

**12**

RESPONSIBLE  
CONSUMPTION  
AND PRODUCTION



REPORTING OUR PROGRESS ON

# RESPONSIBLE PRODUCTION AND CONSUMPTION

**Amay, Arnav, Kalyani, Madu & Prakruthi**



AIM

TO REDUCE WASTAGE OF GRAINS  
THROUGH TRANSPORT AND  
LOGISTICS



TARGET ISSUE  
LOGISTICS, TRANSPORTATION  
AND ITS IMPACTS

## GAPS IDENTIFIED

Each year, an estimated one third of all food produced – equivalent to 1.3 billion tonnes worth around \$1 trillion – ends up rotting in the bins of consumers and retailers, or spoiling due to poor transportation and harvesting practices.



ISSUES AND GAPS  
IDENTIFIED  
IN OUR CITIES:



# PUNE

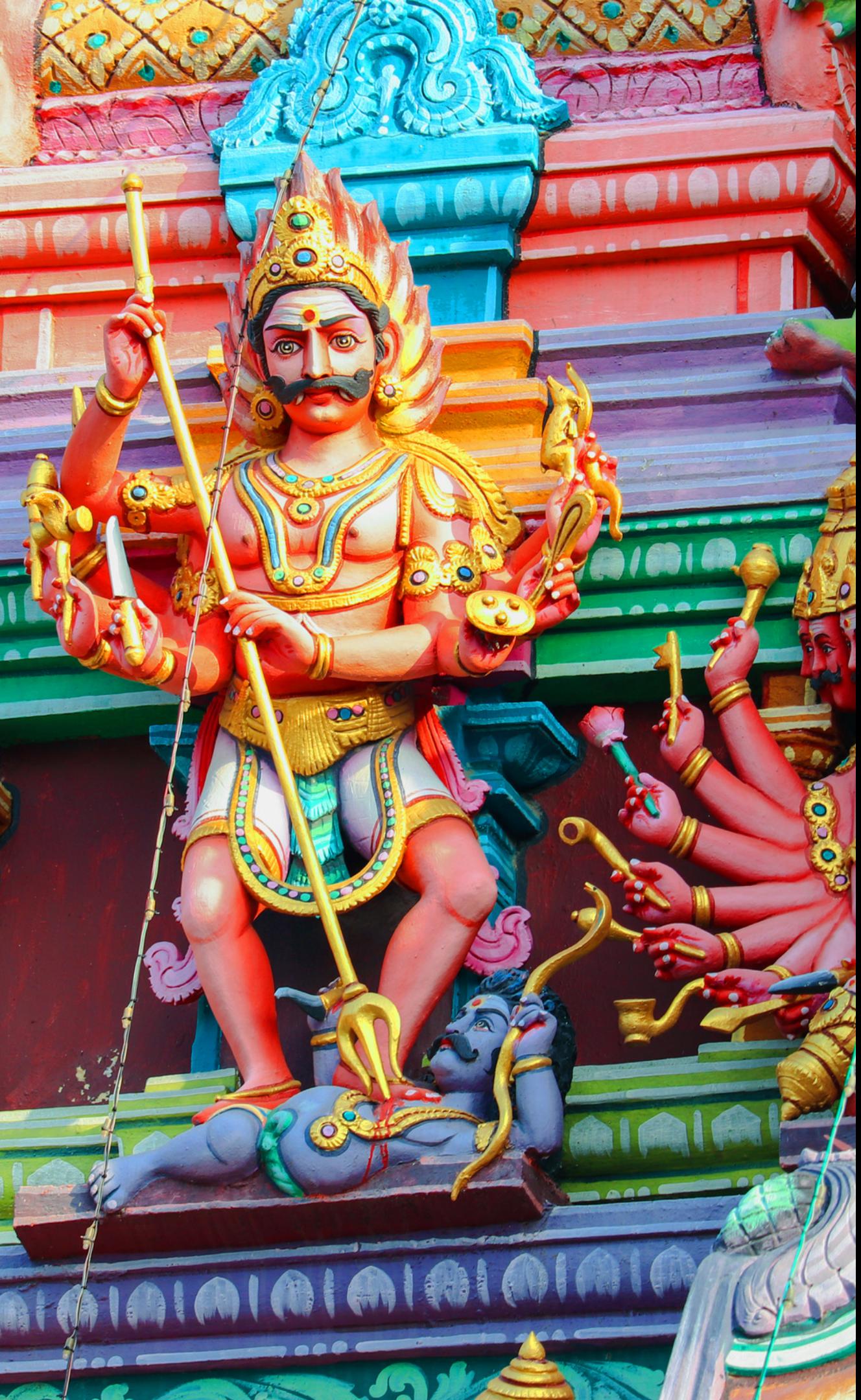
## FOOD WASTAGE

150-tonne food down the drain every day in Pune

PUNE: Eateries in the city dump over 150 tonnes of leftover food every day, or 54,000 tonnes a year — an amount that would be more than enough to save thousands of lives succumbing to malnutrition in the state.

