf>

of agricultural produce was thus felt.

In 2006-07, the state government launched an e-tender pilot program in Mysore for paddy (Chengappa *et al.*, 2012). It was later extended to Davangere APMC and Raichur APMC in 2008⁶ and to another 16 APMCs in 2008-09 and 24 APMCs in 2009-10 (Shalendra, 2013).⁷ The software was developed by the National Informatics Center (NIC), Bangalore, and the implementation was carried out by Keonics, a state government organisation.⁸ This set of initiatives - Phase 1 reforms - was centered largely around the Model Act and automation of agricultural transactions. The implementation was left to local mandi authorities, which resulted in varying pace of reforms across mandis. The software limited itself to existing practices in the markets and new possibilities, like credit of sale proceeds to the farmer's bank account directly were not envisaged. Mandis worked off different IT systems and platforms, that raised the costs of maintenance and made integration of markets difficult.

The ingredients of what we now know as the Karnataka Model came later. The cornerstone of this second phase of reforms was the Karnataka Agricultural Marketing Policy (2013) that laid out the various components of reform and was accompanied by a new legal framework through an amendment of the APMC Rules. This was accompanied by a crucial institutional innovation in the form a Special Purpose Vehicle - the Rashtriya e-Market Services Private Limited (ReMS) that was established in 2014 as a joint venture between the Government of Karnataka and the NCDEX e-Markets Limited. The establishment of the ReMS represents a significant departure from the past. In its routine functioning, the ReMS is an implementing agency that works somewhat autonomously of the state machinery, even while being organically linked to it. It sought to combine "the decision making of the private sector and accountability of government".⁹ Further, the ReMS is guaranteed financial sustainability by design, with 0.2% of the total value of all mandi transactions accruing to the ReMS.

A notable feature of this second phase was the move to go beyond automation of individual mandis towards unification of markets. This entailed the design of a unified electronic platform, that would replace islands of automated markets that resulted from the early attempts at modernization. Consequently, the NIC based system was replaced by a more

⁶<http://krishimaratavahini.kar.nic.in/Kannada/Centre.pdf>

⁷Karnataka has a total of 509 regulated mandis (Government of Karnataka, 2013).

⁸See: *Electronic Tender System for Sale in APMCs in Karnataka*, Rashtriya Krishi Vikas Yojana, http://rkvy.nic.in/static/download/RKVY_Sucess_Story/Karnataka/Electronic_Tender_System_for_Sale_in_APMC.pdf

⁹The Managing Director of ReMS is from the Department of Marketing and Cooperation

advanced software developed by NCDEX. The testing ground for such a platform was established even earlier in December 2011 in Kalaburgi, through a Memorandum of Understanding with the Government of Karnataka. This was later extended to ten markets by November 2012 and to 23 by April 2013. The new software had provisions such as goods in, goods out, inventory updation, e-tendering, invoice generation and settlement. Unlike the earlier system where the trading platform could be accessed only locally and was maintained locally, servicing individual markets, the NCDEX based system operated via a centralised server in Mumbai.

Whereas with mere automation, a trader registered in one mandi could still not bid in another mandi, the introduction of a unified market platform (UMP) in 2013 allowed a single unified market licence system. With licences, now issued by ReMS for a modest fee, a trader, registered with a mandi in Karnataka, could now bid in any mandi across Karnataka. A farmer therefore would now be able sell to a distant buyer without having to choose or travel to a different market ¹⁰ Within the first year of its implementation, 55 APMCs out of a total of 155 mandis within Karnataka were linked to the unified online trading platform.

In order to support the unified platform, ReMS has been preparing to provide services such as assaying, market fee collection, online payment to farmers, and facilitation of warehouse-based sales. Assaying is at present voluntary and a farmer can opt to get his commodity assayed and its assayed parameters are displayed on the unified platform.¹¹ These details enable a trader to place his bid for an assayed lot without being physically present in the mandi to examine the produce. ReMS also plans to introduce online payment, under which a trader will pay for the sale into the mandi bank account; the mandi officials credit the money to the farmer's account, after deducting the relevant charges and the commission of the agent, channelling the latter to the commission agent. Such a system is expected to bring more transparency in the way a farmer gets paid for produce.

2.2 The Karnataka agricultural marketing ecosystem

Agricultural transactions in Karnataka, as elsewhere in India, have historically been carried out by one of three mechanisms: *open auction, closed tender and mutual agreement*.

¹⁰In principle, farmers, commission agents and traders can become registered members of the unified markets, although one expects only traders to work across mandis.

¹¹In this paper, we use the masculine as a generic pronoun.

In an *open auction*, traders (prospective buyers) gather at the shop of each commission agent¹² and after inspecting the quality of produce, announce their bid. The highest bidder gets the produce. The auctioning progresses lot by lot. In a *closed tender* mechanism, all bidders (after inspecting the quality) write in their bids on slips during the permitted window during the day for tendering. Under this mechanism, bids are not disclosed publicly and are submitted to the mandi officials. The highest bidder is identified manually after inspecting all the bids for each lot of the commodity. Once the winner is declared, the trader collects the commodity from the commission agent's shop and settles the trade. Under *mutual negotiation*, the price is mutually decided between the farmer and the trader/agent and only reported to the mandi office.

