

Farm Related Services via Mobile Phones in India - A Case of Micro-warehousing for Farmers in Bihar

Prageetha G Raju

Introduction

Agriculture continues to be at the centre of Indian economy. Though it is the primary source of livelihood for almost 58 percent of Indian population, it is plagued by several issues. To elaborate - erratic monsoon, availability of quality inputs, pest outbreaks, inadequate farm equipment, lack of access to fair priced credit and marketing challenges due to multiple intermediaries are some of the challenges facing the Indian farmer.

Notable among the various challenges is, the lack of adequate warehousing services and facilities. For instance, 260 Million Metric Tonnes (MMT) of food grains per annum are produced in India, but, the total storage capacity is mere 115 MMT. The State and Central Warehousing Corporations together account for 85 MMT of warehousing capacity while the private sector provides another 30 MMT. Small and marginal farmer seldom use these facilities, they sell off their surplus immediately and often at distressing prices due to lack of storage facilities.

Ergos, a Bengaluru based start-up provided the idea of micro-warehousing in 2017 through a mobile app, and its experiment with the maize farmers of Bihar was successful wherein the farmers were able to sell at a price that is 20-30 percent higher a few months ahead of harvest. The app lists out the stock held by farmers in warehouses and real-time market price of grains. The farmer can set his price because he is certain of his stock in the warehouse, and is also aware of market trends. Once the farmer stocks grains, Ergos grades the stock and enters details on the app. The farmer can store grains in good condition and sell his stock when he gets his desired price.

The present case is about micro warehousing through a mobile app operationalized by Ergos, and the arduous efforts by them to create an impact amongst maize farmers in Bihar.

Maize Economy in Bihar

Maize is the third most important food grain crop and is cultivated in over 8.12-million-hectare area with an annual production of 19.77 million tonnes and an average productivity of 2435 kg/ha (Maize Atlas of India, 2009 and Langade *et. al.* 2013). Bihar is one of the traditional maize-growing states in India.

As per the Directorate of Statistics and Evaluation, up to the year 2015, the total yield¹ was around 4000 kg/ha and since 2016, the total yield has gone up to 5335 kg/ha. In India, maize is grown in all the seasons i.e., *kbharif*, *rabi* and summer but nearly 90 percent of the production is from *kbharif* season and is rain dependent. According to State Agriculture Department officials, nearly 65 percent of total maize in Bihar is grown in Seemanchal and Koshi region.

Maize is an important cereal crop which provides food, feed, fodder and serves as a source of basic raw material for a number of industrial products *viz.*, starch, protein, oil, food sweeteners, alcoholic beverages, cosmetics, bio-fuel etc. Not only is it a source of nutrition for humans and livestock as animal feed but also widely used as industrial raw material. Increased industrial demand for maize comes primarily from the starch and milling industry which in turn caters to textiles, paper, glue, alcohol, confectionery, food processing, pharmaceutical industry etc. While the area under cultivation, maize production and yield have increased between 1977 to 2007, there are only 8-10 maize processing units in Bihar. They are mainly into milling of flour and production of poultry feed.

Maize Farmers - Problems and Concerns

A survey with a few maize farmers and traders was conducted using observation and semi-structured interviews to understand their problems and challenges. The key problems that emerged were as follows:

- **No Storage Facility:** Lack of storage facility prevents farmers from benefitting from high prices of maize in off-season.
- **No Minimum Support Price:** MSP procurement of maize in the state is almost non-existent which forces the farmers to sell off their produce in open markets at low prices, going as low as INR 500 per quintal.
- **Poor Institutional Support:** After the scrapping of the Agricultural Produce Market Committees (APMC) Act, no additional institutional support was developed by the state.
- **Poor credit delivery system:** Informal credit delivery system plays a very important role in meeting the credit needs of the maize cultivators and even processors. Local wholesalers/traders provide credit support to maize farmers for meeting their consumption and production needs and hence farmers are obliged to sell maize to them. The survey showed maize farmers of Khagaria district take an average loan of INR 6000-8000 per acre from the traders/moneylenders to meet their working capital requirement. The informal credit has exorbitant interest rate ranging from 5 - 10 percent per month.
- **Disorganized distribution system:** Maize sector is highly unorganized with many intermediaries; farmers depend on the local village aggregator/trader who plays a chief