In 2015-16, around 18,000 children in Maharashtra died because of hunger. The Union government wants hotels and restaurants to mention the quantity of each serving or plate of food item in their menu in grams or number of pieces to stop food wastage. While there has been mixed reactions to the Centre's initiative, the scene in the city is worrisome against the backdrop that over 93 lakh children across the country are suffering from severe acute malnutrition.

The Pune Municipal Corporation (PMC) collects around 125 tonnes of leftover food from eateries in the city every day. Big restaurants have their own processing units and they take care of the leftover food. This would be approximately 25 tonnes of leftover food. According to a PMC estimate, the leftover food amounts to over 150 tonnes a day. The quantity was about 140 tonnes a day five years ago. However, these are official figures. There are thousands of small eateries that are not registered with the PMC and the civic body is unaware of the quantity of leftover food in those outlets. Nobody wants to waste food.



# CHENNAI

Vegetable prices in Chennai have skyrocketed following the incessant rains across the state over the last four days. Traders and vendors attribute the spike to high demand and low supply due to damage of crops, and **delays in transportation**. Tomatoes, for instance, were retailing at Rs 125/kg on Wednesday, up from Rs 100/kg a day before. At wholesale markets, where tomatoes are sold at Rs 35-40/kg, it is now Rs 60-80/kg.

On an average day, close to 400-450 trucks arrive at Koyembedu with produce. However, due to the inclement weather, only 300 trucks are currently reaching the market.

Since the crops are damaged and supply is less, of the few vegetables we get, most are either spoilt or rotten. The produce is not of the same quality we used to get. So, we try to make business with the ones we have and we barely make any profit. Divya, a resident of Besant Nagar, said, “The prices of vegetables are too high, especially essentials like tomatoes and onions. First, the price increased, and so did the price of petrol. Now, it has increased more because of the rain. I had to think twice before purchasing the quantity that I required due to the price hike. If the price goes on increasing, it will become hard to manage.”



# LUCKNOW

The agrarian economy of Uttar Pradesh continues to grapple with low productivity and lack of proper infrastructure and forward industry linkages.

Since a major chunk of the state population subsists on agriculture and the sector also comprises a major share in the state gross domestic product (SGDP), reforms in the sector are urgently needed.

Improvement in the sector in the context of UP is also vital to maintain food security in the country and to insulate India's economy from the recurring fluctuations in the international commodity prices.

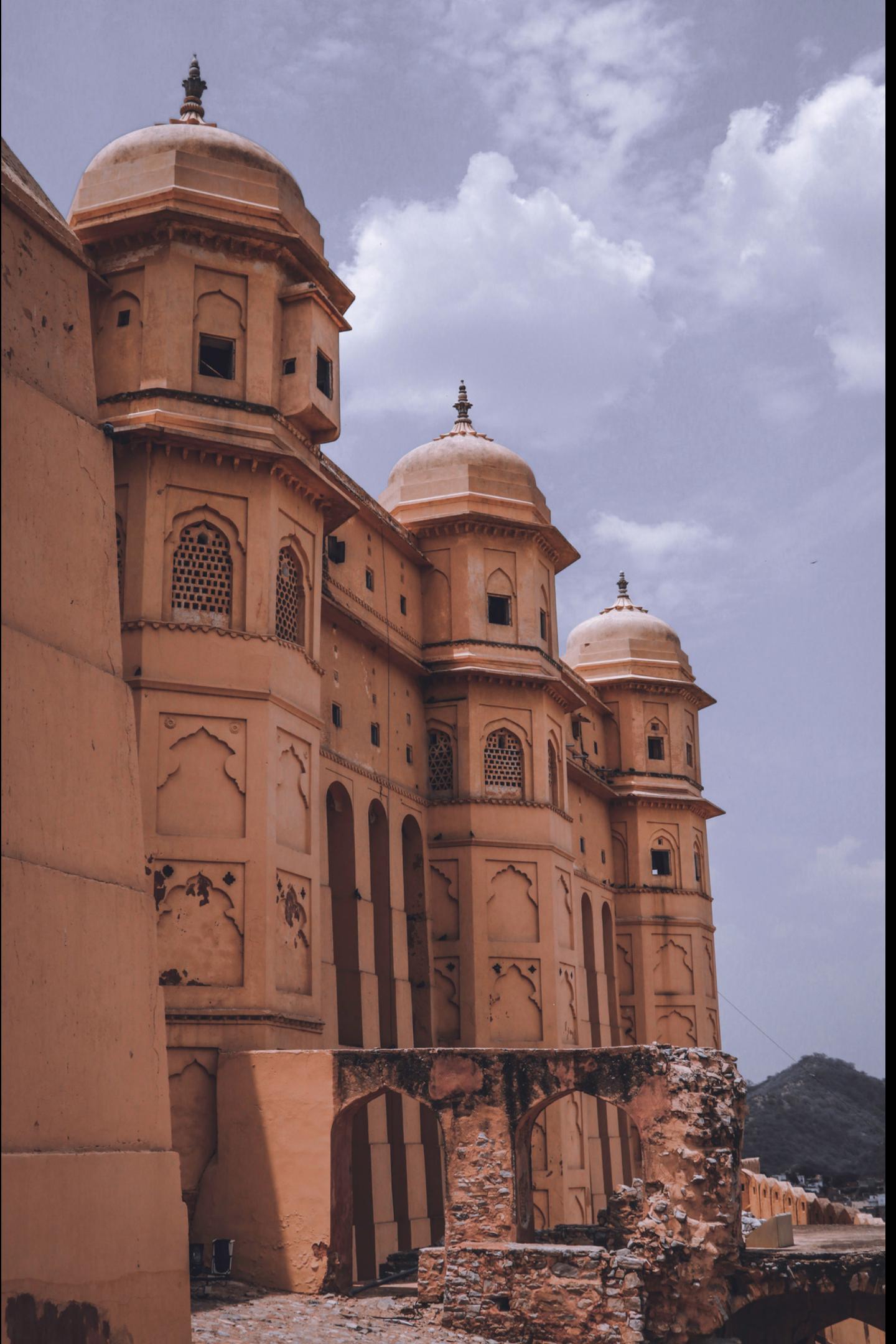
Almost 90 per cent of the state's farmers are small farmers and have very little understanding of and access to institutional credit. Agriculture and allied activities including fisheries, animal husbandry, dairying and horticulture play a major role in the economic development of the state. UP also figures among the top producers in the country on the sheer basis of area under crop.