Open auction is typically preferred for perishable commodities or when arrivals of a commodity to a mandi are low. For commodities that have high arrivals, mandis typically use the closed tender mechanism. Mutual agreement is preferred when a farmer has to sell a commodity in bulk (for e.g., paddy, maize) and, often, for processing. In such cases, both traders and farmers avoid transportation costs to the mandi and transport it directly. Most of the mandis in Karnataka however used the closed tender system.

With modernisation,¹³ these systems have been streamlined to allow automation of some processes. Figure 1 describes the process flow at market yard after automation, under the closed tender, now called e-tender mechanism – the dominant mode of transacting. Under this system, when a farmer brings his produce to the mandi, his name, address, commodity name, number of bags, approximate weight, name of the commission agent to whom the farmer wants to take his produce are recorded. After this, a gate pass is issued in which a system-generated lot number is given. This lot number is used as the reference number for transactions in the commodity. Post gate entry, the farmer takes his commodity to a commission agent of his choice. Simultaneously, the inventory of the commission agent is updated to reflect the arrival. At the commission agent's shop, the trader inspects the quality of the commodity, and places his bid using the kiosks, i.e., computer systems placed in the market yard or through his own computer at his shop.¹⁴ Any trader can modify his bid only upwards before the closing time of e-tender and cannot withdraw a bid.

¹²Farmers typically bring their produce for sale to the mandi and takes it to a commission agent (or cooperative), who facilitates the sale of the commodity.

¹³By modernisation, we mean adoption of electronic trading system, unified license to all participants and provision of assaying facilities.

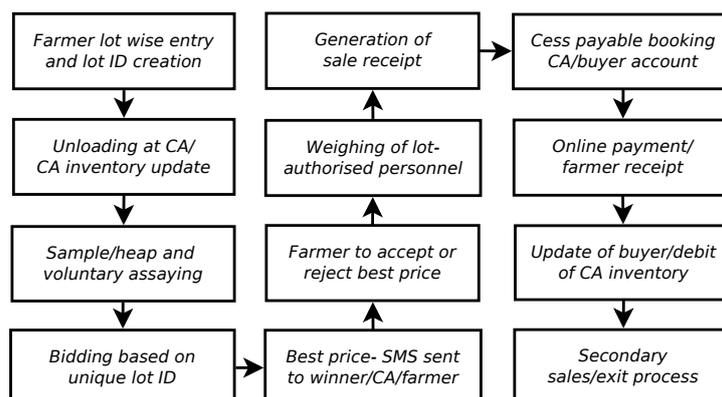
¹⁴Since the mechanism is connected via the (*local*) internet, anyone can place his / her bid from anywhere within the mandi premises.

When the bidding time window closes, lot-wise winning bids are declared electronically. This information is disseminated to all participants via SMS, loudspeaker announcements, print-outs and is displayed on the notice boards and screens at the mandi office.¹⁵

Once the farmer learns the winning bid price of his lot, he can choose to sell his commodity at that price or reject it. If he accepts the bid, the commodity is weighed and a primary sale bill is generated.¹⁶ The buyer is then required to transfer the payment to the agent and pay the market fee to the APMC. The buyer is also obligated to pay a fee to the commission agent for facilitating the trade. The commission agent pays the farmer. Finally, the inventory of the buyer is updated and that of the commission agent's is debited. An e-permit / gate pass is generated to let the commodity out of the mandi.

Figure 1 Flowchart under the e-trading system

The flowchart presents various stages of online process of trade in APMC mandis under the *e-trading* system.



3 Perspectives from the field

In this section, we assess the extent to which the reforms described above are in place in selected mandis and take stock of the successes and challenges in their implementation. We also examine stakeholder perceptions of different elements of the reform in these mandis.

¹⁵An e-auction is similar, except that it involves traders entering bids for each lot and quality parameter, for the duration of the bidding window. A display screen updates the most recent bids and each trader can see privately his own bid as well.

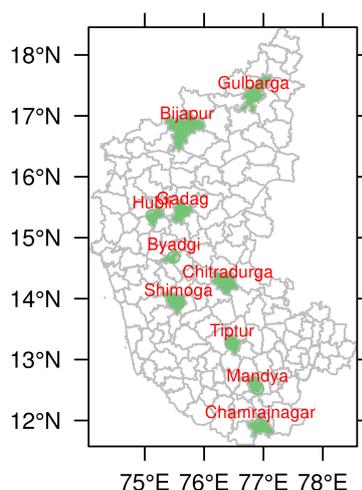
¹⁶In case of a reject, the lot is entered as a tradable lot on the next day.

3.1 The survey

The qualitative data we use come from visits to ten mandis spread across different districts of Karnataka (Figure 2).