¹ The total yield is the summation of *kbharif* maize, *rabi* maize, and summer maize

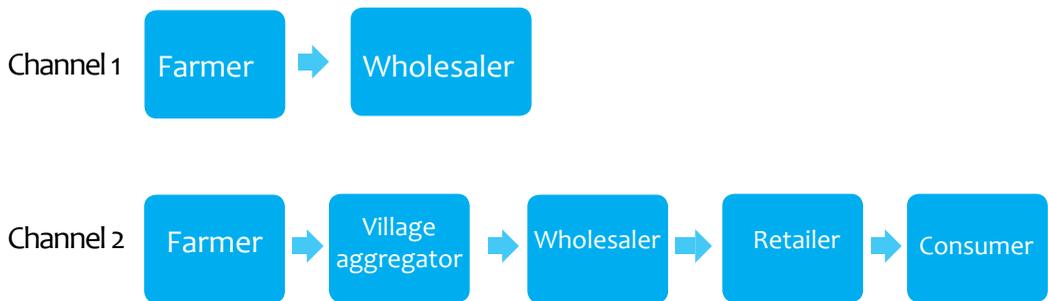


Figure1: Marketing channels in maize

role in procurement and marketing of the produce. Broadly, two marketing channels in maize were observed.

- **High Price Fluctuation:** It is observed that lack of MSP also gives a free hand to traders and businessmen to decide the price.

The Ergos Model

Ergos, founded in 2012 by Kishore Jha and Praveen Kumar offers solution to farmers through micro-warehousing and collateral management facility. Ergos has connected farmers with buyers for sale of their produce. They also plan for the input requirement and forecast the produce arrival.

Brajesh Mandal, a marginal farmer of Purnea district grows maize twice a year. Even when he had a bumper harvest he received low price for his maize as he did not have any place to stock his grains. In his words, *‘Export companies are making a fortune from our maize that they purchase from us at the cheapest of prices. We work hard, put in hard efforts to produce maize, but we hardly get right returns. Maize farmers are exploited by everyone. What can we do?’*

A micro-warehouse is a low-cost format that operates at the village level and helps the enterprise to directly connect with the farmers. Ergos offers a chain of efficient and hygienic warehousing facilities within a range of three to four kilometres from the farmers’ locations while also helping them in better price discovery. Ergos also connects the farmers to financial service providers that help them with the working capital at reasonable rates of interest. Ergos uses a mobile phone app, to list out the stock held by farmers in warehouses and share the real-time market price of grains. The farmer can set his price because he is certain of his stock in the warehouse, and is also aware of market trends. Once the farmer stocks grains, Ergos grades the stock and enters the details on the app. This app has helped make farming a viable business for these farmers and minimize the exploitation by traders. The mobile app provides 24/7 access to farmers to sell, transact, or hold the produce. Farmers can track market movements and sell when they realize better prices. Village Champ (VC) is a one-point contact for them to assist on the transaction.

Ergos runs a network of micro-warehouse called “farmer offices” that work in tandem with the retail partners of Ergos to build capacities of smallholder farmers, and to expand the existing user base. Ergos signs agreements on use basis with several smallholder farmers who store their agricultural produce in the warehouse. Once farmers deposit stock in the warehouses, Ergos checks the quality and quantity of the items and issues a warehouse receipt to the farmers certifying the weight, grade, and quality. This receipt serves as a document to obtain credit or loan from a financial institution. Ergos is also able to negotiate better prices on behalf of the farmers, based on this data.