However, if we consider the acreage (production per acre), gaps in farming get apparent. Agricultural production, including paddy, wheat, pulses and oilseeds, has been fluctuating over the years and has not posted much growth.

Several other crops have registered negative growth or even decreased in productivity, such as pulses.

In UP, almost half of the small farmers are indebted. To make the matters worse, there is declining public investment in agriculture, stagnant gross capital formation and falling share of agriculture in the total plan outlay. There has been a deceleration in the sector over the past decade according to a state planning department note.

Lack of proper infrastructure and proper marketing channels have proved to be impediments to the growth of the sector.



# JAIPUR

Jaipur's rapid development has resulted in its infrastructure lagging behind population and industrial growth, which is especially evident in the unsightly and unsanitary piles of solid waste (garbage) on the roads.

Jaipur Municipal Corporation (JMC) was collecting around 1,450 tons of garbage every day which since the pandemic has gone down 40% to 950 tonnes out of which 38% was Food and edible waste, this waste was picked up by over 580 hoopers, and the number of rounds each hooper had to take fell down from 2400 to 1800. This indicates a reduction in the overall wastage created by the population but still is a big issue. The country's GDP has been increasing at 8% per year. In Jaipur, the population was 2.34 million according to the 2001 census and is now estimated to be over 3.5 million. The process of development involves effects of globalization such as a growing economy, imported 2 resources, information and technology sharing, and more extensive infrastructure. As the growth of various sectors has exploded, more inputs are required. This necessarily means more output is also produced, manifesting itself in a large volume of waste. "Waste" is simply something that is no longer deemed useful and is discarded and daily production of solid waste is around 1100 MT/day from which lifting efficiency is around 80% leaving 200-250 MT/day on the street and the remaining which gets picked up and processed, 38% of it is considered to be food and edible wastes which then leads to an average family size of five residents in Jaipur results in 1.75 kg of food waste per day.



# BANGALORE

Bangalore's growth as a metropolitan city in terms of progressively becoming developed as a city has been exponential in the last decade or so.

Karnataka ranked third in NITI Aayog's Sustainable Development Goals (SDGs) India Index for 2020-21, as per a report released on Thursday. The city has improved its score from 66 in 2019-20 to 72 in 2020-21 and improved its ranking from fourth place to third. The State has shown progress in nine of 16 goals. Karnataka improved its scores on indicators related to reducing poverty; good health and well-being; gender equality; affordable and clean energy; industry, innovation and infrastructure; sustainable cities and communication; responsible consumption and production; and peace, justice and strong institutions.

In the SGD vision proposal given by the government of Karnataka:

Target 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses

The nodal department for the indicator “Infrastructure created to minimize the post-harvest losses of fruits and vegetables” is the Horticulture Department. There are 4,665 post-harvest structure in the State and the department aims to increase the same to 4,900 by 2022 and 5,300 by 2030. The department aims to achieve the target set by creating a post-harvest infrastructure in the State like pack house, ripening chambers and cold storage structures, primary and secondary processing units, plastic crates and Agriculture Produce Market Committees (APMCs) etc. The Department provides 35-90% assistance for the creation of post-harvest structures under different schemes to individuals through Farmer Producer Organisations (FPOs) and Boards.

PROBLEMS THE WORLD IS FACING AND  
how they are tackling it

The present technical brief discusses the process of development of the Uganda national strategy on post-harvest loss reduction in grain supply chains (FAO, IFAD, MAAIF & WFP. Forthcoming), which was developed in the framework of the project using the FAO food loss analysis methodology. The brief shares recommendations and lessons learned from the development of the strategy, which can be used or adapted by governments developing a post-harvest loss reduction strategy to coordinate interventions, engage with key stakeholders, and invest and allocate resources to achieve post-harvest loss reduction goals.