Figure 2 Mandis covered in the qualitative survey

The shaded region in the map shows the ten mandis we covered in the qualitative survey in Karnataka. The visits were undertaken between December 2015 to February 2016.



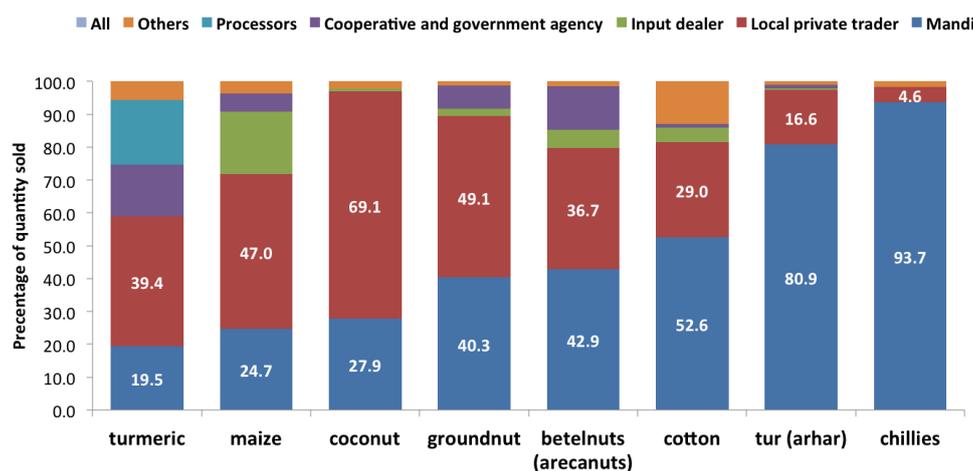
We selected these mandis purposively based on many factors including their location, degree of modernisation and the types of crop traded. The visits were undertaken in December 2015 (2 mandis), January 2016 (3 mandis), and February 2016 (5 mandis), when market arrivals were still substantially large. The focal commodities include turmeric, maize, copra, groundnut, arecanut, cotton, tur and chillies; these have diverse uses (as food and cash crops), are processed on farm to varying degrees and there are differences relating to which marketing channels dominate transactions - some being traded primarily in the mandi and others having strong links with processors and/or agents connected with processors. Figure 3 shows the contribution of different marketing channels in Karnataka for these focal commodities. The ones that have highest dependence for marketing of agricultural produce via the regulated mandis are: chillies, tur and cotton. For all other commodities, the percentage of commodity sold via the mandi channel is fairly limited. The mandis we visited traded in other commodities as well. Table 1 provides details of the selected mandis and the major notified commodities traded in the sample mandis.

Together, these mandis accounted for 23% of the total fee collected across all mandis in Karnataka in year 2011-12 (Government of Karnataka, 2013).

As part of each visit, we interviewed traders, commission agents, farmers as well as mandi officials. The commission agents that we interviewed were of three types: commission agents whose sole activity was to mediate transactions between trader and farmer, commission agents who combined trading activities and commission agents who were also farmers.¹⁷ We conducted interviews with farmers at the mandi but also visited nearby villages to meet farmers who used or did not routinely use the mandi for transacting, to get a comprehensive picture of farmers' preferences for marketing channels. Our semi-structured interviews focussed on the process of a typical transaction in the old system and the new and the elements of modernisation that worked well for the respondents and those that did not. In each mandi, we interviewed the mandi secretary and a few other officials including committee members, computer operators, assayers and tendering officers. Our conversations with the officials included discussions on the challenges in implementing these reforms as frontline workers. In all, we interviewed approximately 27 farmers, 28 commission agent/traders and 16 mandi officials apart from less structured conversations with several others.

Figure 3 Contribution of different marketing channels in Karnataka

The graph presents the percentage distribution of quantity sold by various agencies for selected crops in Karnataka based on the July - December 2012 data from the 70th round of the National Statistical Survey.



¹⁷The last category was particularly true of the APMC mandi in Mandya

Table 1 Commodities traded in surveyed mandis

The table below indicates the major notified commodities in surveyed mandis. The last column of the table shows the contribution of each surveyed mandi to the total mandi-fee collected in Karnataka in 2011-12.

Mandi	Major notified commodities	E-tender commodities	Mandi fee collected (%)
Kalaburgi	Tur, Green Gram, Bengal Gram	Tur	3.76
Vijayapura	Cotton, Maize Bengal Gram	Cotton	1.71
Gadag	Green Gram, Cotton Groundnut	Groundnut, Green Gram	1.63
Hubli	Jowar, Dry Chilly, Bengal Gram	Dry Chilly	2.00
Byadgi	Dry Chilly	Dry Chilly	1.65
Chitradurga	Arecanut, Groundnut, Maize		1.97
Shimoga	Cotton, Dry Chilly, Maize, Arecanut	Arecanut	4.21
Tiptur	Copra	Copra	2.43
Mandya	Jaggery	-	1.39
Chamrajnagar	Turmeric	Turmeric	1.97

3.2 Implementation status

We analyse implementation status in the sample mandis in terms of the degree of *modernisation*, i.e., automation and unification, achieved under the new platform within four major categories:

E-entry : Whether the records of agriculture produce that enters the mandi are entered electronically at the gate.