The micro warehouse network arrangement ensures optimum capacity utilization of the warehouse, low wastage, and higher price realization for the farmers.

Another unique concept by Ergos is farmers’ portfolio management, wherein its software application captures basic information about all associated farmers. The software captures information related to various business transactions between each farmer and Ergos. The enterprise also provides several value added services including grading, cleaning, sorting, and packaging to its members. It trains farmers on various aspects of financial transactions, contracts and markets. It generates general awareness among smallholder farmers regarding the importance of storage solutions through videos, road shows, and midnight cafes. Ergos uses technology such as advanced Enterprise Resource Planning (ERP) software and other web applications. *Ergoslive*, is a unique portal linked to its ERP core database. The application runs on all browsers and can be accessed by users even remotely. It has developed a mobile app for farmers, end users, and internal staff to ensure minimum turnaround time on any service request, and to make the operations easy and transparent.

How does Ergos Identify Warehouses?

“Ergos only engages with those warehouses which are scientifically constructed and plans are approved by NABARD, Warehousing Development and Regulatory Authority (WDRA), or State Agriculture Department,” says the founder, Kishore Jha. The following steps are followed to rope in warehouses and farmers:

- The team conducts a thorough due diligence of the warehouse and creates a survey report covering titleship of warehouse, location, approach road, flood history, height from the ground, distance from police station and fire station, theft history, number of gates, security arrangements, physical condition of the warehouse structure, and number of pillars, among others.
- It finalizes the terms and conditions of long term lease of no less than five years with the landlords and executes the agreement.
- Ergos then obtains notary declaration from the owners, and registers the agreement in local Registrar office.
- The farmers set up account with Ergos, upon submission of KYC documents such as ration card, PAN card, Aadhaar card, driving license, bank passbook, voter card etc.

- Originals are verified by an Ergos executive.
- After the document verification, Ergos creates UID (Unique Identification Number) for the farmer in SAP.

Services, Costs and Revenues of Ergos

Ergos charges a lower rate as they are a social enterprise focused on smallholder farmers. They charge USD 0.09 to USD 0.18 per quintal per month as against USD 0.25 to USD 0.27 charged by others.

Ergos facilitates loans at 10-10.5 percent as it has access to the collateral stored in its warehouses. In collaboration with NCDEX e-market Limited (NeML), they provide electronic warehouse receipts (e-WHR) that farmers can use as a collateral with banks to access credit. Through this platform, it connects the rural warehouses to national market that helps discover better prices for farmers.

Some of the major costs incurred by the enterprise include warehouse rent, relationship managers' salaries, operations fee, and insurance fee. The major revenue streams of the enterprise include warehousing services and advance advisory and processing fee.

Table 1: Costs incurred by Ergos per annum

S. No.	Cost per annum (USD)	Warehouse Capacity (Metric Tonnes)
1	3,000 to 3,750	200
2	4,500 to 6,000	500
3	7,500 to 9,000	2000

Challenges and Lessons

The journey of Ergos wasn't easy. Initially, storage solutions by private sector organization did not receive a ready acceptance from the farmers. Convincing and persuading farmers through road shows, videos, etc. took more than six months. After this, Ergos faced several other challenges relating to marketing, finances and distribution. For instance, there were serious problems in managing operating cash flow, especially for small-size warehouses. The marketing and distribution challenges were related to customer engagement, awareness and trust building, and the need for behavior change amongst the smallholder farmers to adopt warehousing practices. Human resource challenges included difficulty in attracting, training, and retaining suitable talent, as the business concept itself is new, and people with desired skill-sets are rarely available.

Outcomes and Impact

Ergos has disrupted the conventional warehousing model by providing doorstep access to warehousing services to farmers. The company leverages a strong technology platform to ensure services to farmers almost akin to a "grain bank". The company's operations are currently based in the state of Bihar.

