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Scaling-up nutrition: Bridging the great Indian hunger divide

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Ishani Ghosh and Praveen Nahar

Scaling up nutrition

Bridging the great Indian hunger divide through systemic thinking and design

Abstract

This research reflects on the wicked problem of malnutrition in India by a case study of an academic project carried out in National Institute of Design, India titled 'Bridging the Great Indian Hunger Divide through Systems Thinking and Design'. The project is an inquiry into the perplexing ubiquity of hunger, poverty and malnutrition in a fast growing economy like India. This project is an attempt to understand and analyse the multi-dimensional complexity of the myriad branches of the food system in India and the various components that back it. The key questions was- 'How can the Indian food system be designed to ensure food security?' The project built upon the principles of system thinking to understand the various opportunity areas for intervention. With a vision of a nourished India, the project concluded with the mapping of opportunities across all dimensions and conceptualisation of possible interventions that can bolster the existing system.

Introduction: The National Food Security Act, 2013

The state of hunger in India is alarming despite it being agriculturally self-sufficient country. India is at a helm of unprecedented economic growth and despite all its efforts it is not able to rapidly extract children out of the malnutrition cycle to further engage them in the bright future that the government envisages for them. Malnutrition is a vicious cycle, where an individual with malnutrition is unable to utilise the nutrition from the food consumed making them susceptible to illnesses and infections that can cause further malnutrition and so on and so forth.

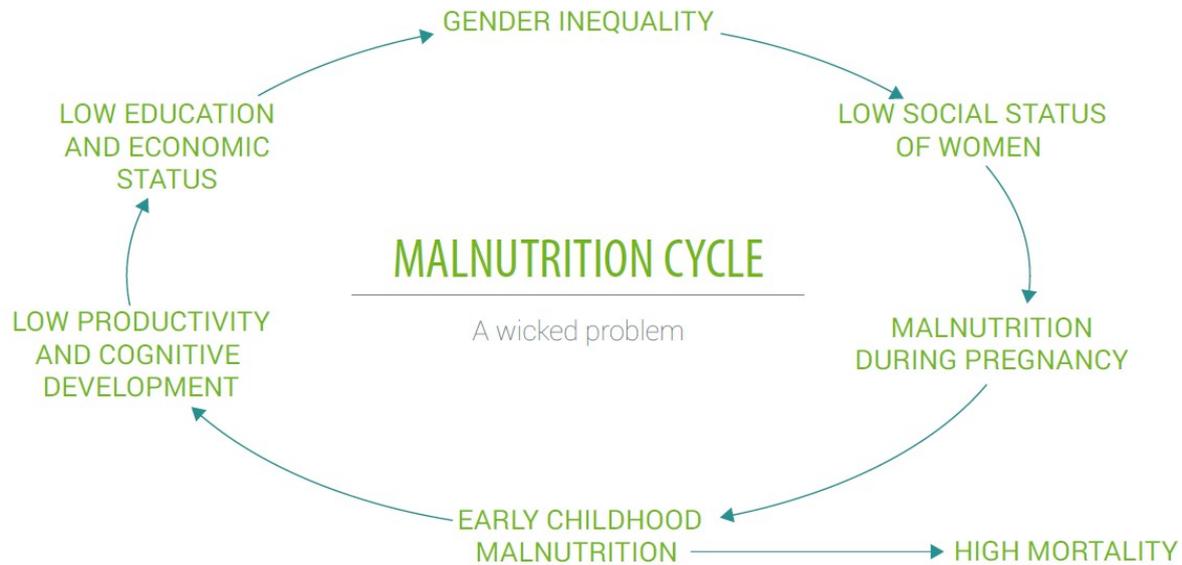


Figure 1. Large scale implications of malnutrition in an individual.

The National Food Security Act of India forms the backdrop of the project. It is “an Act to provide for food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity and for matters connected therewith or incidental thereto.” The Act was introduced in 2013 to support farmers and give legal rights of access to food to almost 8.1 crore intended beneficiaries. This number translates into 50% of the urban population and 75% of the rural population. The act leverages three existing food schemes in India to address the unmet needs. The ICDS (Integrated Child Development Services Scheme), MDMS (Mid Day Meal Scheme) and the TPDS (Targetted Public Distribution System) work in collaboration with both the central government and the state governments. (India Code, n.d.)

As per the Act, across India, these schemes have identified their targeted beneficiaries and the benefits due to them which translate as follows:

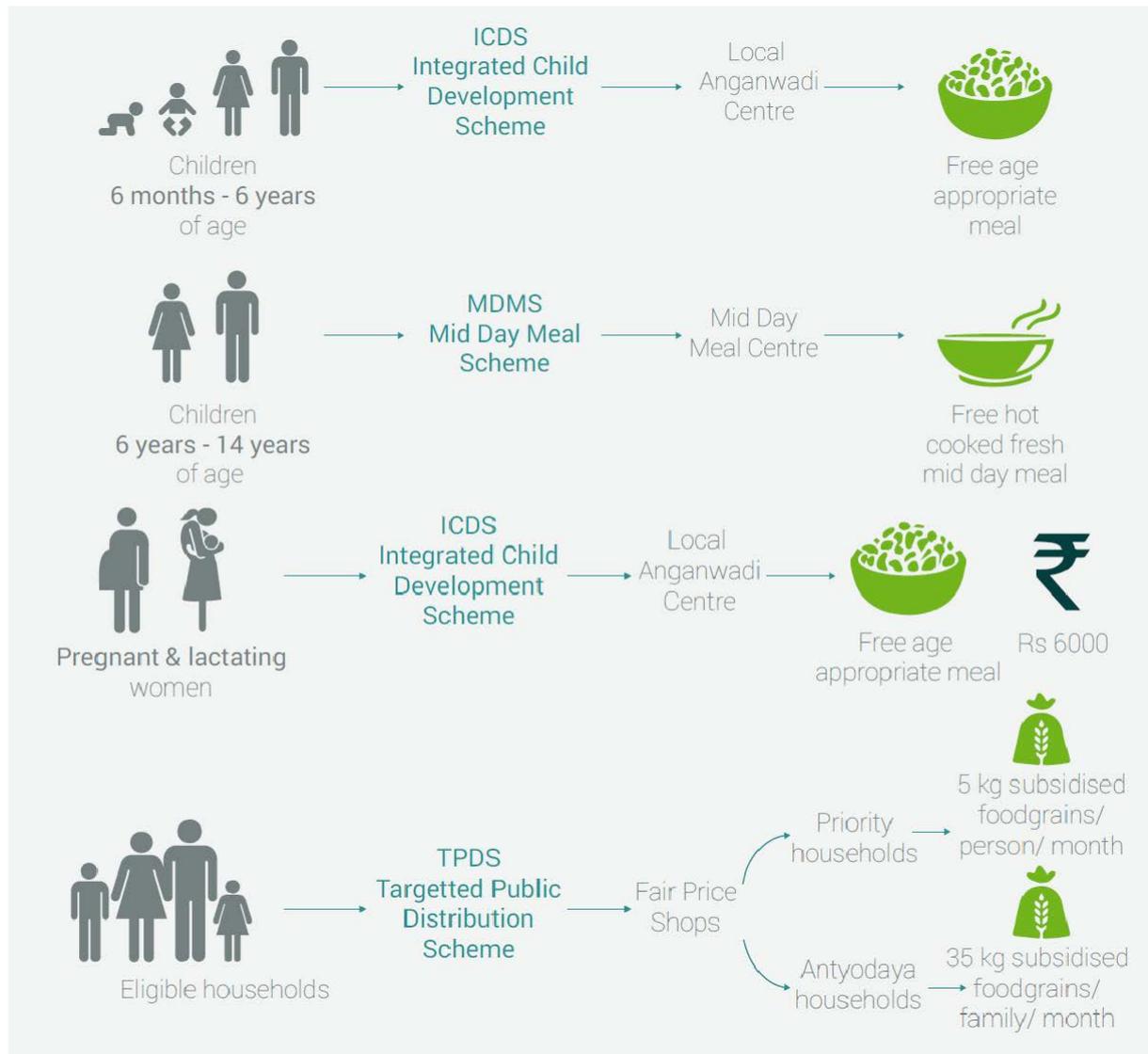


Figure 2. The eligible beneficiaries and the benefits due to them as per the Act.

The targetted beneficiaries protected under the Act are:

- Children under the age of 6 years, who are from poorer households are covered under the Integrated Child Development Scheme (ICDS) and are entitled to a free age appropriate meal per day.
- Children of the age of 6 to 14 years enrolled in government and government aided schools are covered under the Mid Day Meal Scheme (MDMS) and are entitled to a freshly cooked hot meal on school days.

- c. Pregnant and lactating women are covered under the Integrated Child Development Scheme (ICDS) and entitled to cash maternity benefits as well as supplementary nutrition.
- d. All households eligible for access to subsidised food grains are covered under the Targetted Public Distribution System (TPDS) and are entitled to a monthly ration.

The great Indian hunger divide

Although systems design for food security is largely an unexplored territory in India, widespread malnutrition in India isn't a manifestation of the absence of systems to tackle it. The great hunger divide in India evidence of a system in disarray. As mentioned earlier, the National Food Security Act, 2013 leverages three key food schemes in India, which are implemented pan India collaboratively by the central government and the state governments.

Under the MDMS, the government schools also know as the mid day meal centres are supplied with subsidised food grains from the state grain stores. These centres are responsible for providing the enrolled students with internally cooked/ externally procured cooked food in a safe and hygienic environment.

ICDS is implemented via the anganwadi centres, i.e., courtyard shelter, which are responsible for monitoring and aiding early childhood nutrition of the community in that area. They are responsible for providing age-appropriate supplementary nutrition (packaged or otherwise), along with health and nutrition education and immunisation to young children and mothers. TPDS works in securing the benefits of both the supply and demand sides of the food grain chain. It supports farmers against market price fluctuations and by ensuring their protection against exploitation. It also works in maintaining sufficient food grain stocks for contingencies and makes food grains accessible to the poor by subsidising them. Fair Price Shops stock and sell subsidised grains to the eligible beneficiaries at the government set prices.

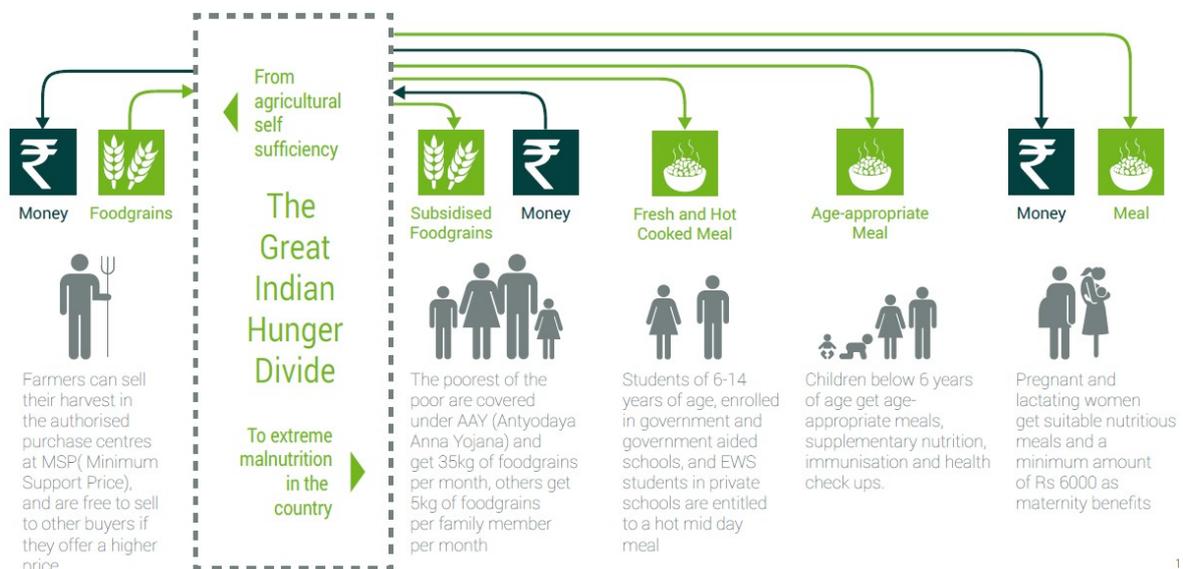


Figure 3. What is causing this great hunger divide?

