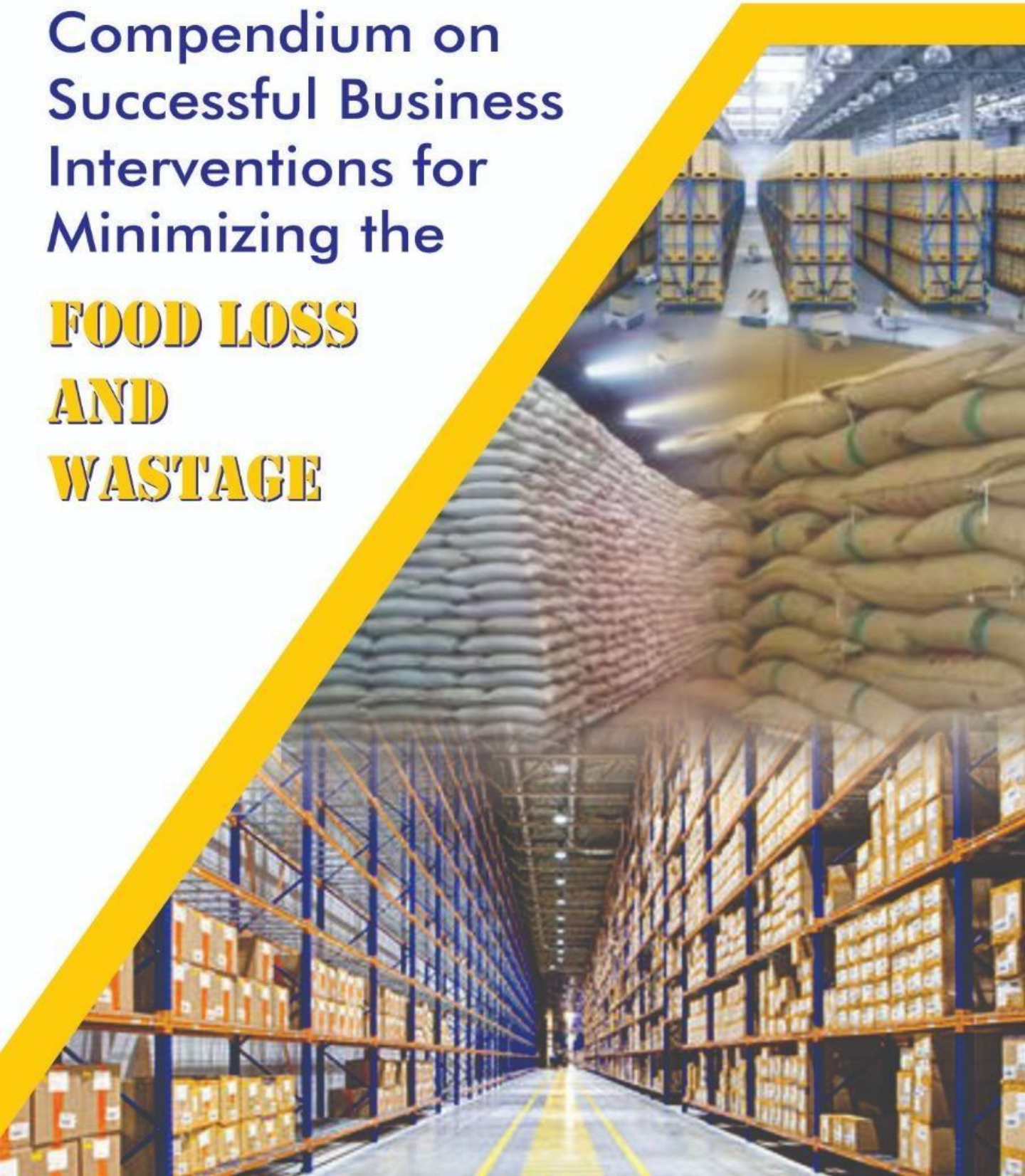
FICCI

Compendium on Successful Business Interventions for Minimizing the FOOD LOSS AND WASTAGE



Recognizing the importance of the International Day of Awareness of Food Loss and Waste

FICCI is pleased to release a Compendium on Successful Business Interventions for Minimizing Food Loss and Wastage

29th September 2020

MESSAGE



Mr. T. R. KESAVAN
Chairman
FICCI National Agriculture Committee & Group President, TAFE

Food loss and waste is a serious concern in regard to food and nutrition security. There is growing pressure to feed everyone on planet with limited resources and increasing population which is expected to reach 10 billion by 2050. This indicates that it is important to analyse significant food loss that happens at multiple stages of supply chain due to several inefficiencies. An estimated one-third of the food produced globally for human consumption is considered as food loss and waste. Food loss definition does not reflect the loss that happens at the point of consumption only, but this also includes loss of farm produce at production level and at post harvest stage. It is estimated that globally 14% of food produced is lost between harvest and retail. Loss and wastage of food not only decrease food availability but also reduce income of small and marginal farmers. Therefore, we all need to be cognizant of such food loss.

Reduction of food waste through application of technologies that improves shelf life, provide scientific storage to farm produce, improve processing levels especially of perishables, makes handling and transportation process efficient are required. It is estimated that processing of fruits and vegetables can multiply their value 50 to 500 times. Processing technologies not only saves post-harvest losses but also add to employment generation at the local level. Growing attention to food loss and waste is also reflected in the Sustainable Development Goals. Therefore, enhancing technical know-how of farmers on good agriculture practices is equally important in the long run, especially in this corona crisis when everyone is thinking of ways to strengthen Agri and food supply chain.