The food loss analysis methodology is based on a combination of the following four methods:

- 1 : a screening to provide an overview of the subsector and to select the food supply chain to be studied;
- 2 : a survey to identify and assess the critical loss points and the possible major causes of losses at different levels;
- 3 : a load tracking and sampling method to collect indicative quantitative data and qualitative information that supports the findings of the survey on the critical loss points and the main causes of losses;
- 4 : and a synthesis and solution finding component to identify and assess solutions that are technically, economically, socially, environmentally feasible for reducing food losses.

## WHO ARE THESE STAKE HOLDERS?

The development of the post-harvest loss reduction strategy drew on consultations with a wide spectrum of stakeholders, which included actors in the grain value chain:

producers, aggregators, processors, technology suppliers, warehouse operators, distributors and consumers; MAAIF and other ministries such as the Ministry of Trade, Industry and Cooperatives (MoTIC); the Ministry of Finance, Planning and Economic Development; the Ministry of Works and Transport; the Ministry of Local Government; Academic and National Agricultural Research Organisation and other state actors, development partners, international organizations, private sector companies and civil society organizations.

# PROBLEMS FACED BY THE WORLD

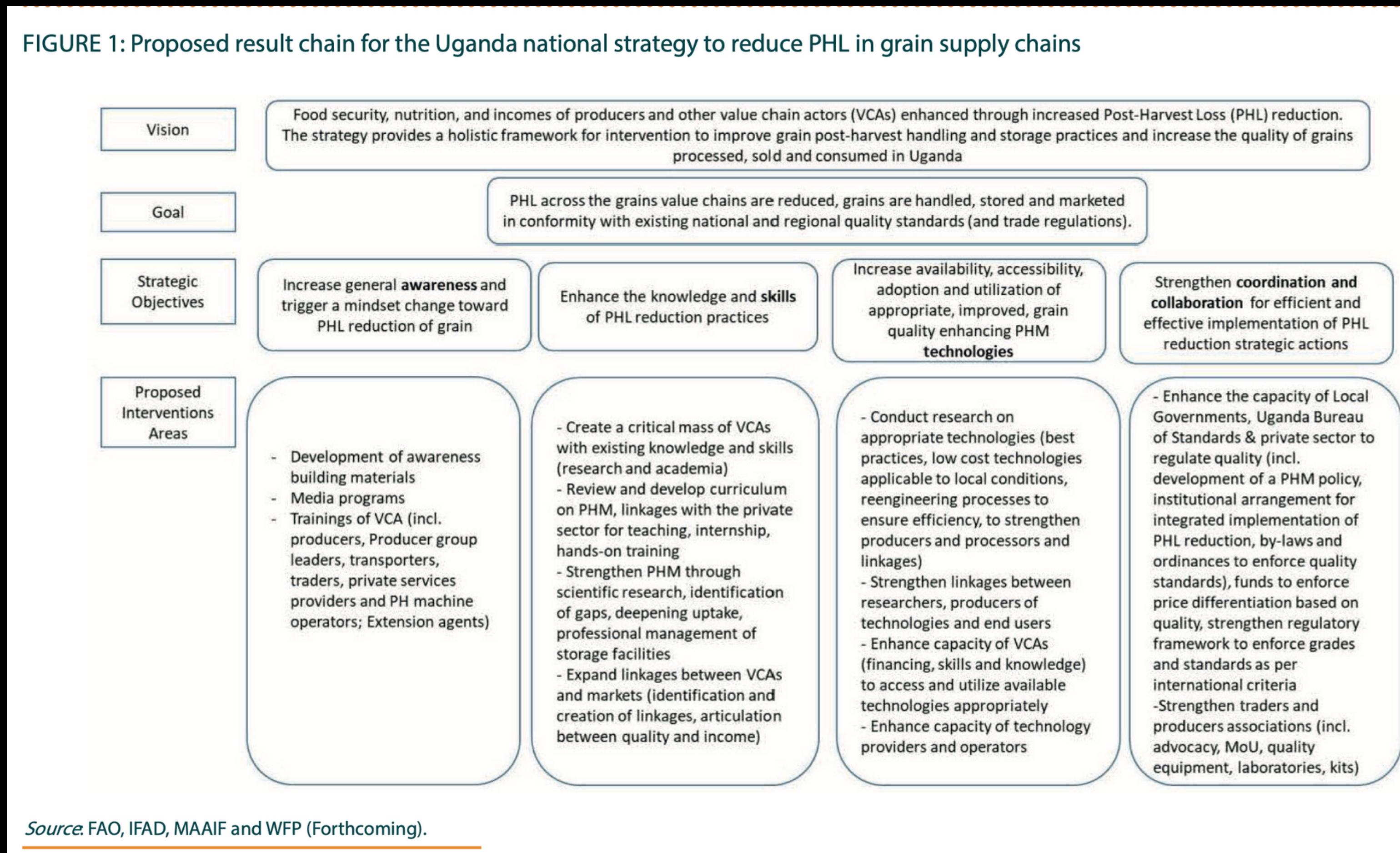
- Poor mind-set
  - Lack of knowledge of good storage practices (Bags stacked up to the roof, on walls and/or on the floor; non-use
    - and misuse of fumigants/pesticides; counterfeit chemicals; mixing of grains; poor packaging materials
    - causing proliferation of pests, rodents and weevils; rough loading and off-loading)
    - Poor storage materials/facilities; poor ventilation; roof leakage
    - High cost of storage and chemicals, inaccessible and hazardous use of pesticides

