

Case Study

e-NAM Soil to Sale

Pan-India electronic trading portal which seeks to network the existing Agricultural Produce Market Committee (APMC) & other market yards to create a united national market for agriculture commodities

Revenue Department, Collectorate, Rajkot, Gujarat.

Website: <http://enam.gov.in>

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I. Executive Summary

e-NAM (e-National Agriculture Market) is a Pan India electronic trading portal with an objective to create a national network of virtual agricultural market that can be accessed online capturing a physical market (mandi) at the back end. It seeks to leverage physical infrastructures of mandis through online trading portal enabling buyers (even outside the State) to participate in trading at the local level.

The Agricultural Produce Market Committee (APMC) Rajkot in Gujarat is spread over 135 acres and stated to be one of the largest APMCs in the State. Rajkot APMC has a dedicated website which gives all necessary information about APMC and its activities. Entire APMC is covered under CCTV for security and transparency purpose. Most of the solutions are provided under one roof e.g. assaying, grading, weights, completion, storage, farmer's choice for timely selling time and at desired rates. This has helped APMC to attract maximum number of farmers and traders to come under e-NAM. The APMC which started with 3 commodities in September 2016 has now registered 33 commodities. Farmers have gained 25 to 30 % more profit through e-NAM and now it is easy to buy and sell commodities.

With effective implementation, Rajkot APMC has the highest coverage of commodity at the national level and got the 2nd rank in the country in terms of transaction. Rajkot APMC has 100% cashless trading, 100% registration under e-NAM and 100% entry and exit monitoring system. It has achieved reduction of marketing management cost and increased direct benefit for the farmers and eliminated exploitation and hardships for marketing.

1. INTRODUCTION

e-National Agriculture Market (e-NAM) was envisaged as Pan India electronic trading portal which seeks to network the existing APMC & other market yards to create a united national market for agriculture commodities. NAM's objective is to create a national network of virtual market that can be accessed online capturing a physical market (mandi) at backend. This seeks to leverage physical infrastructure of mandis through online trading portal enabling buyers (even outside State) to participate in trading at local level.

The project was initially adopted in 21 mandis of 8 States and has now been expanded to 455 mandis expanded over 13 States with-

Buyer	:	96118
Commission Agent	:	51126
Seller	:	5076501
Total Traded Quantity	:	11371.72 Ton
Total Traded Value	:	31424.04 Crore
over sells & exports of Major Commodity	:	Wheat, Chillies, Paddy, Cotton, Potato, Caster Seed, Maize, Ground Nut, Mustard, Guar Seed

Rajkot is one of the largest APMCs in the State with 135 acres of land coverage, around 45000 farmers, 22 commodities, Rs. 1327.03066 crores (approx.) of turnover, around 1008 registered traders & commission agents, 314 broker office, 121 front live sundry shops, 12 auction platform (18000 mts app.), 60 tea & food stalls, 7 banks - ATMs, water storage tanks (1600000 ltr – R.O. Mineral & water plant), covered by TV camera & sound system, solid waste system, computerized weighbridge (50 & 100 ton), soil testing lab., Kishan Aaram grah (khedut guest house), Khedut help center, Medical dispensary, etc.

Rajkot APMC has developed a framework that aims to create a common ground to develop policies that balance economic prosperity with social inclusion and environmental stewardship.