There are many successful examples of private sector projects that have tackled the food loss issue successfully. On the occasion of International Day of Awareness of Food Loss and Waste, we at FICCI have profiled innovative approaches adopted by Agribusiness industry and Agtechs in regard to reduction in food loss. We do hope readers will find this compendium useful.

MESSAGE



Mr. HEMENDRA MATHUR
Chairman
FICCI Task Force on Agri start ups

TECHNOLOGICAL INTERVENTIONS FOR MANAGING FOOD LOSS AND WASTE

It is criminal to waste food when significant part of world population is mal-nourished or starved. Also, wastage of food puts pressure on natural resources damaging the environment. It is time to push paradigm shift in food loss and management framework. Food loss management should be seen as integral part of strategy in achieving food and nutritional security. Technology has a huge role to play in building a robust food loss management system. Technology can be bucketed into three components – digital tech, biotech and processing tech.

Digital Tech

Food demand is predictable however supply is not aligned because of multiple layers between consumers and farmers in layered supply chain in countries like India. Its time to align food demand with the supply by building data interface across the chain. Data interventions have multiple components and all need to be seen in totality.

- Data to reduce demand supply mismatch on account of regional and seasonal arbitrage through building predictive models
- Data to monitor potential food losses such as the ones occurring from pest attack and weather shocks
- Data monitoring wastage, consumption and contamination in the supply chain to fix accountability

There is enough technology available to capture the data as listed above. Data can be captured through satellite imagery, drones, sensors, IoT devices, smart phones and many evolving hardware devices. This data can be synthesized to estimate quantity and quality loss at various stages of the food supply chain and fix accountability.

Biotech

While digital applications are critical, biotech also has a huge role to play in reducing food loss. Biotech applications including hybridization, gene editing, plant growth stimulators and improved fertilisers etc that can improve the crop immune systems which can in turn, cut down on pre and post-harvest losses. This has been the focus areas of research for agricultural universities and private sector companies. However, many innovations remain confined to the laboratories for lack of awareness and connect with the industry and start-up ecosystem.

Processing Tech

Affordable cold storage, mobile pack houses and dehydration solutions at the farm gate presents another set of innovations for managing the food losses.

A combination of these techniques is gaining importance in the context of diversification of diets and tilt in consumer diets towards perishable products, where the losses could be higher because of lower shelf life. Diversification of consumer diet from staples to horticulture, dairy, poultry and fisheries is a good sign as these diets are fiber and protein rich. However, this also opens up the challenge to improve shelf life and mange food loss.

This compendium is a step towards showcasing such innovations developed by corporates as well as startups. I sincerely hope these set of innovations inspire value chain players to adapt and innovate further.



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Arya Collateral Warehousing Services Pvt. Ltd. (Arya)



Name	:	**Mr. Prasanna Rao, Mr. Anand Chandra, Mr. Chattanathan Devarajan**
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Website	:	**www.aryacma.co.in**
Intervention	:	**Store-Tech, Fintech expand boundaries of agri-storage**
Value proposition	:	**Democratisation of storage without CAPEX**

Project Details:

- Name of project: Flexible hermetic storage solutions for farm gate storage integrated with tech-enabled financial and market linkages
- Area of operation: Pan India Basis
- Year of execution: 2020

Introduction

Farmers in villages of Begusarai district weighed these two choices in selling their produce. Lower prices if sold immediately or higher storage losses if wanted to sell later and get better return. A collaboration of PwC promoted Cheria Bariyapur Producer Company with Arya, helped them avoid this choice – and get 4% higher rate from the local market while avoiding any loss to their produce.

This comprehensive solution meets three interrelated needs:

- Doorstep scientific storage in their own village: Arya's flexible hermetic storage (FHS) technology ensures field storage of grains and other produce at locations where no warehouses exist. This ensures grain storage for periods over 3 years without any chemical treatment and can be set up in 3-4 days.
- Seamless finance against stored produce: No banks Or FIs offer post-harvest finance in these villages. Aryadhan, Arya's Fintech platform extended finance within record time from storage. This ensured access to cash-flows needed for their consumption needs and the next crop.
- High return Market linkages that looped cashflows to close the loan: Arya leveraged its unique arrangement with NeML to establish market linkages for the Producer Company (PC) on a digital platform that allowed sale at an appropriate price with access to a large set of buyers. This arrangement also ensured that the PC didn't have to repay the loan before selling the produce, as is the general practice with all bank loans. The sale proceeds from the digital sale came in to repay the loan without putting any burden on the FPO.

Key Impact:

India is reported to have a storage gap in excess of 35%. This is further acute after considering requirements versus availability in primary agriculture centers closest to the farm gate. This leads to substantial food loss and wastage even before the produce reaches the first point of aggregation. Additionally, absence of storage facilities is one reason why smallholder farmers and FPOs often do not participate in income enhancing post-harvest activities.

Flexible Hermetic Solutions offered by Arya help them store their produce where storage facilities are not available. Hermetic Storage helps in averting 2 to 3 percentage of losses of stored commodities compared to the traditional unscientific storage practices. The technology is now proven to store most of the grains, cereals, oilseeds and spices. This tied up with easy access to finance and market linkages can substantially improve their realisations.

Parts of this model have been implemented by Arya across 105 FPOs covering more than 50,000 farmers. More than Rs.100 crores worth of finance has been extended to FPOs and farmers through Aryadhan. Commodities in excess of 100,000 MT belonging to FPOs and farmers have been stored in primary agriculture centers closest to the farm gate. Of this over 6000 MT have been stored in FHS solution at locations where no warehouses existed.