These schemes seek tackle malnutrition and by linking it with contemporary concerns such as women empowerment, caste system, child labour, right to education, maternal healthcare, micro and macroeconomics, personal hygiene and household nutrition.

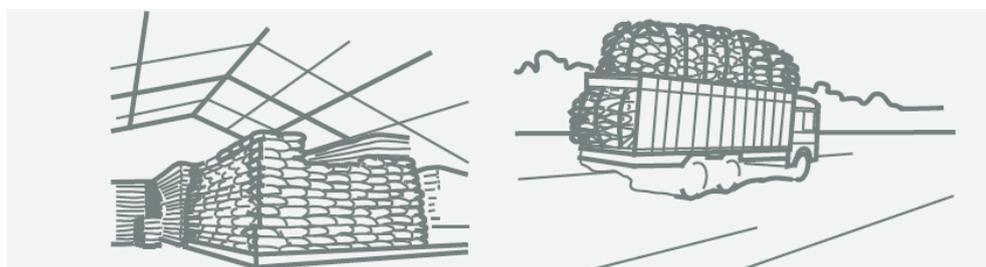
To further understand why the state of malnutrition is as is in India inspite of all the support systems, the study expanded into the global and national political, legal, historical, social, economic, logistical, emotional, aspirational, cultural and futuristic angles of food, eating and cooking and agriculture in order to find all possible interdependencies in the system. By employing the methods design thinking, system modelling and challenge mapping the Indian food system was decoding component by component and layer by layer.

Decoding the Indian food system

Food grains and money are the main ingredients of any food system, as is also clearly elaborated in the National Food Security Act of India. However the additional components such as the that policies, vigilance mechanisms, infrastructure, key data sets as well as the administrative structures play crucial roles in the system as well. Food security of a nation is ensured by the seamless interaction of these components at all levels: National, state, district, local, family, and individual. Achieving food security is a complex task which requires that food be internationally and nationally available, locally accessible, economically affordable, quantitatively and qualitatively adequate and finally biologically utilised by every individual. Simple as they may sound, these are difficult requirements to fulfil because of their myriad dependencies across various domains.



Availability or the existence of food depends on the capacity and ecological viability of a nation's domestic food production, seasonal stock piling of food, international and national trade, resilience to natural calamities, man-made disasters, climate change and weather fluctuations, as well farmer support and rural infrastructure in the form of local market access to farmers to sell their produce at viable prices. It is taken care of by the TPDS.



Accessibility to food means the transportation of harvested food items to the open market/ retail with direct access to the consumer and storage of surplus harvest for utilisation in the event of any agricultural calamities. It is determined by the civil infrastructure for storage and transportation, efficient and honest monitoring and management of stocks, unprejudiced food allocation to all (states, communities, genders etc). The priority is to ensure that what is due to a beneficiary reaches them and doesn't get diverted in the process. It is taken care of by the TPDS.



Affordability is the ability to purchase food. This is achieved by Government interventions to ensure purchasing power for all by designing economically viable pricing policies, special schemes and subsidies to economically and geographically fragile consumer groups. It is largely dependent on the economic status of communities and their knowledge of and access to government policies as well the absence of the black marketeers. It is taken care of by the TPDS.



Adequacy implies adequate daily energy and nutrition intake of an individual. It is dependent on the regularity and frequency of optimum quantities of balanced, hygienic and nutritious age/occupation-appropriate meals. Even if all the processes mentioned above work well, it is at this level that malnutrition starts to manifest. In India, an individual's food consumption is dependent on the intra household food distribution practices. Low purchasing power of the family means that the family is not able to procure adequate food for themselves. Lack of nutritional knowledge and poor food preparation, feeding practices and eating habits mean that nutritional value of the food can be lost at the time of cooking or post cooking storage.

And finally, lower status of women and the girl child in the family/community mean that there is differential distribution of food within a family. It is partly taken care of by MDMS and ICDS.