2. OVERVIEW OF THE CHAMPION AND THE TEAM

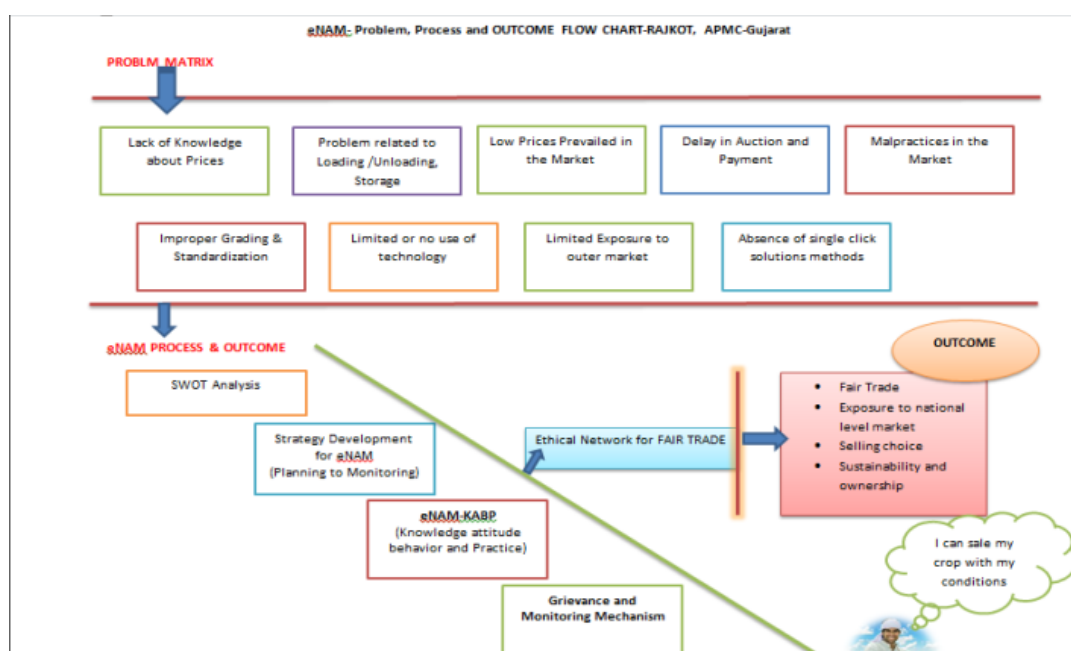
The head of the project, e-NAM Soil to Sale, Dr. Vikrant Pandey is presently serving as Collector of Ahmedabad, Gujarat. He worked as the Collector & District Magistrate, Rajkot when the project was initiated. In his 13 years of service, Shri Pandey has done developmental and welfare work for the landless tribals, viz. distributing forest land for agriculture, connecting land through canals and facilitating the agricultural produce to market. He has received several national awards including the Prime Minister Excellence Awards in Public Administration for the year 2013 and Best Electoral Practices Awards 2014.

Other team members of the project are Shri Tekchand C. Tirthani, District Registrar, Cooperative Societies and Shri Babulal R. Tejani, Secretary, APMC-Rajkot.

3. PROJECT OVERVIEW/HISTORY OF THE PROJECT

The APMC Rajkot, established 52 years ago, now has spread over 135 acres of land and is stated to be one of the largest APMCs in the State. Major areas of concern for the APMC, arrived at through a consultative process as the effect of the project were found to be as follows :

- Lack of technical expertise: Delayed setting up of grading/assaying facilities
- Traders feared of taxman, farmers feared of lower price if produce is assured (so bringing farmers, traders & commission agents online was a challenge)
- A mindset of having tardy process in adoption with electronic form
- Absence of mechanism to sale in multiple markets
- Pre-post auction difficulties
- Legitimate exposure of market to wide network
- Information asymmetry between the traders and the farmers
- Farmers were not getting the competent amount for their commodities resulting inadequate competition
- Lack of transparency in market operations
- Unavailability of weighbridge monitoring facility
- Auction/bidding process in market was not 100% transparent
- Post auction difficulties was a major issue
- Remoteness of existing markets



4. SITUATION IN CHAMPION'S STATE/ DISTRICT

4.1 Problems Identified:

Limited knowledge of main stakeholders (mainly farmers) in terms of:

- Farming Practice
- Use of IT in Agriculture (Soil to Sale level)
- Limited access to mandi
- Well established network of Agents/traders
- Absence of sequential convergence
- Transparency
- Ownership and sustainability
- One common platform to get agricultural services

4.2 Strategy Adopted

4.2.1. Implementation model

Rajkot APMC having good infrastructure and convergence with all departments related to agriculture has given smooth path to promote and implement e-NAM. The details of innovations adopted by APMC are as follows:

1. Convergence with various Departments for State and Central programmes
2. Development of a Mobile Mandi app for traders which helps traders to participate in the online auction through the mobile application
3. Soil to Sale concept to provide all agriculture related quality services under one roof
4. Agronomic practice –skill development at grass root level
5. e-NAM Setu, e-NAM Bridging officer, e-NAM scouts at APMC level for hand holding support
6. Top to Bottom Approach with communication and dissemination strategy
7. Maximum use of local governance for awareness, dissemination, adoption and monitoring
8. Covered 20 commodities till 31.12.2016 which has now increased up to 33 commodities
9. Local level policy modification for 100% sale and purchase through e-NAM
10. System certification at international level with 3rd party verification for “Good Business Model”
11. Backward and forward linkages with local agency, buyers and exporters
12. Adopted information farming practice module to reduce input cost, save the environment, quality products and also focus on social aspect

4.2.2. Communication and dissemination strategy and approach used

Participatory decentralized approach has been adopted for communication and dissemination, the Soil to Sale (S2S) concept.

In September 2016, e-NAM had been started with main objective of “Doubling the income of farmer”. To spread this message at grass root level Rajkot APMC developed and adopted various strategies and thereafter, different communication modules have been developed to reach out:

1. e-Media: Through website, SMS and WhatsApp groups, awareness has been disseminated amongst the farmers (Approx. 5600 farmers and 1000 traders)
2. Print Media: Through, leaflets, posters & banners
3. One to One:
 - Individual contact and group meetings at village level through mandi members, peer groups and Panchayati Raj Institutions (PRI) members (Approx. 10,000 Farmers).
 - Individual contact at APMC: e-NAM scouts at APMC level is the initiative taken by Rajkot APMC to educate the farmers about e-NAM who do not have sufficient knowledge on the procedure for selling their commodities. Easily identified scouts wearing blue t-shirt with e-NAM logo are available to provide handholding support to the farmers for e-NAM and the team interacted with a couple of these volunteers and asked about their methodology.
4. Mass Awareness: through Camps and Shibirs: Krushi Shibirs, Camps, Gramoday Se Bharat Uday (35,000 farmers)

5. MODALITIES OF THE NEW SYSTEM (SOLUTION)

5.1. Technology Platform used:

5.1.1. Description

- Server-side Programming language: JAVA EE, JBoss
- Webserver: Apache Tomcat Coyote 1.1
- Scripting language: Javascript (lib: jQuery, Bootstrap, Angular)
- Data center: CEP Data center
- Hosting Provider: Dedicated Hosting (Deity)

Mobile App: e-NAM Android App (v1.2) by small farmer’s Agri-business consortium

- Audience: Mandi functionaries & other stakeholders in agriculture supply chain like farmers, traders, commission agents, processors, exporters.
- Has limited features of bidding by the traders & viewing the information related to the trade on eNAM. It facilitates remote bidding by traders and access to arrivals and price related information to farmers and other stakeholders on their smart phones.

e-Readiness of APMC:

- 1) PC/Laptops: 12 (At Admin Work & 1 each at operational gate) + 1 laptop

- 2) Printers: 4 (Laser - Admin Work), 1(Thermal - each at operational gate), 1(Laser - weighing)
- 3) Tablet: 5
- 4) LAN Network & internet speed: Auction Hall & Admin Building – 10mbps
- 5) Ingate/Outgate Pass system (Vehicle & lot management)
- 6) Sorting/grading/arraying machines
- 7) Established Weighbridge monitoring system
- 8) Electronic weighments
- 9) e-Tender/e-Auction Facility (with Announcement) Garnering:

a. For traders: Traders can bid on lot available for trade, enter fresh bid, change last bid price, check bid history, min & max prices open auction.

b. For farmers: Farmers can view state-wise lists of mandis, arrival, min. & max. price prevailing at mandis availability bid for the lot available for trade, enter fresh

- 10) Online agreement, sales invoices
- 11) APMC helpdesk/support
- 12) WIFI-APMC
- 13) LED screen in the APMC premises is giving price, tracking auction etc.

5.1.2. Interoperability

In technical sense:

As Java is general purpose and cross-platformed language, so it is interoperable over any internet & accessed platforms. Open source- java servlet container functions as a web server, provides some interoperability over its web-based counterpart.