The innovative market structure mechanism facilitated through interplay of storage technology and fintech assists FPOs in selling their produce without the need to repaying the loan prior to sale of produce. This flexibility helps FPO overcome severe constraints for working capital.

Way Forward:

Encouraged by the response from FPOs and other field trials, Arya is scaling up the storage model involving FHS solutions. It has initiated further trials with a larger set of commodities and has collaborated with large corporates such as ITC, Cargill, Britannia etc. to enable farm gate level storage and effective market linkages with FPOs. Arya is also in touch with various state governments for enabling this integrated offering for democratisation of storage. Further, Arya is integrating FHS solutions into its digital warehousing and post-harvest solutions platform, www.a2zgodaam.com to make it available to relevant stakeholders in the agri value chain.

Inficold India Pvt. Ltd.



Name	:	Dr. Nitin Goel
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Intervention	:	Inficold Instant milk cooling
Value proposition	:	Savings on fuels (Diesel with Generators) and improvement in Milk quality

Project Details:

- Name of project: 7 Nos
- Area of operation: Pan India
- Year of execution: September 2019

Introduction

The refrigeration of Milk is essential to maintain its quality, to prevent bacterial growth and to avoid constituent changes. Due to power outages, all milk coolers rely on diesel generators, which are not only expensive to operate but also costly to maintain. Inficold's Instant Milk Chiller (IMC) provides most affordable, intelligent and retrofittable cooling backup for Milk Cooling. Thermal Storage System (TSS) essentially converts and stores the solar / electrical energy in the form of ice, which is later used to cool the Milk. Inficold's IMC can provide instant cooling for up to 6000 liters of Milk per shift. Apart from providing cooling autonomy from electric power availability, the milk precoolers provided by the company are power packed devices which provide 6-7 times the cooling of the compressor capacity at same wattage. The instant precooling provided by it's system helps in preserving milk quality and thus increases its shelf life. This cost-effective solution has in-built cooling backup in the form of ice, which eliminates the need for diesel genset during power outages. The inbuilt cooling backup is enough to cater cooling requirement of a dairy even with 6 hours of grid availability in a day. The entire system is automatic and does not require user intervention during power outages. For areas with no grid power availability, system is available with Off-grid solar integration.

Key Impact:

- Annual Fuel savings of 900 litres of Diesel with Generators
- Saved diesel of Rs. 5,000 per month (Rs. 60,000 per annum on diesel)
- Milk quality has improved and is now Milk is eligible for UHT production
- Increased Income of Rs. 7,30,000 per annum on improved milk quality

Way Forward:

The company will be launching soon 200L and 500L capacity Solar Integrated Bulk Milk Coolers that could help farmers with 5 to 20 Cattles to cool the milk at the farm level and help the farmers to improve the quality of milk and reduce Loss and Waste due to milk spoilage.

Intello Labs Pvt. Ltd.



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Intervention	:	Reduce Customer Returns and Food loss
Value proposition	:	At least 50% of the losses could be controlled if they deploy early quality check in the supply chain.

Project Details:

- Name of project: Deployment of Intello Track for reducing customer returns
- Area of operation: Delhi / NCR
- Year of execution: 2019/20

Introduction

The client is a B2B fresh produce distribution company that buys fresh fruits and vegetables directly from farmers and supplies them to retailers and restaurants. Their hypothesis was that they do excellent manual sorting/grading. They were confident of the dispatch quality. However, they had a small % of customers who would frequently complain about the quality, or return goods, or refuse to pay. The client wanted the company to do an objective assessment of the quality (at dispatch as well as of returns). Their hope was that if they get a clear quality report that the dispatch quality was good, they could go back to the conflicting customers and challenge their returns. Eventually, the target was to reduce food loss at procuring and handling stage.

Intello Labs has the mobile app product - Intello Track – that uses the smartphone camera to capture the image. Images are then processed by the cloud-based AI to generate almost-instantaneous quality reports and calls-to-action. The company deployed Intello Track at client's warehouse to check the inbound quality and the quality of customer returns. They were able to objectively, check, record and report the quality trends. Management team was given access to web-based dashboards, with live updates on the quality. They could see issues with the current systems and approach.

Key Impact:

Within a few days of deploying the mobile app, it was clear that the manual sorting/grading had too many issues. Quality was not controlled properly at the warehouse. Defects were slipping through. The company found out that all the commodities that were quality checked and accepted for stocking had defects.

- The defects (or "Grade C) % was higher than tolerance levels (10%).
- The defects% (or Grade C) in the procured items were as high as 87%, that accounted for massive customer returns. Customers' returned stocks were simply being thrown away since it is too late to extract any value out of it, that were causing food loss and food waste.

The customers who had issues were a minor % but they were merely an indication of the larger problem. If the quality control issues were not addressed immediately, there was a risk of conflicts and returns escalating with others. The client took immediate action and some of the staff was changed. Training sessions were re-organized. Additional supervision was brought in for monitoring specific problematic commodities (with more defects). Within a month, the dispatch quality went up and the customer returns came down by 25%.

Way Forward:

The key finding was at least 50% of the losses could be controlled if they deploy early quality check in the supply chain.

- ❑ Client can equip farmers to check quality at farm level and act there itself.
- ❑ Grade B or C, if detected early, can be directed elsewhere.
- ❑ Client can avoid logistics costs in transporting defective items or for replacement of bad items.

IPCA (Subway)



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Intervention	:	Increase usable life of Iceberg Lettuce
Value proposition	:	Establish better quality and shelf life for lettuce thereby also reducing wastages.