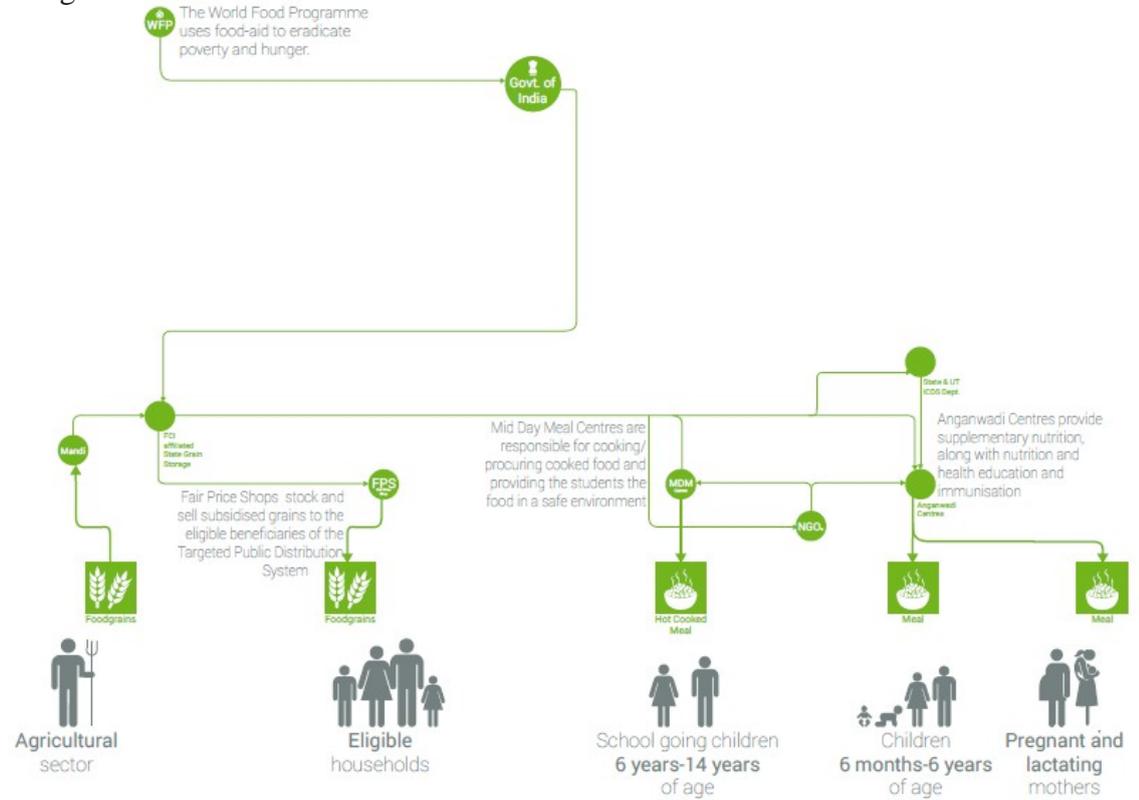


Utilisation of food implies the absorption of adequate nutrients in the body from the food consumed. Pre-existing medical conditions, and malnutrition can greatly impact nutrient utilisation in the body thereby further aggravating malnutrition and lower health status of the individual. Nutrient utilisation requires ample support in the form of community, household and individual hygiene, child care and maternal care and household water and sanitation quality. It is partly taken care of by ICDS.

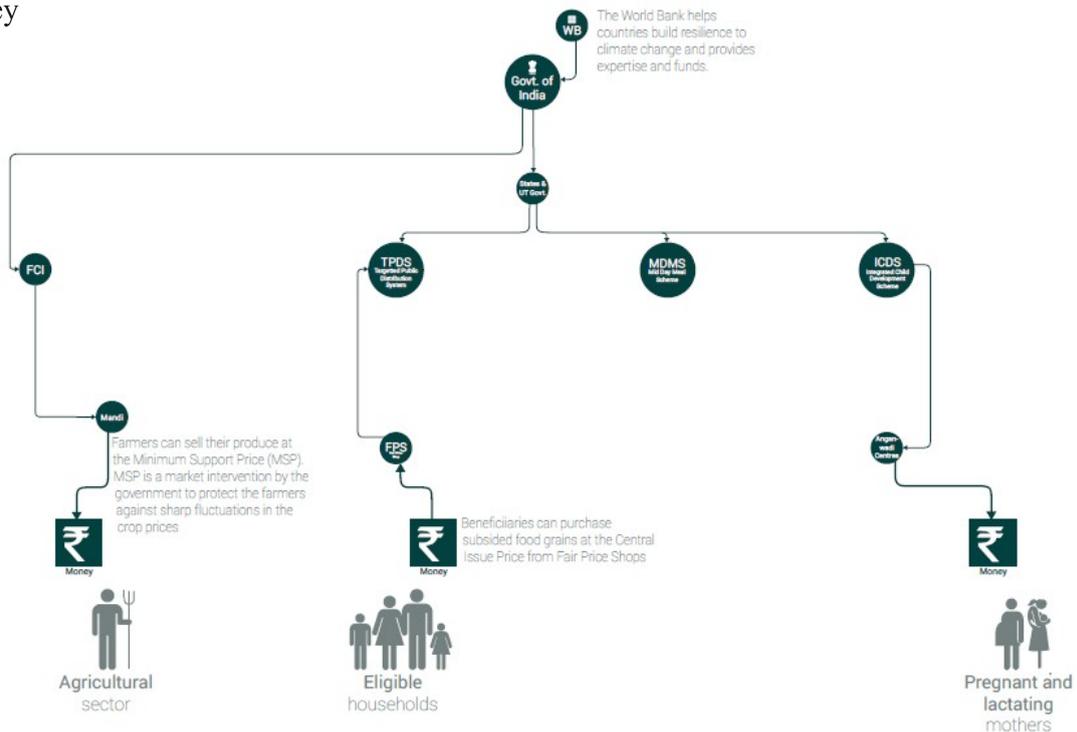
Mapping the Indian food system

With the understanding of the levels, determinants and components of food security in India, the layers of the food system in India were mapped layer by layer.