In operational sense:

Ability of a computer system to run application programme from different vendors, and to interact with other computers across local or wide-area networks regardless of their physical architecture and operating systems has generated following major impacts:

- Fair Trade
- Exposure to national level market
- Selling choice
- Sustainability and ownership
- 100% Net banking
- Grievance and Monitoring Mechanism

5.1.3. Security concerns

In technical sense:

- Use of open standards for interoperability {eg: originally Simple Object Access Protocol (SOAP) – web based services}.

- BSP1.0 addresses these security threats.
- Use of strong authentication mechanisms (SSL/TLS) to address principle spoofing.
- Used encryption to address the security risks of confidentiality.
- Java based customized security settings deals with security exploits & vulnerabilities that can severely input interoperable solutions.

In operational sense:

100% secure and an ethical system for all stakeholders from entry to exit point. All the parameters covered under software which is 100% safe, secure and transparent.

5.1.4. Issues with the technology used

Being PAN-India initiative, the servers are not distributed, hence the system slows down a bit as most of the backend operations are being done at server side. The Request & Response takes a bit of time in between. Cloud computed storage must be adopted.

Skill enhancement at grass root level and literacy level (e-literacy) are the main issue.

5.1.5. Service Level Agreements (SLAs)

With Section 31 c(2)(3) of amended APMC act by Director of Agriculture Marketing & Rural Finance, Gujarat Government issued an adhoc license and National Spot Exchange Ltd (NSE), Mumbai. granted a permission to establish a unified e-Market in State of Gujarat.

For various level services, SLAs have been done with some of the agencies;

1. Control union – System certification
2. FARM NGO, for skill development of farmers for sustainable agriculture practice
3. Dev-Q, Research and feedback mechanism
4. Soil test lab, lab was linked up with APMC for soil testing

5.2. Citizen Centricity

5.2.1. Impact on effort, time and cost incurred by user

e-NAM Seva Setu has been specially developed where users can understand the use of e-NAM. This mechanism provides satisfactory two-way communication to the users. e-NAM scouts are provided hand holding support in APMC campus to deal with ICT in marketing and other agriculture allied services.

At grass root level, users were also connected through local level institutions like Panchayat, Co Operatives and Gram Mitra/Kheti Sahayak to avail e-NAM services.

5.2.2. Feedback/grievance redressal mechanism

A common platform was developed in APMC as well as direct observations from Govt. authorities also developed transparent feedback mechanism for all the stakeholders.

Grievance cell was one of the ideal platforms to resolve a problems raised during auction, weight, marketing and many more.

5.2.3. Audit Trails

Audit was collected by the private, NGO and Govt. agencies.

5.2.4. Interactive platform for service delivery

- e-Nam Setu is an interactive common platform for delivery.
- In August 2015, the APMC and the District Administration jointly organized a District level seminar in which a large gathering of concerned farmers, traders and commission agents were apprised and registered on the e-Nam scheme.
- In 2016, the APMC convened an inter district meeting of the members/chairpersons/ Secretaries of the APMCs of Saurashtra-Kachchh region and took these dignitaries through a rigorous brainstorming session on e-NAM scheme. They were also pressed to disseminate the scheme's information to the last farmer standing as it were.
- Rajkot APMC is having more than 140 mandis and covering 169 villages of the three blocks, 1) Rajkot, 2) Lodhika, 3) Padhdhari. To disseminate awareness and adoption of e-NAM many handholding events have been organized by Rajkot APMC. To implement this priority program, top to bottom approach has been applied at local level. Rajkot APMC has developed resource pool at grass root level and they have organized handholding events at village level. From district to village, various events have been organized covering 146 mandis members and 169 villages through PRI members :

1. District level workshop for Govt. Officials and APMC team
2. Training through Bhaskaracharya Institute for Space Applications and Geo-Informationatics (BISAG) earlier called RESECO – Remote Sensing and Communication Centre) (Vande Gujarat Channel) for e-NAM operation.
3. Saurashtra trader's workshops
4. Mandi and PRI members' workshops
5. Village level meetings (through mandis and PRI members)
6. Krushi shibir, Gramoday se Bharat Uday
7. Agricultural Technology Management Agency (ATMA), training and shibirs are also covering e-NAM
8. International Trade fair, Tax Seminar (Income & Sale Tax) at APMC with farmers and traders

5.3. User convenience

5.3.1. Service delivery channels

Service delivery through web based application, mobile application, e-mail and SMS/WhatsApp and one to one interactions.