Introduction

IPC is a Subway Franchise owned company and it manages complete Procurement and Distribution for Subway Restaurants. The initiative was primarily to improve the quality and shelf life of Lettuce which is a highly perishable item. The concern was addressed through a supplier Partner Vista Processed Foods Pvt Ltd. The initiative was implemented in the complete value chain to address gaps at each level starting from farm level until processing and supply.

Few key highlights are summarized as below:

Effective Cold Chain Management:

It was ensured that the temperature control started right from the time of harvest. They worked with the growers to have the Cold Storage with temperature control (1 degree to 5 degree C) made at the farms. Lettuce was harvested during early morning or towards evening and transferred immediately in the Chiller. **This delayed the deterioration of the highly perishable vegetable.**

The transportation of the produce from the farms happened in chilled trucks (1 degree to 4 degree C) to the processing plant. At the plant, the product was offloaded fast and immediately transferred to the raw material chiller to ensure minimal degradation.

With this process correction, the shelf life of whole Lettuce heads was increased from 7-8 days to almost 15 days in the Chiller and this also helped in improving the keeping quality, finished product yields and reduced wastage. During processing, water used for washing and sanitization was also maintained between 1 degree to 5 degree C, which further helped in maintaining the processed product quality. This is how it could establish better quality and shelf life for Lettuce thereby also reducing wastages.

Key Impact:

Shelf life of Whole lettuce increased from 8 to 15 days which further led to 90% increase in shelf life. So commercially they could transport larger quantity of Lettuce in one truck thereby helping in reduced freight per Kg and hence lower raw material cost.

Increased shelf life of finished product from 4 to 7 days helped the company by improving efficiencies in the last mile. It could again manage with lesser frequency of deliveries, for example, instead of making 8 deliveries in a month to one restaurant; it could manage with 6 deliveries in a month which is another 20% saving on the last mile and also better utilization of truck as more quantity could be transported in the same vehicle.

With the improved raw material quality, the yield of Lettuce improved from 50-55% to 65 - 70% which helped in better cost efficiency at processing level and in reduced wastage.

Way Forward:

The company plans to continue work on getting even better product quality and shelf life for whole and processed Lettuce, thereby achieving more cost reduction.

Iplansys Ecom Pvt. Ltd.



Name	:	**Mr. Rajinder Bhagat**
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Intervention	:	**Minimizing waste, Maximising profits**
Value proposition	:	**Enabling stakeholders reduce food wastage through sustainable technological solutions.**

Introduction

Excess ingredient inventory has always been considered a source of problem in the food industry. Sales forecasts are important for good planning, but situations change, and new products are continuously being launched while old ones get delisted. Manufacturers produce in anticipation of market demand that is subject to number of unpredictable factors that inevitably affect production. Consequently, inventory gets piled-up turning it into a financial, logistical, and commercial burden for all entities in the chain. This eventually leads to disposal of food ingredients which is a huge ecological and financial loss. iplansys has been able to take hold of one of the major pain points for the food industry- excess food ingredient inventory by providing a convenient, secure and transparent gateway to liquidate quality ingredients. The company aims to ensure sustainable technological solution for partners, industry, and society at large, thereby, bringing the entire industry on one platform as a one stop place for sourcing and liquidating inventory.

Key Impact:

Almost all the companies in the industry know the enormous task which follows after a particular ingredient becomes dormant or is nearing its shelf life. Add that to a massive storage cost and eventually the disposal cost after expiration of the ingredient. iplansys provides a convenient, secure, and transparent gateway to liquidate quality ingredients. iplansys have successfully helped some industry giants liquidate good quality imported fruit concentrates, stabilizers, cocoa powder, Whey Protein Concentrates to registered buyers and have thus provide a means of dispensing quality ingredients while helping the society reduce food wastage. The company cracked its first deal within initial 3 months of operations with a Dutch MNC for two of their non-moving ingredients and have been clocking 2-3 deals each month later.

Way Forward:

As currently, the system requires human intervention as it is in a primitive stage. The company's idea of scaling up is to automate the system with minimum human intervention. B2B Marketing in the food industry and registering maximum companies, initially by increasing Foot-On-Street and then shifting to online registrations and being very active on social media.

National E-Repository Limited (NERL)



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Website	:	**www.nerlindia.com**
Intervention	:	**Popularization of eNWR in Registered Warehouses of WDRA during COVID19 environment**
Value proposition	:	**Warehouse based scientific storage and digital record-keeping of warehouse receipts along with easy market connectivity and easy access to finance**

Introduction

The transactions and price discoveries in APMC regulated markets or private regulated markets completely depend on Over the Counter (OTC) trade which has several limitations due to lack of transparency and possibility of manipulation.

The Warehousing Development and Regulatory Authority (WDRA) ecosystem in India promotes warehouse based scientific storage and trade to overcome the drawbacks of OTC trading. The main objective of this ecosystem is to:

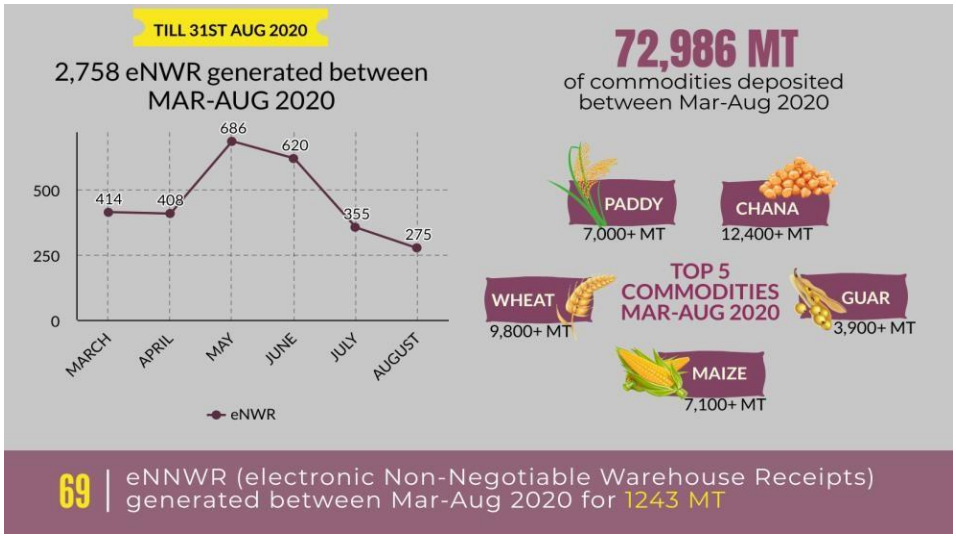
- Standardize the warehouses and agricultural commodities stored in these warehouses
- Create a homogenous environment for agri-commodity trading promoting one nation-one market
- Facilitate easy trade, finance and market access

NERL has initiated collaboration with NeML electronic trading platform for trading agri-commodities using eNWR(Electronic Negotiable Warehouse Receipts) helping farmers and traders to digitally sell/buy produce at the right price. The proposal of auctioning / trading of eNWR in spot trade was submitted to WDRA and promptly approved following which, both teams collaborated in training and handholding buyers and sellers on the platform. Without withdrawal of stock, the depositor can sell the stock by just transferring the eNWR to the buyer's repository account digitally. This has reduced the logistic cost and the turnaround time for completing the trade. This enabled India's first Warehouse-based sale through eNWR in June 2020.

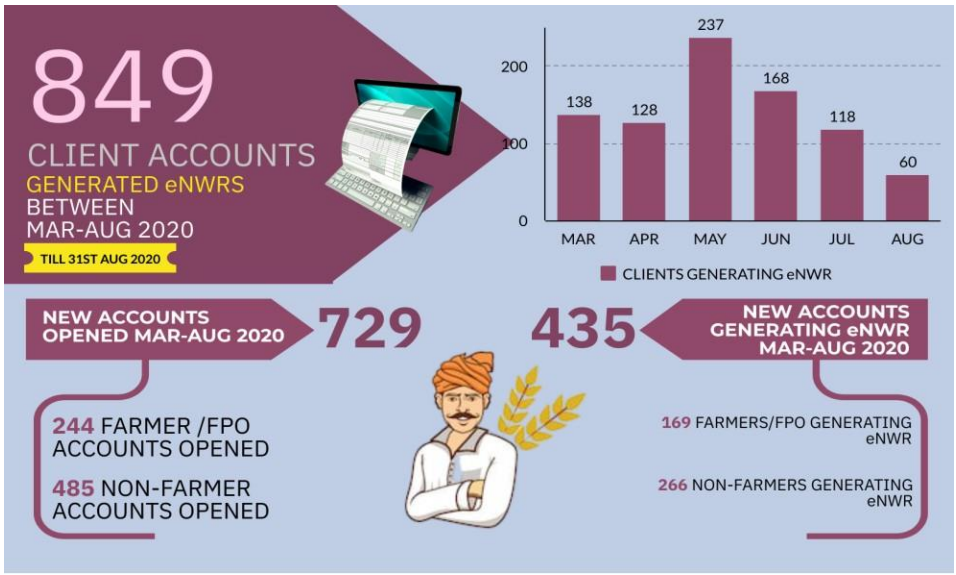
The company completed the Integration with eNAM in April 2020. eNAM electronic trading platform is used for price discovery and completing the trade in APMC regulated markets. Now farmers can sell their produce in APMC regulated market through registered warehouses. Scientific warehousing and market access to farmers has a huge role to play in reduction of post harvest food loss.

Key Impact:

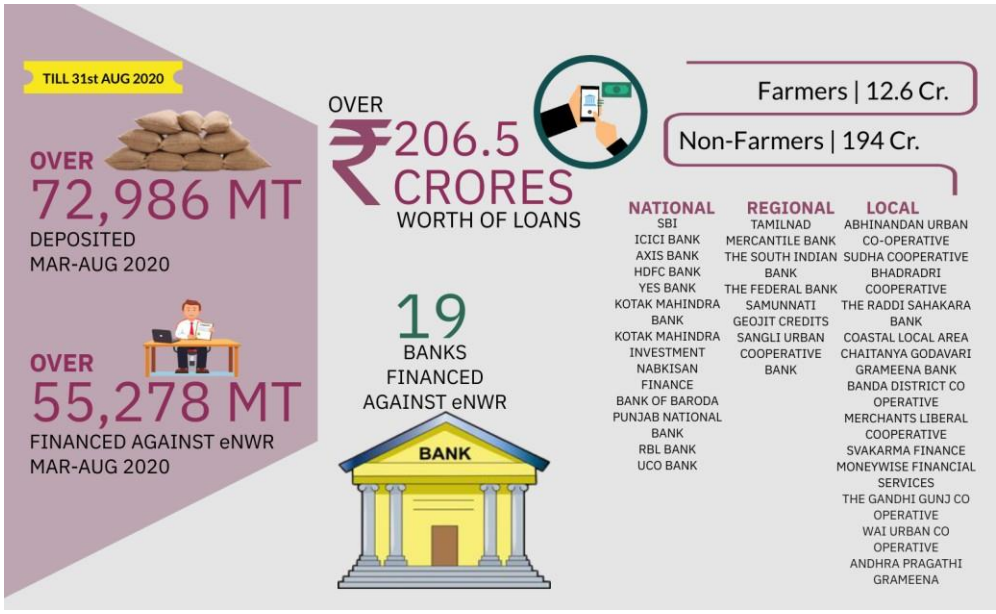
July and August are considered to be the lean periods for deposits. They key measurable outcomes are depicted below:



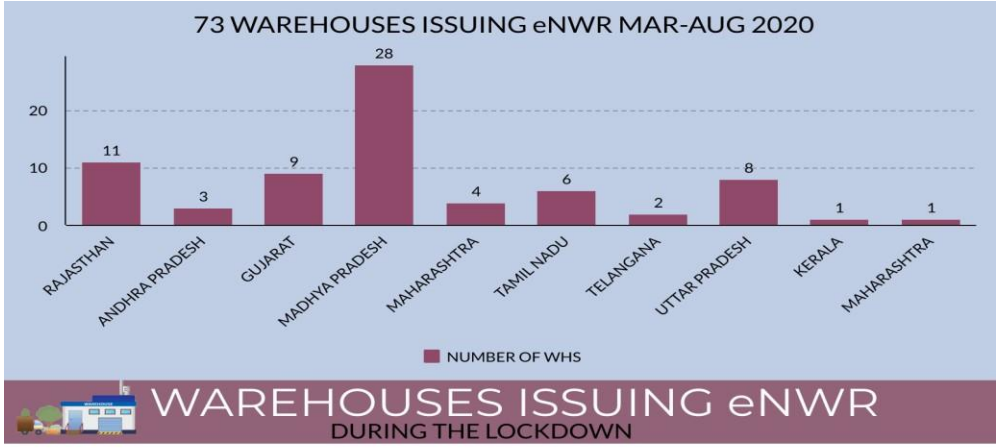
- **2,758 eNWRs were generated between Mar-Aug 2020**
- **72,986 MT of commodities were deposited between Mar-Aug 2020**

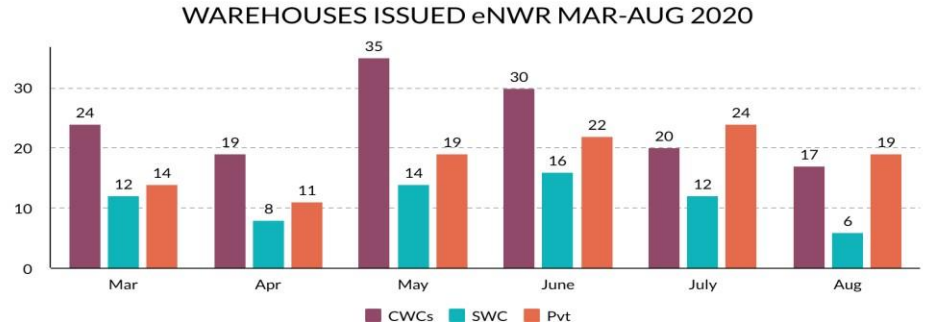


- **849 Client Accounts generated eNWRs between Mar-Aug 2020**
- **729 New Accounts were opened between Mar-Aug 2020**
  - **244 Farmer/FPO accounts**
  - **485 Non-farmer accounts**
- **435 New Accounts generated eNWR between Mar-Aug 2020**
  - **169 Farmer/FPO accounts**
  - **266 Non-Farmer accounts**



- **Over 55,278 MT was financed against eNWR between Mar-Aug 2020**
- **Over 206.5 Crores worth of loans disbursed against eNWR**
- **19 Banks financed loans against eNWR**





- **73 Warehouses issued eNWR between mar-Aug 2020**
- **These included CWC, SWC and Private warehouses**

Way Forward:

- Expansion of the markets across the country.
- Advocacy with the Government to make eNWR issuance mandatory for all the warehouses in the country, whereby helping the Government to identify the private stock stored across the country for taking well-informed data-driven decisions on hoarding or price manipulation, if any.
- Handholding and encouraging FPOs to store members' produce and offering easy market access for better price realisation. Eventually, bringing them under the ambit of "One nation, one market".

National Collateral Management Services Limited (NCML)



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Intervention	:	**Surakshit Mandi**

Project Details:

- Name of project: Surakshit Mandi & state of the art scientific Silo storage
- Area of operation: Surakshit Mandi – Rajasthan; Silo storage: UP & Bihar
- Year of execution: Surakshit Mandi – 2020; Silo Storage – 2018

Introduction

Post-harvest losses in agricultural commodities ranges from 4% to 10% for cereals, pulses, and oilseeds, of which nearly 50% is on account of improper storage and preservation. NCML, a leading player in post-harvest space, addresses this particular aspect by adopting scientific storage techniques for storage and preservation. NCML has developed an in-house rating system for warehouse structures and commodities are stored only in such structures which are adhered to the quality norms as prescribed by NCML. Apart from the storage structures, scientific preservation techniques are deployed to minimise the storage losses which includes proper aeration, ventilation and timely control measures to minimise the losses on account of storage pests. Storage in Silos is one of the renowned practice globally and NCML is the first company in the country to offer Silos for storage of commodities for private players.

NCML's "Surakshit Mandi", a new initiative with the major objective to tackle aggregation of farm produce without breaking the protocol of social distancing in the global pandemic. This is also helping farmers in selling their crops through its network of warehouses across the country with the help of state of the art e-market place - www.mktyard.com. Surakshit Mandi uses digital token-based queue system, digital transaction for price discovery between farmer and customers, the digital flow of credit between buyer and lender comes to life, at the NCML owned warehouses/silos/cold storages, which are nodal point for this whole process.