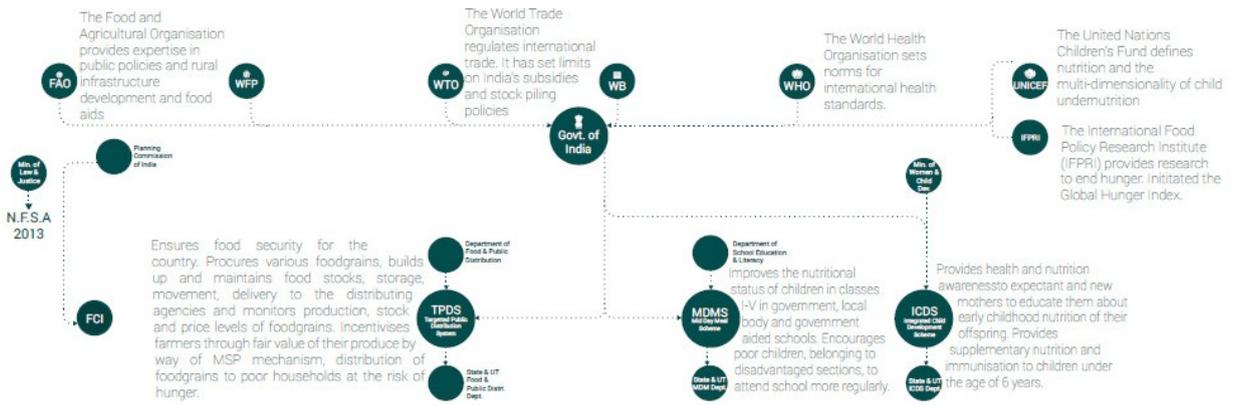
Food grains



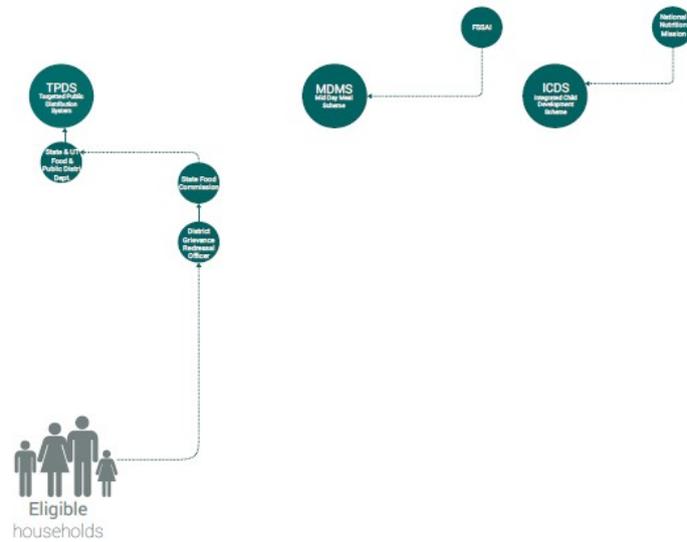
Money



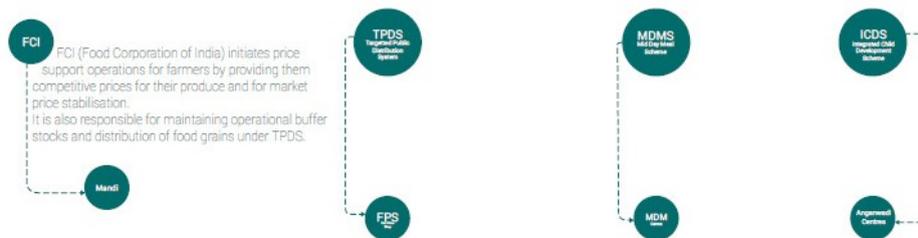
Policies



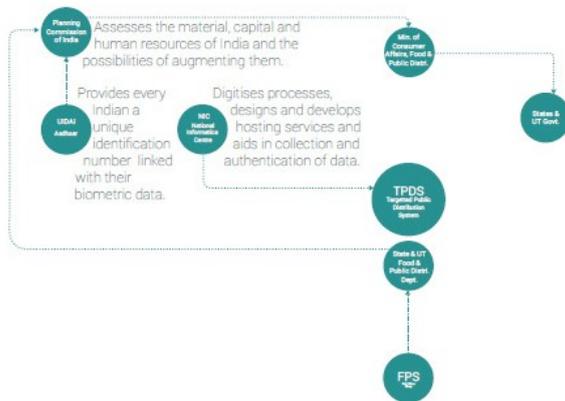
Vigilance



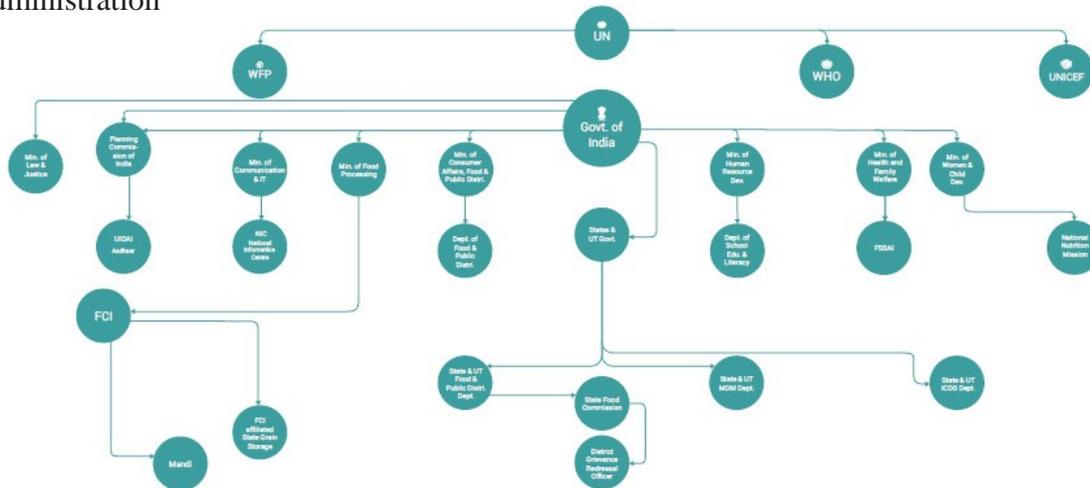
Infrastructure



Data



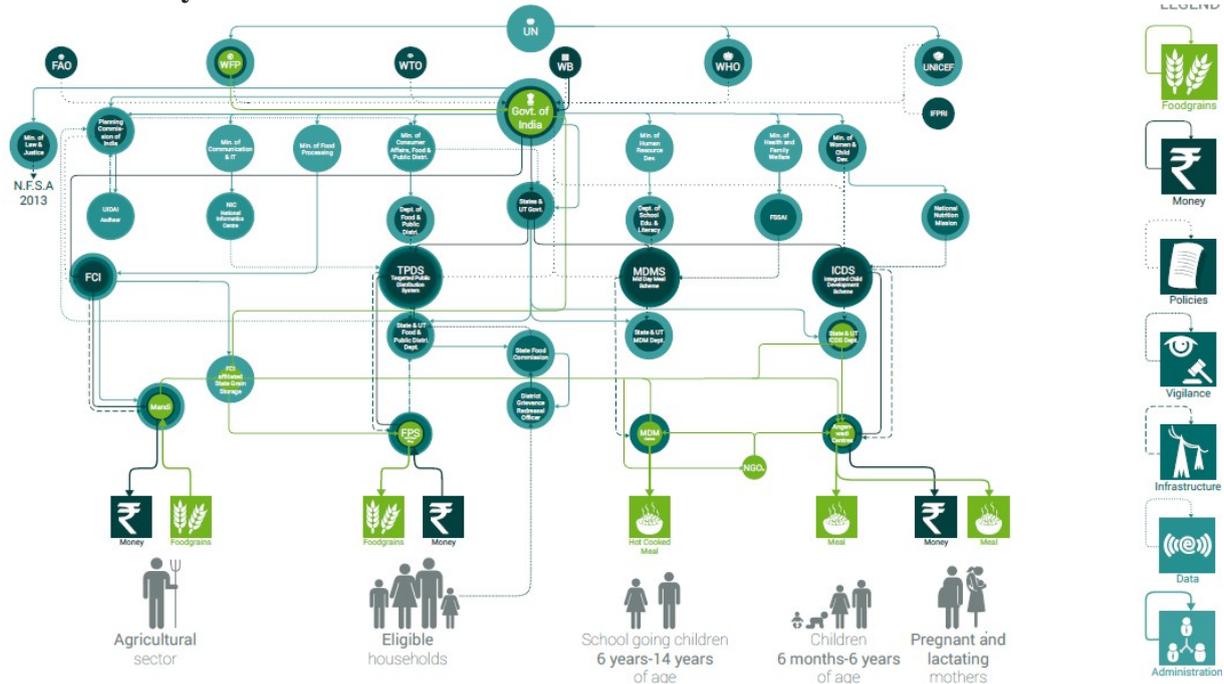
Administration



Bringing all the layers and interconnections between them, reveals a very complex system which is seemingly robust and also impenetrable.



Indian food system

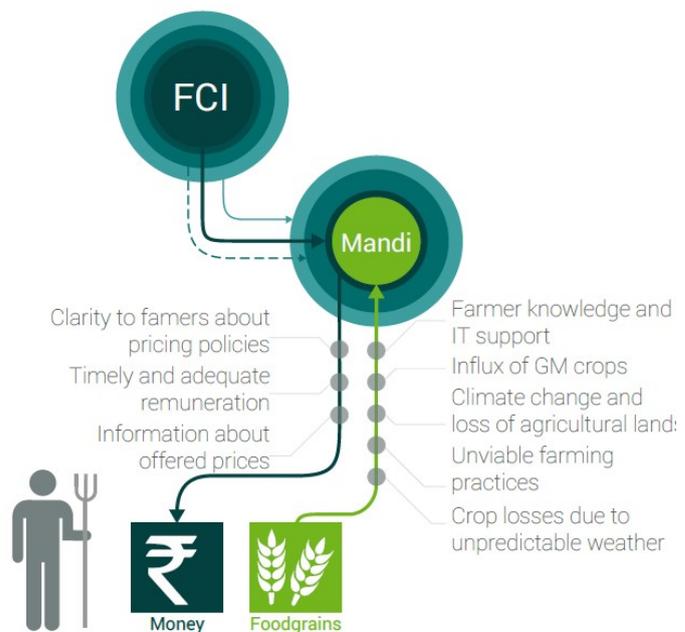