5.3.2. Completeness of information provided to the users

- All the information has been provided at grassroot level and APMC level with the use of multiple media and other supportive mechanism like phone, SMS, WhatsApp.
- e-NAM setu and e-NAM scouts have made remarkable change in farmers' and traders' attitude towards cashless transactions.

5.3.3. Accessibility

e-NAM setu works from 9 in the morning to 6 in the evening, without any discrimination in respect of size of farmers, commodities etc.

5.3.4. Distance travelled to Access Points

Mainly covering 30 km areas surrounding the APMC, but it is main APMC, so for marketing purpose anyone can come for sale.

5.3.5. Facility for online/offline download and online submission of forms

- Adaptation of peer-to-peer has been carried out with counter based management system having receipt and report of each staged activity carried out, whether we call from entry-to-exit gate pass system, weighbridge monitoring, e-Auction; Sales & payment are cashless, one would have direct cash transfer to their bank account.

- e-NAM mobile app introduced far more transparency in viewing commodities like price listing at a real time.
- e-NAM Setu has been specially developed to provide online and offline services to users.

5.3.6. Status tracking

- Each status can be tracked online via eNAM web portal & eNAM mobile app.
- e-NAM mobile app brings e-Mandi Network on a hand of farmers to have a real time price and bids of commodities at a very adopted competitive profit.
- 100% sale and purchase has been tracked with CCTV, Software and mobile scouts
- LED screen in the APMC premises is giving price, tracking auction, etc.
- All the online data available in the screen on e-NAM setu for tracking

5.4 Efficiency Enhancement

- (i) Volume of transactions processed: 35,49,653 Quintal as on 18th Nov 2017.
- (ii) Coping with transaction volume growth: We started with 518.19 and last transaction was 35,49,653 Quintal.
- (iii) Time taken to process transactions: 31-09-2016 to 18-11-2017 (approx one year seven weeks).
- (iv) Accuracy of output: With 100% of registration of each commodity on gate, entry has been made 100% transparent at marketing level which has removed all mischief of entry and exit level marketing.
- (v) Number of delays in service delivery: 0% delay in service delivery – Usual time required between entry-gate to exit-gate is 3 to 3½ hrs (depends on arrival).

6. IMPACT ON THE STAKEHOLDERS/BENEFICIARIES

6.1 To Organization

- Rajkot-Bedi APMC has achieved the following with effective implementation of e-NAM:-
- Highest coverage of commodity at the national level
- 2nd rank in the country in terms of transaction.
- 100% cashless trading
- 100% registration under eNAM
- 100% entry and exit monitoring and transparent system

6.2 To citizen

- Complete removal of exploitation
- 100% focused reduction of marketing management cost and increased direct benefit of farmers
- 95% adoption of eNAM by all stakeholders
- Sequential convergence has provided single window to get all agriculture and allied services support

- Fair Trade
- Exposure to national level market
- Selling choice
- Sustainability and ownership

6.3 Other stakeholders

- Buyers, traders and other brands have directly approached to APMC for purchase

7. **Future Roadmap/ Sustainability**

The district administration is undertaking all the efforts to ensure sustainability of the scheme:

- It is keeping the governing processes as transparent as possible - especially when the middle men are strong, and the farmers have a limited exposure of the national market – by appointing local APMC supervisors who monitor the auction activities, the grading system, who also support the farmers to decide the crop quality and get the price appropriate to the quality and quantity of their produce.
- Farmer friendly eNAM concept adopted by farmers, will surely make secure and stable economy for the farmers.
- Entire system is secure and confidentiality is maintained.

8. Teaching Notes

e-NAM Soil to Sale

PAN-India electronic trading portal which seeks to network the existing Agricultural Produce Market Committee (APMC) & other market yards to create a united national market for agriculture commodities

1. OVERVIEW

e-NAM (National Agriculture Market) is a Pan India electronic trading portal with an objective to create a national network of virtual agricultural market that can be accessed online capturing a physical market (mandi) at the back end. It seeks to leverage physical infra of mandis through online trading portal enabling buyers (even outside the State) to participate in trading at the local level.