Key Impact:

NCML is proud to announce that losses on account of storage and preservation are reduced by almost 50% in the warehouses it operates. Moreover, the Surakshit Mandi Concept has started gaining momentum where in various corporates, processors and other value chain participants have started showing interest in associating with NCML for aggregation and procurement of commodities basing warehouse as a nodal point.

Way Forward:

With the new Farm bill, warehouses are to become focal points for all the post-harvest requirements of the value chain such as assaying, test & certification, aggregation, procurement, sale, warehouse receipt based financing, NCML is keen to implement Surakshit Mandi on pan-India basis across all the warehouses it operates, strengthen its existing services and offer customised solutions as per the requirements of the value chain participants.

Sohan Lal Commodity Management Pvt. Ltd. (SLCM)



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Intervention	:	**AGRI REACH**
Value proposition	:	**Reduction in post harvest losses from 10% to 0.5%**

Project Details:

- Name of project: AGRIREACH
- Area of operation: INDIA and MYANMAR
- Year of execution: 2011

Introduction

In India every year, an enormous amount of food grains gets wasted due to archaic procurement, storage and inefficient warehousing methods. Typical storage losses for agri produce in India accounts for approximately 10% (only for the dry food grains) of the entire production which is staggering INR 1, 00,000 Crores. This results in huge burden on the economy because one, it leads to inflation as additional supplies could have helped cool down prices and two, this production can go a long way in providing food to millions of poor people in India at subsidized rates.

"AGRI REACH", a proprietary technology developed by SLCM is the culmination of all the processes, methods & systems that the group follows to maintain health of the crop & start operations of a warehouse in just 24 hours at any location irrespective of infrastructure and provide the same operational excellence in the facility.

AGRI REACH is an algorithm which combines series of processes, audits and Real Time tracking of the facilities to give error-free results and deplete the risk of crop damage. It uses techniques like geo-fencing to Real Time tracking, bar-coded storage receipts to avoid thefts/ pilferage, Internal Audits along with a "Maker and Checker" policy at each level. In short, it is a culmination of defined processes, its execution without any deviation & finally the monitoring for overall control. With this technological innovation, SLCM has ingrained the ability to establish a new facility within 24 hours of notice.

SLCM is the only company in this domain which has this Centralized Real Time Process Management System. The Company has applied for patent of its "System and Methods for Real Time Data Management" and has named the process as "AGRI REACH", patent of which is pending.

AGRI REACH, which took about eight years to develop and is constantly evolving, covers the gamut of inspection services for Agri-produce by not only quality monitoring but also prescribing curative steps if crops were found to be degrading. Weekly checks are carried out by SLCM auditors in geo-fenced warehouses and the information is relayed instantly to the headquarters. The Group has integrated the system in android-tablet at its locations. This device is a smart portable system that is configured to track the record of the data inventory and communicate the same to the client on Real-Time basis.

Key Impact:

Scientific Storage Techniques followed at SLCM have shown remarkable impact on the quality of goods. Typical storage losses in India amount to approximately 10% of the stored goods; a huge loss for the entire economy. SLCM has been able to effectively reduce these losses to 0.5% of the stored value of goods as it conducts various different audit processes every month to maintain high standards of storage.

The reduction in storage losses from 10% to 0.5% can have huge impact, to approx. INR 100000 crores per annum in India alone, if replicated across the system. In a nation, where it is estimated that at least 200 million people go to bed empty stomach each night such post-harvest losses are bothersome. With the help of AGRI REACH, SLCM has been able to reduce these post-harvest losses to a great extent and has given interim solution to "Food Security Problem" of India which is a major social challenge to our society by saving on post-harvest losses.

Way Forward:

In a marketplace model, Intelligent Call centres have an extremely important role to play particularly during a crisis like COVID -19 as apart from providing an interface to warehouse managers, who otherwise use only emails and online portal for interacting, it enhances the level of service since most of the call centres have a dedicated customer care personnel to talk to.

Smart Call centres when integrated with real-time data embedded in Artificial Intelligence helps in real-time tracking of the facilities providing error-free results on the status of the warehouse and the products stored within as well as in transit.

SLCM has already augmented its dedicated 24x7 call centre to create an interface that warehouse managers may be more comfortable using. The call centre builds upon our Centralized Real-Time Process Management System "AGRI REACH" and integrates it with Artificial Intelligence for real-time monitoring, thus enhancing the level of service.

The company is in the process of deploying various technologies like SAP, Android Jelly beans, My SQL, etc. and integrating it all onto a digital platform. Further, the platform is augmented with AI and Auto ML

SourceTrace



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Intervention	:	**Digitising farmer information and traceability of the produce.**
Value proposition	:	**Bridging the gap between farmer and consumer by establishing direct market linkages for farmers without any intermediaries.**

Project Details:

- Name of project: Krishi Pragati Foundation
- Area of operation: Maharashtra
- Year of execution: 2016
- Project USP: Digital tracing of produce to its origin, with details of farmer, farm location, and date and time of harvest, complete visibility into logistics, storage conditions, etc. helped bridge the gap between farmer and consumer by establishing direct market linkages for farmers without any intermediaries

Introduction

In India, reportedly over 60 percent of the quality of fresh produce is lost in this journey. This wastage is owing to multiple constraints in the agri-supply chain, such as: lack of timely delivery, lack of uniform grading of harvested produce, improper packaging, multiple intermediaries, lack of transparency and traceability, poor market infrastructure, and improper pricing.