Ergos was able to negotiate better prices on behalf of the farmers, based on ERP data. The micro-warehouse network helped Ergos accomplish business development as well as transaction execution. *Ergos is able to achieve higher turnover with limited capital. It has also achieved greater price efficiency in certain crops such as maize, wheat, and paddy, as these are the major crops cultivated in the region,* says Kishor Jha. Initially, the team set up the warehouse facility with the help of National Collateral Management Service Limited (NCML), which helped Ergos to understand warehousing and credit access, and also provided access to finance to enrolled smallholder farmers. The farmers who are at the core of the value chain, are slowly realizing the benefits and the convenience that follows e-negotiable warehouse receipts (eNWRs), especially with regard to access to easy finance.

The success of Ergos has been a result of a partnered effort between NERL and Svakarma Finance to help farmers in India avail easy access to credit facilities, which is the beginning for many more farmers to come on board the Repository Platform. As on October 2019, nearly 7000 farmers out of 19913 registered on the platform in Samastipur, Begusarai, Darbhanga, KJhagaria, and Muzzaffarpur districts of Bihar are reaping benefits of a smart decision taken last season. Instead of selling their produce cheap, or immediately after harvesting, they warehoused yields and waited for grain prices to appreciate in the off-season.

Ergos charges INR 7-12 per quintal (per month) as warehousing-cum-market linkages charges. The post-sale payment (to farmers) is made within four to seven days into the bank account of the farmers. For immediate cash requirement, the farmer can use the warehouse receipt to borrow (70-75 percent loan-to-value) from banks and Non-Banking Financial Company (NBFCs) such as Samunnati, IDBI and SBI, in this case.

Ergos' model tends to address the following -

1. Enables farmers to warehouse their produce and thus avoid distress sales during harvest season at low prices.
2. Set up digital warehouses at the village level
3. Help farmers reduce wastage by quality warehousing.
4. Help farmers tide over their immediate liquidity/ financing needs by working with NBFCs/ Banks to extend loans to farmers against the security of their warehoused produce on one click.
5. One Tap-Connect farmers to market enabling them sell their produce in the off-season, at prices which are nearly 25-30 percent higher.

Impact

Ergos began with four warehouses (with 800 MMT storage capacity) in 2013 and has grown to include over 42 digital warehouses (aggregating over 20000 MMT).

The impact can be inferred from the satisfaction of the farmers as well as the rising demand for micro digital warehousing services of the company. Since the entire

intervention is geared towards participation of small and marginal farmers (S&M), an attempt was made to examine the pattern of participation vis-à-vis medium and large farmers (M&L) and changes in the same over time.

Since Samastipur is the oldest district where Ergos started their intervention, the trends are more visible here as compared to the other two where work was initiated only in 2016. In 2015-16, maximum number of registrations and participations were from farmers in the S&M category. However, there was a significant shift in both registration and participation by 2017-18, when the total registered S&M farmers at 3593 are outnumbered by the total medium and large (M&L) farmers at 4388. However, the company seems to have made a conscious effort to give preference to S&M farmers as reflected in the actual usage figures where S&M stands at 787 (57.8 percent) as compared to 576 (42.3 percent) for M&L in the year 2017-18. A similar ratio is to be seen in the other two districts where the S&M farmers account for 69.5 percent in Begusrai and 72.2 percent in Muzaffarpur of actual usage. The good news is that landlords are beginning to buy in to the model and building larger warehouses for Ergos.

In summary, the following impacts have been created through the Ergos Model of warehousing using mobile app:

- Economic impact achieved: Increased volume of sales, increased yield, increased market access, increased access to credit, reduced transaction cost, reduced production cost, and received higher product prices
- Environmental impact achieved: Increased efficiency in agro chemical use, increased access to agricultural information services in real time
- Social impact achieved: Increased women's participation, increased youth participation, improved social capital, increased economic mobility, enhanced social inclusion, improved social equity, enhanced social well being
- Technical impact: Increased technology adoption, improved information dissemination, increased labor demand, increased the need for agricultural extension agents, better support for extension agents