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2. TEACHING OBJECTIVES

➤ Learning Objectives

- As-is situation analysis and identification of pain points in the existing delivery process.
- Importance of innovation and technology to bring transparency and proper accountability.

➤ Challenges/Issues Faced

Limited knowledge of main stakeholders (Farmers in large) in terms of:

- Farming Practice

- Use of IT in Agriculture (Soil to Sale level)
- Limited access to mandi
- Well established network of agents/traders
- Absence of sequential convergence
- Transparency
- Ownership and sustainability
- One common platform to get agricultural services

➤ **Ways to Improve the Situation**

Major Features-

- 100% cashless trading
- 100% registration under eNAM
- 100% entry and exit monitoring and transparent system
- Complete removal of exploitation
- 100% focused reduction of marketing management cost and increased direct benefit of farmers

Strategy Adopted-

Rajkot APMC having good infrastructure and convergence with all Departments related to agriculture has given smooth path to promote and implement e-NAM. The details of innovations adopted by APMC are as follows:

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3. SUGGESTED QUESTIONS & ANALYSIS

- a) **What changes were brought in the system using the e-NAM Soil to Sale Project?**

- Traders/commission agent been brought at one platform
- Through Soil to sale concept, all the agriculture and allied services have been covered under one roof making strong pillars for e-NAM at grass root level
- e-Payment modes were adopted to by stakeholders (100%)
- Adoption of e-Auction/e-tendering as envisioned in eNAM project brought transparency and accountability, eliminating scope of intentional/unintentional manipulation of tendering/auction process which in turn has reduced the manpower requirements
- Mobile app, My bid for traders
- Wi-Fi APMC making market place approachable to internet access in turn to increase e-readiness among them

b) How e-NAM Soil to Sale Project has helped in increasing efficiency and effectiveness in the system?

- (i) Volume of transactions processed: 35,49,653 Quintal as on 18th Nov 2017
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4. CLASSROOM MANAGEMENT

➤ **Group Discussion**

Divide the participants in groups of 4 -5 and discuss the case on following aspects. Each group should take one aspect:

1. Discuss Change management and Communication as some of the key factors for project success.
2. Challenges, issues and risks if the project is to be rolled across other States.
3. What is next step for the project?

Please have an open brainstorming session regarding how this project can be evolved and replicated in other States. Each group should present their findings in a short 5-10 minutes presentation afterwards.

➤ **Group Activity (30 -40 minutes)**

Make two groups of participants. One group has to act as major stakeholders, i.e. land owners/farmers and employees/users of the system and the other to act as Government.

Major Stakeholders: The task of the stakeholder group is to come up with novel and different (but realistic) service requirements that they want from a project like e-NAM Soil to Sale. They should consider all the problems they face or they can face in future and build up a suggestion around them. They should also build a justifiable timeframe against each service they want to build in the system.

Government: The task of the Government group is to see how they can provide such services within shortest possible time. They should hold discussion with stakeholders to devise roadmap and implementation plan. The objective of this exercise is to highlight expectations of stakeholders and the readiness of Government in meeting them. It is a role play type of exercise which offers plenty of flexibility in the way services can be further augmented.

➤ **Summary- Key lessons learnt (15 minutes)**

Each participant shall write down a summary in not more than 500 words highlighting key learning from the case.

Abbreviations and Acronyms

Abbreviation	Explanation
APMC	Agricultural Produce Market Committee
IT	Information Technology
NAM	National Agriculture Market
PRI	Panchayati Raj Institutions
Java EE	Java Platform, Enterprise Edition
CEP	Complex Event Processing
DeitY	Department of Electronics and Information Technology
LAN	Local Area Network
SOAP	Simple Object Access Protocol
SSL	Secure Sockets Layer
TLS	Transport Layer Security
NSEL	National Spot Exchange Ltd
NGO	Non-Governmental Organisation
BISAG	Bhaskaracharya Institute For Space Applications and Geo-Informatics
RESECO	Remote Sensing and Communication Centre
ATMA	Agricultural Technology Management Agency