## *DISTRIBUTION AND MARKETING*

- Lack of knowledge of good practices (rough/improper handling and loading of bags; spillage; spoiled produce mixed with good)
- Low-quality sacks and bags
- Bad road and vehicle conditions; poor market infrastructure
- Traders' lack of funds for accessing appropriate markets
- Pilfering during transportation
- Exposure to bad weather

# HOW DID THEY TACKLE IT ?

FIGURE 1: Proposed result chain for the Uganda national strategy to reduce PHL in grain supply chains



**THE INDIAN GOVERNMENT IS COGNIZANT OF  
THE POOR STATE OF COLD CHAIN LOGISTICS AND  
HAS IDENTIFIED SEVERAL AREAS OF CONCERN,  
A KEY ONE AMONG THEM BEING INADEQUATE  
ROAD CONNECTIVITY.**

Significant quantities of perishable goods are wasted, with the estimated loss amounting to around INR1,000 billion at current prices. Apart from the entire system suffering monetary losses, this results in unavailability of food for those for whom it is intended at a time when malnutrition among children is as high as 45% in the country.

CASE STUDY 1

**UZHavar SANDAI IN TAMIL NADU**

## PROBLEM

1. Due to the involvement of middlemen transportation of the produce is being delayed. due to this delay, most of the produce is being spoilt.
2. The trucks are not well equipped to transport goods as they prefer low-cost trucks.
3. The produce is transported through a lot of places before it reaches the main market to increase sales.
4. Unconventional routes are being taken to save fuel.
5. The produce is exposed to unconventional temperatures as they travel to different parts of the country without proper types of equipment.
6. Due to the increase in the supply chain the prices are being skyrocketed which results in the wastage of these products in the market.

Generally, the middlemen and wholesale businessmen purchase the Agricultural products from the farmers at a lower price. They also get the commission from the farmers for the transactions made. In turn, fresh vegetables and fruits purchased at the lower price from the farmers are sold out to retail businessmen at higher price and the retail businessmen sell those Agricultural Products further at higher price to the consumers. As a result, the farmers get only the lower price for their produce whereas the consumers have to pay higher price for the same produce. Hence, the Government of Tamilnadu has introduced an alternate scheme of marketing, which is known as “UZHavar SANTHAI” in order to derive more benefits to the farmers as well as consumers.

Aim:

- To facilitate direct contact between the farmers and public.
- To provide fresh vegetables and fruits at reasonable price daily without any interference of middlemen.
- To provide correct measurement to the consumers.
- To give full satisfaction to the farmers and public.
- To aim for providing higher price than that of wholesale price to the farmers for their vegetables and fruits.
- To provide the fresh fruits and vegetables at the lesser price than that of retail price to consumers.
- The Uzhavar Santhai also functions as a Technical Information Centre to the farmers
- It also acts as a Technical Training Centre to the farmers.
- Seeds and Other Inputs are also provided in some Uzhavar Sandhais
-

## WHY WAS IT A SUCCESS?

### A SUCCESS STORY

The scheme of Farmer Markets (Uzhavar Sandhai) is, by and large, functioning successfully, Chief Minister M. Karunanidhi said on Monday.

The number of farmers visiting the markets in December 2009 was 2, 65,671 whereas it was 2, 09,128 last year and 1,90,187 in 2007. The figures of sales of fruits and vegetables were 60,501 tonnes in December 2009, 47,173 tonnes in 2008 and 33,992 tonnes in 2007. The numbers of consumers went up from 57,51,138 in December 2007 to 1,07,83,055 two years later, the Chief Minister said in a statement.

source : the hindu

<https://www.thehindu.com/news/cities/chennai/Uzhavar-Sandhai-a-success-story-Karunanidhi/article16838278.ece>

The whole idea of UZHVAR SANDIS is to connect the farmer directly with the consumers by eradicating the connections of middlemen.

This became a successful approach as it ensured

1. the produce reaches directly to the consumer in the least possible time without anyways stoppage in the middle. This makes sure the product is not spoilt in the process of transportation.
2. By teaming up with the government farmers are provided with the most technologically advanced transportation.
3. Farmers do not have to worry about storage as the whole process consumes minimal time and the produce can be freshly cut and transported and their produce is sold on the same day.
4. Due to the prices being less the product is being completely sold which reduces the headache of storage the unsold by the end of the day.
5. All the local transportation agencies are assured of jobs as only one fixed agency is not being called for work every time.
6. Since the produce comes directly inside the city, highways are being used which reduces the necessity to go through bad roads and climatic conditions.
7. These markets are conducted in the nearest possible town or city present to the location of the farm.