Bridging the hunger divide: Opportunity mapping

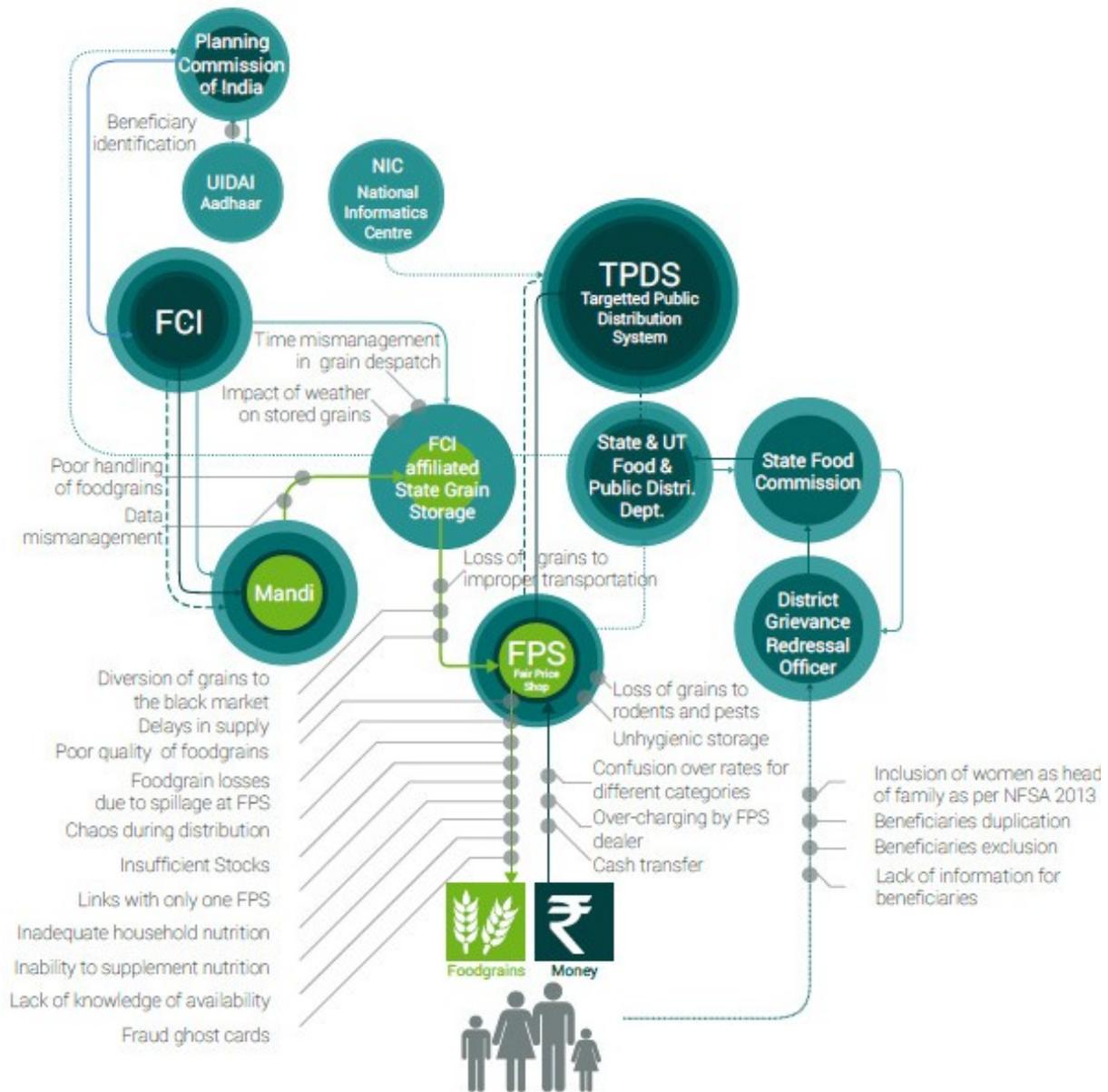
Extreme hunger and malnutrition in India despite the existence of the well planned and thorough food system, is indicative of either micro level concerns and last mile implementation issues or that the macro level premise of the entire system is questionable. Zooming in on focused areas, gave us a chance to minutely analyse pain points in the system and identify all possible areas of impactful intervention.