E-tender/e-auction : Whether trading occurs through the online platform. The trade can happen either through an electronic tender or an electronic auction.

E-permit : The commodities traded during a particular trade day require a permit from APMC to leave the market yard. This permit is generated electronically.

Information dissemination : The declaration of the winning bid which can happen through distribution of printed slips, via SMS, and displayed on screens in the market yard, or through announcements using microphones.

We also examined assaying facilities in the mandis. Other initiatives such as online

payment, warehouse-based sales were not implemented in the sample mandis at the time of our visit, though pilots had taken place. Table 2 summarises our observations.

Commodity arrivals are recorded at the gate of market yard only in two mandis i.e. Shimoga and Tiptur. In the other mandis, the *e-entry* process was either not implemented or abandoned due to various factors. Most of the mandi officials said that gate entry is very time consuming and “farmers do not wait for that long”. This was especially true during periods of high arrivals. In mandis like Chitradurga, officials mentioned that since the mandi is situated at NH4, e-entry had stalled traffic on NH4. Hence, the farmer takes his produce directly to the commission agent of his choice, and the lot number is generated when the commission agent has communicated the arrivals to the mandi.

It turns out that not all commodities across all mandis are *e-tendered* (Table 1). The decision of whether a commodity should be traded on an e-platform is based, apparently, on total arrivals of the commodity in the mandi. For example, the APMC mandi in Gadag has an electronic platform for trade in pulses and groundnut. However, dry chilly is auctioned manually. Amongst the mandis that we visited, there was at least one commodity in each mandi that was e-tendered on at least one of the weekdays. This was true of all mandis except Mandya. The Mandya APMC mandi deals primarily in jaggery and is auctioned manually. A brief trial of e-auction was discontinued because traders opposed it (discussed later). We also observed that electronic trading in a commodity was conducted on selected days of the week. On the remaining days, the commodity is tendered manually.

The *e-permit* system that electronically generates exit passes to allow a traded commodity to leave the market yard, has been implemented in all the mandis. These e-permits serve as proof of taxes paid as the commodities are transported across state.

Information dissemination is done through different methods. Printed slips are distributed among market participants in Hubballi and Gadag. SMS facility is available to registered market participants in Chamrajnagar, Tiptur, and Kalaburgi. Tiptur and Chamrajnagar even use the electronic screens in the market yard for this purpose. The results of e-tender are declared on microphones in Hubballi, Gadag, Byadgi, and Tiptur. Information dissemination of winning bids was mainly via distribution of printed slips, apart from microphones and loudspeakers in some mandis. Display screens at the APMC office were seldom used. In Hubballi, an APMC official said that traders and commission agents did not prefer SMS since it was difficult to collate all information into one, whereas in Shimoga, for example, it seemed that most farmers, agents and traders were

comfortable and accustomed to receiving information on the SMS.

In order to facilitate online bidding from any place, *assaying* facilities are required. Among the mandis covered in this study, Vijayapura, Gadag, Hubballi, Shimoga and Chamrajnagar had assaying instruments for a few commodities. However, only a few farmers opt to have their lots assayed. A pilot experiment for compulsory assaying was conducted at Kalaburgi in 2015. While mandi officials claimed that it was a successful experiment and that both traders and farmers were happy with it, commission agents and traders deemed the experiment a failure and mentioned that they were not even given the final results of assaying.

Overall, even though e-trading was in place at least for the major commodities, other elements of the modernisation process were either not implemented or were abandoned due to various reasons. In a few mandis, officials identified internet connectivity, server load issues, power cuts and hardware requirements as key constraints. At Byadgi, for example, poor internet connectivity sometimes disrupted trading; one mandi official lamented that he has had to apologise to furious traders and felt quite helpless. In many mandis, officials claimed that the staff were not adequate. One former mandi committee member in Chitradurga pointed out that while the benefits of automation were many, the expenditure and costs for the mandi in the new system were also high - staffing salaries, computers, their operators, and so on.

Table 2 Degree of modernisation in surveyed mandis

The table summarises the degree of *modernisation* in the selected mandis in terms of four parameters: e-entry, e-tender, e-permit, and information dissemination. The information is disseminated in the market through screens, SMS facility, printed slips, and microphones.

Mandi	Area of modernisation			
	E-entry	E-tender	E-permit	Information dissemination
Kalaburgi	×	✓	✓	✓
Vijayapura	×	✓	✓	×
Gadag	×	✓	✓	✓
Hubballi	×	✓	✓	✓
Byadgi	×	✓	✓	✓
Chitradurga	×	✓	✓	×
Shimoga	✓	✓	✓	×
Tiptur	✓	✓	✓	✓
Mandya	×	×	✓	×
Chamrajnagar	×	✓	✓	✓

3.3 Success and challenges in Karnataka's reform efforts

Given the variable intensity of implementation, it is useful to examine critically where the reforms have, in the eyes of the stakeholders, begun to yield benefits and where there have been significant challenges.