CASE STUDY 2  
PROTECTION OF CROSS CONTAMINATION

# CROSS - CONTAMINATION

Food handling is a process of preparing food that is safe for public consumption. It is necessary to comply with safe food handling processes to avoid contamination which may lead to outbreaks of foodborne illnesses e.g. salmonella. According to the World Health Organization (WHO), foodborne illnesses can cause long-lasting disability or even fatality. That is why it is important to keep the vehicle clear of debris, clean, and odor-free before loading the products. The presence of any cross-contamination could spread throughout the packaging and spoil the goods being shipped. Multiple transfers of goods can also damage the packaging or the product itself, it is advisable to have direct consumer transactions to reduce the risk of contamination.

Cross-contamination between products during shipment and from transport vehicles from prior shipments remains a significant issue. It was this issue that singularly prompted Congress to pass SFTA. The most significant means for cross-contamination is by way of less-than-full-load (LTL) shipping practices.

A truck, train or other carrier arrives at your receiving dock and, to your dismay, you learn that your freshly boxed vegetables have been commingled during transportation with freshly boxed raw meats and assorted bags of food-grade chemicals. Sound unrealistic? Unfortunately, this scene is played out on a daily basis for food companies that ship or receive products on a less-than-full-load basis. In a related situation, consider receiving a container from your trucking company that is “broom clean,” but reeks from the odors of industrial chemicals. Do you load this truck with your cellophane-packaged cookies? If so, what are the risks to the consumer and to the business? This situation, too, is frequently a daily dilemma for the transportation, food safety and QC staff of many food processors.

At IPSC, they have constructed a product handling and compatibility matrix that shows types of food products (e.g., frozen meat, dry goods, fresh produce) as both outbound and backhauled items. Included in the matrix are hazard classification categories, ranked from those scenarios with the highest risk of cross-contamination (Category 1 Hazard) to those with the lowest risk (Category 4 Hazard). After the food processor has consulted the matrix and determined a system of hazard classification, he can then consult the definitions of the appropriate hazard categories and make a sound decision about effective preventive measures.

For example, if the first shipment contained in a truck includes industrial equipment, botanicals or chemicals and the product being backhauled is fresh produce, the matrix shows the processor that this is a Category 1 Hazard: Special Handling. The Category 1 Hazard classification is reserved for hazards associated with chemicals, industrial equipment, botanicals and other sensitive nonfood materials. Category 1 represents the greatest risk for product contamination due to chemical or biological agents. Because of the high degree of associated risk, great care and diligence must be exercised when selecting product combinations that are assigned the Category 1 hazard classification. The company's food safety transportation program manual will include a set of preventive measures that correspond to Category 1. For example, such preventive measures would include the following:

1. Preventive Measures (Category 1 Hazards).
2. Preventive Measures (Category 4 Hazards)

*The risks associated with LTL shipments are a fact of life for the food processing industry. Moreover, due to economic considerations, there appears to be a trend toward expanding this practice. The delivery of foods from warehouses and distribution centers to the retail trade is done today almost exclusively on an LTL basis. In response to this food safety issue, a number of food processors and trucking companies have aggressively sought to implement transportation food safety programs. Such programs are intended to minimize the risk of cross-contamination during transportation. In general, the food processing company will work with its trucking companies to first identify compatible products and to prescribe the cleaning and sanitation measures that are required between shipments.*

## RESULT

THE process is being successfully run in a lot of high profitable firms that have enough money backup and care about the feedback and the satisfaction of their customers.

- 1.the product is being sent fresh to the consumer.
- 2.there is no sign of contamination in the produce.
- 3.life of the produce is long lasting
- 4.diseases due to consumption of cross contaminated produce.

The difficulty rises when we expect the smaller firms to adapt this method. Financially lacking firms find it difficult to adapt to this method as shipping different goods in different transportation methods cost more money.

# RESULTS OF CASE STUDIES

## **PROBLEMS IDENTIFIED IN THE CASE STUDIES**

1. Involvement of middle men increases time resulting in wastage of the produce.
2. Not knowing the best routes to reach a desired place
3. Not knowing the best conditions to store and transport produce

# PROPOSAL

## AN APP THAT :

1. analyses the type of produce harvested by the farmer
2. analyses the perfect supervisor for taking care of the produce during transportation.
3. suggests the shortest routes and best supported weather conditions for the transport.

## HOW DOES IT WORK?

- the application will be available in the most basic phones, even those that run on basic versions of different softwares.
- once the farmer downloads the app, it tracks the locations and requires one to upload basic details about the exact location of the farm and the farmer details.
- different transport agencies also register in the app providing information about the amenities their vehicles provide.
- the app analyses the kind of grain harvested and the distance to the nearest market and suggests the best suited vehicle to opt for.
- the app has a priority list from the best option to the least possible option. the farmer according to his budget can choose the desired vehicle.
- if any farmer wishes to do all by himself or herself, the app connects the farmer directly to the government run institutions to approach for knowledge about the right storage and transport for the produce.
- timely notifications and tips for the care of their crops.

## WHY DO WE NEED THIS APP? ISN'T THERE ANYTHING ALREADY EXISTING?

the need for this app rises since there has been no solution for the problem in this field. the world has witnessed wastage of grains due to which there is a rise in prices but never really given a thought of how and why. the farmers are not educated properly.

there are different provisions for different problems such as farmers have access to knowledge of how to take care of the produce and they have contact of local transportation agencies and such in different modes. the lack of communication between these modes is what costing the farmer his harvest and the common man his money.