A non-profit organization in Maharashtra, Krishi Pragati Foundation that specializes in fresh agri-produce supply chain, implemented SourceTrace geospatially enabled software for bringing transparency to a digital agriculture supply chain.

SourceTrace provides digital inputs for agriculture, helping in the development of sustainable supply chains and bringing efficiency, transparency, and traceability to them. Tamper-proof touchpoints across every stage, from farm to retail, “DATAGREEN” allows for the tracing of produce to its origin, with details of farmer, farm location, and date and time of harvest. In addition, it provides complete visibility into logistics, storage conditions, etc., using geospatial and emerging technologies like blockchain and smartphones. This empowers the value chain to follow ‘First-in-first-out(FIFO)’ specially for horticulture commodities, as they are sensitive to handling, storage temperatures, and have a delicate shelf life, thereby preventing rotting, shrivelling and other degradation in the fresh fruits and vegetables.

Application of Traceability Solutions had the following net resultant:

- Trust and Transparency between farmers and customers
- Streamlining of supply chain to minimise losses
- Proven safety and purity of produce
- Ensuring better internal quality monitoring and reducing wastages
- Minimising returns/reputation risks with quality control and traceability

Key Impact:

Krishi Pragati Foundation needed information on yield estimates, customer demand, availability of produce, and much more. In addition, it was looking to streamline single point farmer information and traceability of the produce.

DATAGREEN provided traceability from farm to fork, tagging each bunch of fresh leafy greens and lot wise tagging for veggies, precise estimation of production for planning and marketing, helped in streamlining storage, data retention and security were among the key benefits. Digitization of the supply chain using geo-location resulted in fewer expenses, improved supplier relationships, heightened security, and lighter agriculture impact on the environment.

Impact Points:

- Complete visibility of the supply chain from farm to retail outlet on a real-time basis
- Digitization of organizations and farmer groups, along with procurement transactions and place of procurement.
- Batch printing of QR Code and barcode labels of farmer/farm ids for supporting traceability.
- Provided real time access to buyers for the fresh produce, significantly reduced storage, and handling of perishables, hence reduce wastages.

Way Forward:

Currently, the plan to scale operations has been delayed by Covid. The challenge has been to keep the supply chain running at the bare minimum. But going forward, the pandemic has made consumers more aware of food safety and hygiene and the company plans to expand the project at the earliest.

In the meantime, its latest solution 'TraceNext' is the need of the hour technology to minimise the time and money taken for quality checking of the produce at farm, freeing the farmer from the burden of laboratory testing and certifications separately, while his crop is ripe. TraceNext, leverages the best of technologies to solve issues for farmers, agribusinesses, and consumers alike. A one-stop seamless solution for food origin and quality for effective trade, procurement, production, and consumption of food. Traceability is going to be the most critical technology to ensure food safety. Hence, the company is looking at a complete transformation of the agri-food ecosystem.

Tan90 Thermal Solution Private Limited



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Intervention	:	**Cost-effective decentralized Portable Cold Storage**
Value proposition	:	**To de-centralize cold storages and reach out to the marginal farmers to reduce post-harvest losses.**

Project Details:

- Name of project: Energy efficient and cost effective Portable Cold Storages
- Area of operation: Tamil Nadu, Maharashtra, Andhra Pradesh, Delhi, Karnataka
- Year of execution: 2020
- Project USP: Aim is to transform any room to a cold storage facility and give the users to use any logistics service available to them, thereby reducing capital and operational expenditure by 40% and 30% respectively.

Introduction

Centralized cold storage has limited reach and often their operations are ceased due to their high operational costs. This beats the purpose of setting up cold storage infrastructure as it leaves the marginal farmers behind. To make technology and infrastructure available to all at the grassroots, Tan90 provides portable cold storage units that are powered by proprietary thermal panels which get charged/frozen twice as fast as compared to other solutions available in the market. We provide a wide range of such thermal panels, starting from -8oC to +4oC, to cater to several segments starting from fisheries to horticulture at the procurement stage. Being modular, any logistics service can be used to transport perishables, starting from two-wheelers to even railways to take the perishables directly to the consumer end, thereby support farm-to-fork services directly.

Key Impact:

For horticulture, shelf life of freshly harvested green leafy vegetables has been increased from a couple of hours to 2.5 days. The company's intervention does not only maintain lower temperature but increase the shelf life by controlling the respiration rate too. With its solution, the company has reduced the post-harvest loss of greens and fruits at the farm gate itself. They provide solutions which was helpful in maintaining the freshness while transporting fruits and vegetables from the FPOs to the customers' doorstep during the lockdown phase. Not only horticulture, Tan90 portable cold storages can even increase the shelf life of fishes, and that too, without the need for ice. This practice reduced the operational costs of the fishermen aggregator by approximately 40%. Village-level entrepreneurship was encouraged with our products, with the aim to reach out to the citizens with farm-fresh vegetables. This is a great model, and an attempt has to be made to scale up such practices.

Way Forward:

With the mission to empower a million farmers with affordable cold storages in 3 years, Tan90 is working actively with FPOs in the country. They have started with Andhra Pradesh, Rajasthan and Maharashtra; and aiming to onboard several more FPOs in the near future, particularly working on floriculture and fisheries. Continuing their work with the department of Horticulture, Government of Tamil Nadu, Tan90 look forward to work with other state governments as well.

FICCI PROJECT TEAM

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FICCI provides a platform for networking and consensus building within and across sectors and is the first port of call for Indian industry, policy makers and the international business community.

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