3.3.1 *Automation and Unification*

Perhaps the greatest achievement yet of the reforms are the benefits derived from automation. The manual closed tender system, even though designed to provide remunerative prices to farmers, was time consuming and prone to collusion, manipulation and mistakes. Often, the prices in the tender slip were changed later; sometimes there were errors in identifying the winning bid manually. During peak season, when arrivals were high, especially in large markets like Byadgi and Chitradurga, declaration of winning bid occurred at 8 or 9 p.m. in the night or even later. Farmers, thus, had to stay at the mandi for the night or leave with cash well after dark with the fear of getting robbed.

With the new automated system, there is agreement across stakeholders that it is fast and convenient, with winning bids declared within few seconds once the tender is closed. Farmers are able to return to their villages by 5 or 6 p.m. Farmers concurred that the risk of getting robbed has reduced. This savings in transactions costs is perhaps especially beneficial for small farmers who trade in small quantities, but still have to incur a huge cost in terms of time and effort to sell at the mandi. A second widely cited benefit is the fewer errors and mistakes in declaration of the winning bid through the automated system, which has reduced the scope for disputes. Some also reported that with the automated bids, the scope for manipulating the bid price, ex-post, was now severely restricted.

In contrast to these tangible benefits in the form of savings in transactions costs, it is apparent that the more significant benefits of automation and unification have not materialized so far. The ultimate goal of these reforms is to ensure transparent price discovery and to reduce the collusive power of commission agents and traders, partly by bringing in new players and partly by the transparency that automation would bring.

The market expansionary effects of unification, in terms of new players are as yet absent. For example, officials in most of the mandis said that they were not receiving any bids from outside at present, although several traders were eligible to bid across mandis. At the APMC mandi in Byadgi, commission agents pointed out that even in the older

system, traders bid from outside using the license of traders registered in the Byadgi mandi and paid a small charge to local registered traders for its use. That practice seemed to continue.

3.3.2 *Assaying Facilities*

A key factor deterring cross-mandi bidding is quality assessment. On the one hand, it seems traders would much rather rely on commission agents to assess the quality of produce than on assaying. Further, officials in several mandis mentioned that although voluntary assaying is available, traders typically prefer visual inspection and trusted commission agents to do this. Traders echoed this reluctance to move away from current practice saying “it is virtually impossible if you do not have someone physically present at the mandi”. Without a credible assaying mechanism, traders were therefore unlikely to bid on the electronic platform in distant mandis.

Where facilities did exist, they seemed inadequate for the task at hand. At present, progress with building up assaying facilities is at a nascent stage, and neither the farmers nor the traders seemed to have confidence in these facilities. Farmers in Chamarajanagar, for instance, believed that tests for the curcumin content of turmeric were not accurate. Many traders expressed skepticism as to whether scientific assaying can capture all relevant parameters. For example, traders in jaggery in Mandya mentioned that there were 20 grades of jaggery, based on colour, translucence and shine and asked, “how is it possible to have a parameter that captures the colour of jaggery, a crucial parameter judged through visual inspection?”

Moreover, the demands on assaying facilities during periods of high arrivals are overwhelming. At Gadag, it took ten minutes to obtain results of assaying groundnut. Tests for curcumin in turmeric takes half an hour and moisture content could take hours. It is not hard to imagine the scale of assaying infrastructure and personnel required to cope with the volumes traded in the larger mandis. In some mandis, officials asserted that there is neither enough space nor personnel to get all the produce assayed.

3.3.3 *Market competitiveness and collusion*

With assaying remaining a key constraint for bidding across mandis, the consequences of the latter are that the new system is rendered just as vulnerable to collusion. For example, in Mandya, the e-auction pilot for jaggery was abandoned after only a few days. The

more prosperous farmers-turned-sugarcane crushers pointed out that though they favored e-auction, commission agents/traders colluded to reduce the prices during the pilot. In the copra market at Tiptur, despite the competitive anonymised bidding platform, all traders and commission agents explained that each day, before bidding starts, traders/agents get together to agree on a bid price. By all accounts, it seemed that the price for copra in Tiptur was virtually entirely determined by just one big octogenarian trader. All traders place their bid around his.

Further, while the electronic platform works, in reality, a majority of the transactions now occur on non-e-trading days. We were told that bids are placed on the electronic platform only for a few lots and the rest of the lots are traded in the traditional manner on the next day, using the previous day's bid as the guiding price and adjusting for quality. In the case of copra, all varieties were mixed by the commission agents cum traders and bids are for this mixed quality, undermining the idea that better quality ought to fetch higher prices. Such practices would continue in the new platform as long as the markets do not attract new players from outside that in turn hinges on adequate assaying facilities.