## WHY WOULD THIS BE A SUCCESS?

this app could become one of the biggest problem solvers as it establishes a communication between the different elements of the journey of a produce from the farm to our houses.

## ADVANTAGES OF THE APP

- reduces the travel time by identifying the shortest and the best route.
- makes sure there is a knowledgeable person in case things go wrong.
- provides information about care and gives tips for their better growth.
- all the transport agencies get opportunities rather than just one.
- live tracking facility for the farmers and the sellers to know when to set up the store and what conditions to provide with the arrival of the crops for better storage.

## WHAT PROBLEMS IS THE APP GONNA SOLVE

- 1.Travelling in bad road conditions
- 2.Not knowing the proper requirements for certain times of grains
- 3.Travelling under bad weather conditions
- 4.Lack of supervision and man power
- 5.Extremely long routes to reach the desired market
- 6.Involvement of middle men and a huge supply chain
- 7.Trafficking and commissioning of the produce in the supply chain.
8. Extreme high prices of grains in the market.
- 9.Unemployment of travel agencies
- 10.Farmers lacking knowledge about their crops

## IMPROVEMENTS YET TO BE MADE

- 1.increasing the supply chain online.
- 2.increasing stops in the smaller areas while travelling
- 3.associate with the government to provide exemptions in rates for transportation and production grains.
- 4.Reduce financial implications as much as possible