The agricultural sector

The National Food Security Act of India seeks to safeguard the broader interests of farmers. However there are growing concerns regarding the viability of the practices adopted by the farmers, the clarity of information provided to them, the existence of middle men fleecing the farmers and of course the unpredictability of mother nature. Food Corporation of India (FCI) helps tries to ensure timely and appropriate remuneration of the farmers for selling their produce in the agricultural produce markets known as mandis.

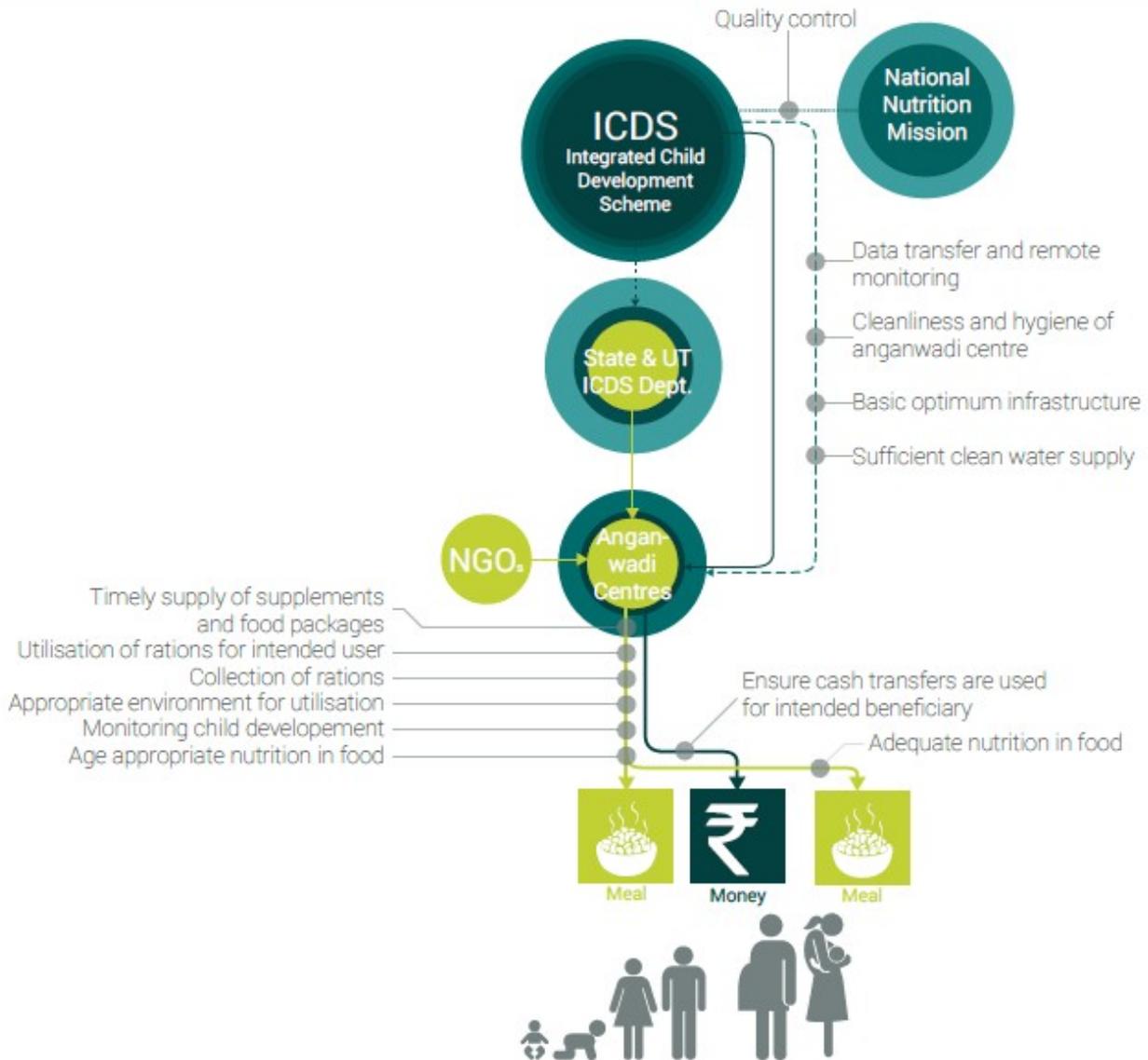


Targetted public distribution system



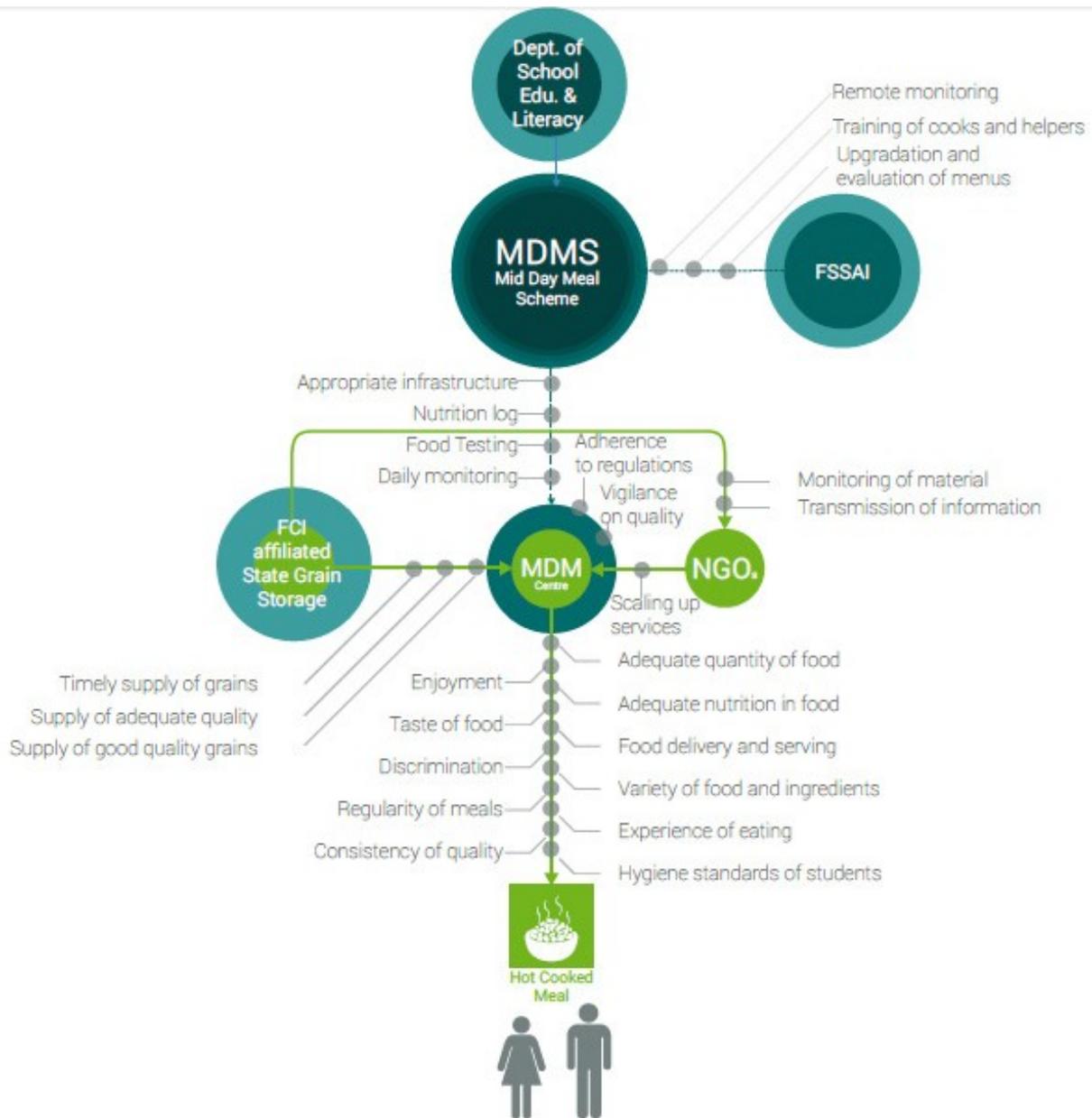
The basic premise of this scheme- of having subsidised food grains in the market makes the system susceptible to black marketing, leakages and hoarding. The illiteracy of the targetted beneficiaries leave them prone to exploitation and leads to diversion of benefits away from them. Additionally the system is logistics-heavy and involves large volumes of food grains being stored and transported pan India, which in the absence of proper implementation of vigilance, safety and hygiene measures can compromise on the quantity quality of the food grains. With the advent of Internet and other communication technologies in India, there is immense scope of modernising this system in terms of monitoring as well as beneficiary awareness and redressal.

Integrated child development scheme



This scheme intends to augment early childhood nutrition and health education via cash transfers and food supplements. This scheme targets young children, pregnant and lactating mothers, however the low social status of women in certain communities and the cultural hostility towards a girl child can mean that the benefits may never reach the intended user. This scheme can only supplement the nutrition of its target group and not wholly support it. Poverty and illiteracy can mean that the target users are themselves not able to support the nutritional benefits of the scheme from their own end.