In short, none of our interviewees felt that there was any increase in the arrivals after the introduction of new system. Nor did they feel that the increase in prices seen in the recent period was due to the new system. Most felt that it was because of drought/ poor rainfall in the region and crop diseases. It is possible that these benefits are visible only over a long term and after the many challenges that exist in current implementation are successfully overcome.

3.3.4 *Online Payments*

The most controversial reform in the current set of measures is the introduction of online payments or an *e-payment* system under which payments of sale proceeds would be transferred directly to farmers' bank accounts with ReMS acting as the clearing house in the settlement of trades. The rationale is to bring in more transparency in the way a farmer gets paid for his produce. Official accounts suggest that it was tried in Hubballi, Gadag and Tiptur and is at a nascent stage in all the ten mandis. We found that all mandis have initiated the process of registering farmers' bank details. Some like Shimoga are much ahead of the others in this process, with 38000 of the 40000 farmers in the catchment area already registered.

A pilot experiment on bank payments was conducted in the Gadag APMC mandi in May

2015. It was a voluntary facility where the trader could opt for a direct payment. It seems that for 2-3 lots everyday, farmers were paid directly through his bank account. However, mandi officials said that the implementation quickly ran into rough weather due to the problems faced (discussed in the next section) by both farmers and traders.

3.4 Stakeholder perspectives

We now discuss the experience of different stakeholders through these years of incremental reform.

3.4.1 *Farmers*

Farmers, who are ultimately the intended beneficiaries of the system, had diverse views and responded to different elements of the reform differently. Many farmers who came to the mandi were aware that a new system has been implemented but were quite unaware of its operational details, although many confirmed that the introduction of e-tendering saved time. A few farmers acknowledged that in the new system, they were happy with the electronic weighing machines. They claimed that weightment was suspect earlier, but with the new machines, it was reliable and transparent.

However, most farmers continued to rely on the commission agent for price information and trades and only a few were involved directly in the e-tendering process.

Farmers did not seem to be enthusiastic about getting their lots assayed before sale. Those farmers who agreed that better quality produce fetched better prices did not think that the benefits of grading were worth the costs involved. For tur for example, farmers felt it was simpler to have the agent deduct 2 kgs from each bag using a thumb rule.¹⁸ Some farmers feared the opposite, that with assaying, they would get a lower price on account of quality issues. In Mandya, some of the poorer farmers or crushers mentioned that during the e-auction trial, no prices were quoted for low quality produce, unlike in the manual auction.

Penalties for poor quality were relatively less when visual inspection is used, they felt. It did not seem that the premium associated with quality was an incentive for farmers either to sort or clean their lots or to opt for assaying. In some mandis, assayers complained that farmers were reluctant to part with samples - one bag per lot - for assaying.

¹⁸1 kg deducted for the weight of the gunny bag and 1 kg for the moisture, impurities, etc.

Nor were farmers uniformly enthusiastic about direct payments into their accounts. In general, it seemed that bank payments were welcomed by farmers, who typically sold through co-operatives (such as for arecanut in Shimoga). Across mandis, while some conceded that they would prefer this mode of payment, others indicated that going to a bank is a cumbersome process. As opposed to immediate cash payments, these online payments through banks takes between 24-48 hours. Besides, the penetration of banking services in most rural areas is still low and accessing banks made large demands on a farmer's time. Some also mentioned that bank officials do not treat them well and they therefore prefer payment by commission agents. Commission agents "treat us like partners", said one farmer in Vijayapura. Others worried that payments into the bank account would automatically serve to extinguish their loans and would be unavailable to them as cash.

Most of all, however, it seemed that the farmers' deeply entrenched relationship with the commission agent allowed them access to credit and it was logical that they sold back to the agent (and therefore to traders of the agent's choice) to service their debts. In the case of jaggery in Mandya, farmers who sold to traders directly outside the mandi continued doing so and said that they prefer direct sales since it saves them transportation costs and time. In the case of turmeric, farmers in Chamarajanagar received advances from distant traders in Erode who then collected the produce from the farm after harvest, that too at prices broadly comparable to that in the mandi. Here, mandi modernization and unification seemed to offer little incentive to alter their practice. Why, after all, would they go to the mandi when the buyer from Tamil Nadu came to them?

3.4.2 *Commission agents*

As one would expect, the commission agents were the least happy with the new system. In Karnataka, they have pushed back in different ways, with varying degrees of success. In Kalaburgi, the poster child for Karnataka's reforms, commission agents went to court, challenging the issuing of new licences. In Tiptur, the market for copra, the entire e-tendering process has been summarily undermined by collusion, wherein a lead commission agent determines a bid price and everyone bids the same or around that bid. In Mandya, commission agents-cum-traders protested and led a boycott of the mandi for two weeks when e-auctions were introduced, forcing the mandi to go back to the manual auction system. It seemed that only in mandis where farmer marketing cooperatives dominate trading, for example, arecanuts in Shimoga, or in some of the large mandis that

trade in pulses, oilseeds and grains as in Chitradurga, have commission agents welcomed reforms.