OVER 1,50,000 USERS PAN INDIA



THE MOST ADVANCED SOLUTION TO PROTECT THE PRODUCTS  
AND ENSURE SAFETY FOR BOTH CONSUMER AND RETAILERS

GET IT ON  
 Google Play

Download on the  
App Store

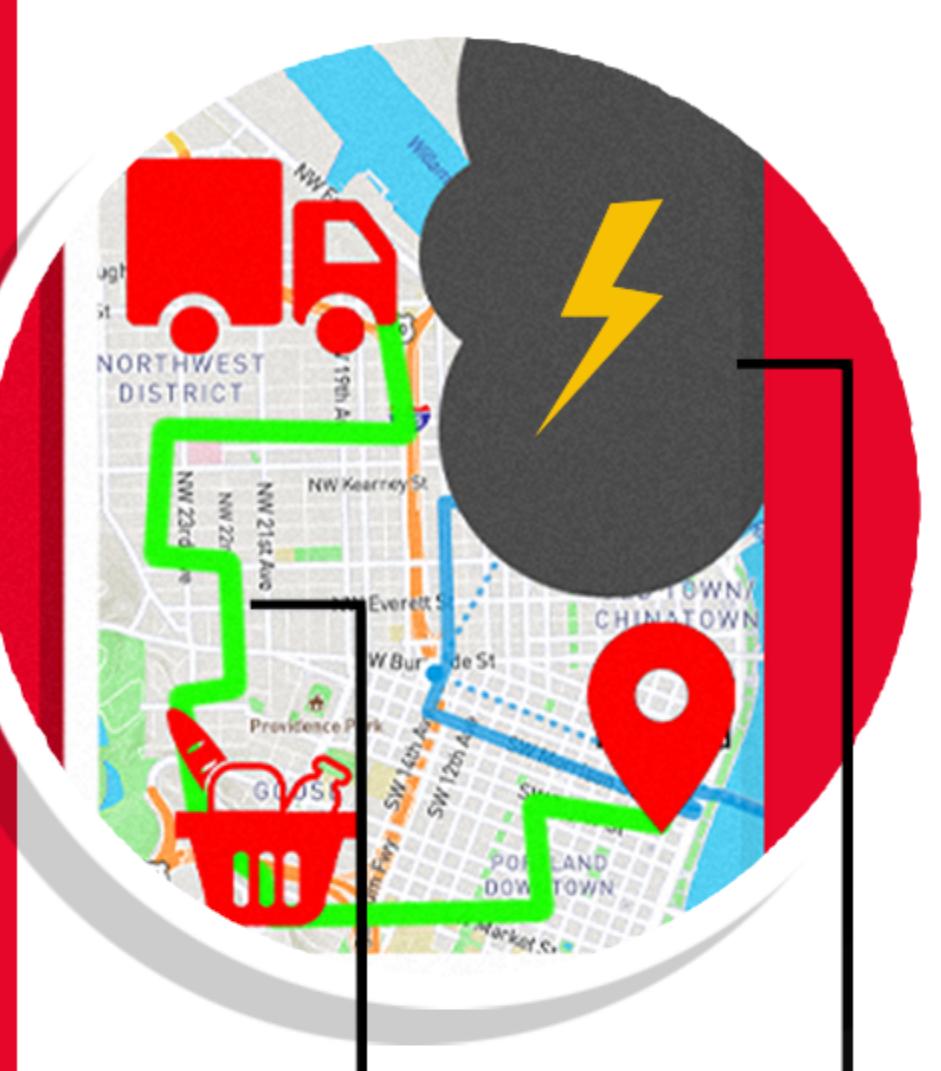
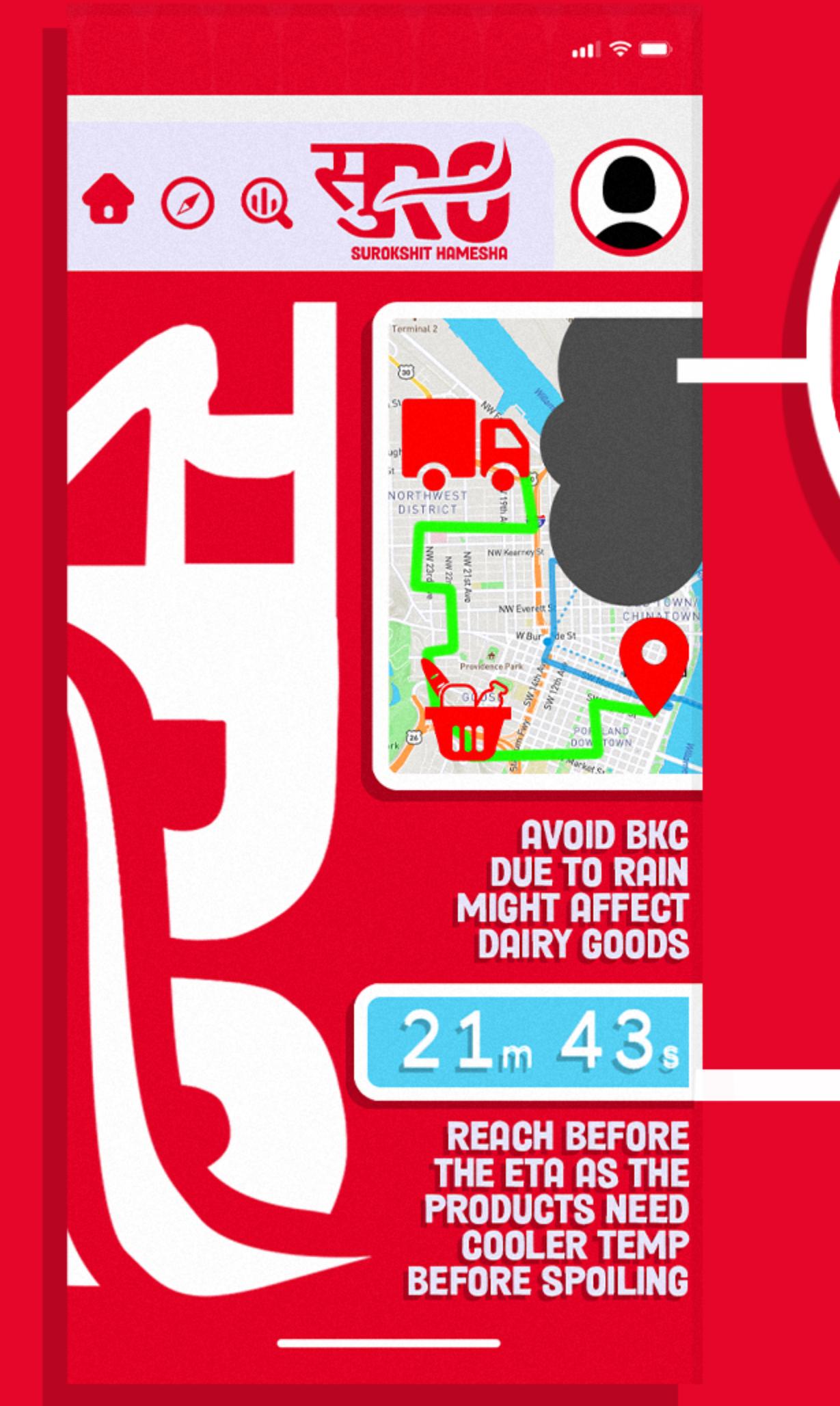


OVER 1,50,000 USERS PAN INDIA  
INCLUDING DRIVERS, RETAILERS  
D2C BUSINESSES & MORE

EASY TO USE AND  
SETUP HELPING LAKHS  
OF DRIVERS AND STORES  
SAVE THE PRODUCE



PROTECTING  
PRODUCE



**IDENTIFIES STORMS AND  
FINDS ROUTES USING  
ADVANCED ALGORITHMS  
ENSURING BEST TEMPS  
FOR THE PRODUCTS**



TIMER WHICH TELLS  
THE USER ABOUT THE  
ETA IN WHICH HE  
SHOULD PROVIDE THE  
PRODUCTS BEFORE IT  
GETS SPOILED/WASTE

# REFLECTION

the whole project started with self reflection. the first task being the analysis of our own houses. this gave an insight of how we are miss-using resources at the most basic level of the chain. It taught us the right way to analyse situations and bring out the outcomes. Having an aim and a topic to disclose really helped the analysis. As a designer, being sustainable is similar to the Hippocratic oath taken by doctors. Having a knowledge of the goals is completely different than understanding them through research. The most interesting part of the project was narrowing research to the rurals of our cities. The lack of resources and knowledge we see there is enormous. Creating a design solution to solve a problem that has an economic and logistical problem was an interesting task. It tested our strategic abilities. Research is the biggest part of any design intervention, this project taught the right way to go about things, the right questions to ask and the right data to depict and depend on.