Virtually all the commission agents we interviewed shared the perspective that the new system is meant to eliminate the commission agents from the marketing process, disregarding the services they provide. They emphasised that a commission agent not only acts as an aggregator of agricultural produce, but plays a crucial role - taking on the risk of rejection if the trader disagrees with the quality of the produce once delivered, acting as a forwarding agent to ensure that the sold output reaches the trader, providing immediate payment to the farmer for the produce after a trade, while himself receiving the payment from the trader after 3-6 months. “Why”, they asked “should traders be asked to pay immediately when even the government does not pay on time?” They cited examples of procurement of sugarcane and maize by the government that were associated with significant delays in payments. Besides, they said that the traders trust the judgment of quality by commission agents, based on which they place their bids. Commission agents also provide loan to farmers whenever the latter requires it, even if for consumption, filling in for the absence of formal financial services for the farmers. Their 2% commission embodies compensation for their role as information gatherer and negotiator of better prices for the farmer.

In several mandis, commission agents felt that e-tendering and its concomitant reforms were driving out legitimate transactions to the world of unregistered trades. They claimed that since 2009, arrivals at the mandi have come down drastically. As a result many commission agents have closed their business. One commission agent in Hubballi remarked his own business has come down from a turnover of Rs. 10-15 crore to Rs. 2-3 crore. He said, “the commission agent is dying, he is in ICU, on oxygen”. Direct sales between traders and farmers have increased and these unregistered trades do not attract any cess, adding that perhaps, “the APMC should be wound up and officials be transformed into flying squads to levy cess on private transactions”.

Apart from passionate arguments about their own livelihoods, commission agents also articulated positions on specific aspects. Most of the commission agents dismissed the idea of e-tendering by saying that the existing infrastructure is a big constraint. They asserted that under manual trading, there is greater flexibility to change the bids and rectify mistakes that trader make in their quotation. Disputes could get easily resolved with mutual understanding. It is 'difficult' in the new system. One of them claimed that “e-tendering had taken away the possibility to bargain the price in favour of the farmer post bidding”. For perishable commodities like jaggery, they said that the electronic

trading is not possible since only the high quality jaggery gets traded on that platform. The low quality jaggery is left to perish, unlike in manual trading.

On unification, most felt that the unified license does not serve any purpose since no buyers place their bids from outside due to quality verification issues. Even if assaying facilities are provided, it would take too long to assay all arrivals, “Who will wait for so long during peak season?” said an agent. “The system we have currently is better”. They also said that the traders will not have faith in any third party assaying mechanism.

They were strongly opposed to the idea of e-payments. Of the pilot in Gadag, one agent said, “*gaya e-payment pani mein*, it will never happen.” Overall, the commission agents felt that ReMS should take views of all participants into consideration before bringing new reforms.

3.4.3 Traders

Most of the traders that we met in the mandi were also commission agents and shared many of the commission agents’ perspective. Other traders were mostly skeptical about the prospects of the unified market platform. They agreed that while automation had resulted in time savings, they dismissed the idea of assaying and unification. They opined that they only trust what they see and without looking at a commodity physically, they would not place a bid. For commodities like jaggery, and copra, they said that there is “no scientific way” of checking the quality. Even if there were a technique to scientifically assay the commodity, there is not enough space in the mandi and it would take too much time to assay lots. It seemed that they would much rather trust the commission agent, especially those with whom their association goes back a long way, even generations.

Traders were similarly unenthusiastic about online payments. Commission agents often allow traders upto six months to pay for their purchases, until which time the commission agent puts up the money towards payments to farmers. An online payment system would require trader to pay upfront and is their less preferred option. Furthermore, with the current system, traders retain the right to reject produce after delivery if it is found to be of inferior quality, with the risk of such rejection, borne largely by the commission agent. They felt that an online payment system would undermine this flexibility.

3.4.4 *Mandi officials*

Mandi officials walk a tight rope, managing different interest groups while pushing the reforms forward. It was clear that all of them were deeply committed to the process. Some mandi officials have had fewer challenges than others, both with respect to infrastructural support as well as in tackling groups of disgruntled commission agents or traders.

The mandi officials were mostly satisfied with the implementation of the e-tender system, and said that all stakeholders including farmers, commission agents and traders have accepted the system well. There was initial resistance and difficulty in getting the traders to bid online. However after several months of training, the traders were now comfortable with putting their own bids in the computer system.¹⁹

Officials, especially in the large mandis like Chitradurga, concurred that e-tendering has led to substantial reduction in time taken to announce the winning bids, improved price transparency, reduced scope of human errors and possibility of manipulation. Senior APMC officials at different mandis admitted that commission agents and traders are no longer able to manipulate the prices.

Regarding assaying facilities and online payments, even though the mandi officials said “It must be done, we will do it”, privately, they were less optimistic. They said that the transition is politically difficult and that the farmer-commission agent relationship is difficult to break. They said that even for e-trading, there was strong resistance both from commission agents and traders initially. In fact, traders boycotted trading for 2-3 weeks. However, after much persuasion, they finally accepted the system. Some mandi officials however said that this acceptance has come at a significant cost. At Hubballi, for example, e-trading drove trade out of the mandi. A lot of transactions now occur outside the mandi premises. The heaviest resistance was at the Mandya APMC mandi where electronic trading had to be suspended. However, the mandi officials there indicated that they were holding discussions with the traders and commission agents and would try to address their issues. Remarked a mandi official, “If we cannot convince them, we will confuse them . . . but we will implement the new system.”

¹⁹For traders who are still not able to do that, t computer operators enter the bids for for them. In some mandis, the computer operators said that it took five years for people to feel at complete ease with the system. In others, it took only a few weeks for traders to adapt to the system.

4 Lessons for e-NAM and beyond

While it is premature to judge Karnataka's achievements with agricultural output market reform, it is useful to draw on its ongoing experience for a clearer understanding of what such reform entails for e-NAM.

Karnataka's experience with output market reform suggests that the unified national agricultural market is not simply about propping up an electronic platform, nor is it merely a technological problem. Rather, it is one of redesigning the architecture of agricultural marketing that is sensitive to the complex and deeply entrenched farmer-agent-trader relationships that characterise agricultural output transactions in India. Karnataka's experience suggests that enterprise of marketing reform is best achieved by focussing simultaneously on three fundamental features - *institutional reform, incentives and infrastructure*. When these three align with one another, then substantive market reform is possible. Piecemeal efforts that address any of these without addressing the others are unlikely to bear fruit.

Institutional reform that establishes a legal framework and shapes the context and actors in agricultural market is a necessary condition. For e-NAM, the need of the hour is a roadmap to ensure that a new legal framework is in place that supports a new architecture for agricultural transactions across the country. Even though the Union Budget recognises that "Amendments to the APMC Acts of the States are a pre-requisite to join this e-platform", there is a significant risk that this might not materialize (Government of India, 2015). A failure to obtain legal reform across the states limits the idea of a seamless unified national market, where the state with the most restrictive APMC Act would determine the extent of the reforms. The Economic Survey 2015-16 recognises that e-NAM transcends state laws and identifies constitutional provisions under which the politically difficult task of reforming state laws can be achieved. This needs to be accorded priority. What is required too, as a precondition for unification, is a regulatory framework that can settle disputes across states and one that keeps the implementation agency distinct from the regulatory agency.

Incentives refer to elements in the design of these marketing systems that attract stakeholders to participate actively in the market and keep them there. As Karnataka's example shows, in order to truly unify markets, stakeholders need to have incentives to participate in the new platform across multiple locations. Traders, who make the market, should be willing to place bids in distant mandis. Karnataka's experience suggests that this reluctance is in part due to concerns relating to quality and trade credit, where

their reliance on local commission agents is overwhelming. Commission agents who mediate transactions between trader and farmer, on the other hand, have a strong incentive to undermine state's efforts at reform for reasons discussed earlier. Reforms of the mandi need to focus on reinventing roles for the commission agent and co-opting them rather than seeking to eliminate them, to the extent that they fill in for multiple market failures. Mandi reform that seeks to render middlemen irrelevant are therefore bound to fail, unless the failures of the formal institutional credit to achieve financial inclusion, access to information and storage facilities are all fixed simultaneously. For farmers, an electronic platform holds little attraction when they continue to depend on commission agents for credit, consumption loans, information and storage facilities. Karnataka is already pushing forward with initiatives on several fronts to address these issues. For example, there is already an effort in the Hubballi APMC to provide traders with bank loans at 14% per year (as opposed to the 2% per month loans available from the commission agents) to enable them to pay the farmers upfront. There are also plans to separate farmers' APMC payment account from their main loan account to assuage farmer fears that their earnings would all go to meeting their debt obligations. These are steps in the right direction.

Infrastructure is an essential enabling factor and, in this context, would include physical and financial payments infrastructure to support market transactions. These include developing a comprehensive set of grades and standards for a diverse set of products and invest in assaying facilities that are quick, cost-effective and credible ways, as yet woefully inadequate across mandis.

While the mandi is central to agricultural marketing in the country, for several crops, mandi-based trade is of limited importance and strong ties to processing industries and direct marketing have emerged. Even for the commodities traded in mandis, a significant proportion of transactions now seem to take place outside (reportedly between 50 and 75% for turmeric and copra). In this scenario, it would be important for the state to look beyond the mandi as a site for trade, even while preserving its place in the marketing ecosystem. Measures such as warehouse-based sales, institutional innovations that enable farmers to aggregate to undertake marketing would be relevant.

If a revolution in agricultural marketing is the goal, the efforts have to be commensurate with the task at hand. Without it, the revolution would be kept waiting, as it has been for decades.

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