Mid day meal scheme



This scheme hopes to pull children out of child labour and into schools by the promise a healthy and freshly cooked meal. With the intent of ridding the society of caste and gender based prejudices, this system brings girls and boys between the age of 6 and 14 years to school. And thereby educating and protecting the well-being of these children. However the key thing plaguing this system is the lack of daily monitoring of the food quality across all the mid-day meal centres. Children accessing this scheme are frequently victims of mass scale food poisoning and illnesses in the event of food contamination.

Key system design questions

India, in spite of a well-designed food system, a National Food Security Act, and multiple schemes to tackle hunger in combination, is still grappling to quickly extract Indians out of the quagmire of extremely rampant nutrition. The study proved that all these schemes provide a part solution to nutrition. And even in the case of complete functionality they cannot fully eradicate malnutrition. This led to the formulation of the key questions in the whole scenario:

1. How can nutrition be scaled up?

Government food schemes can only contribute to a part of one's daily nutritional requirement. In the absence of full sustenance of one's nutrition at an individual level, these schemes will only be able to tackle episodic hunger and not be able to comprehensively eradicate malnutrition.

2. How can the system evolve from a charity model to a cyclic and/or self-sustainable model?

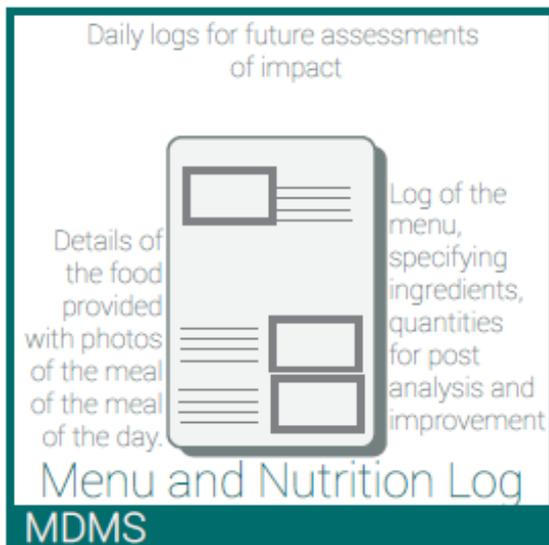
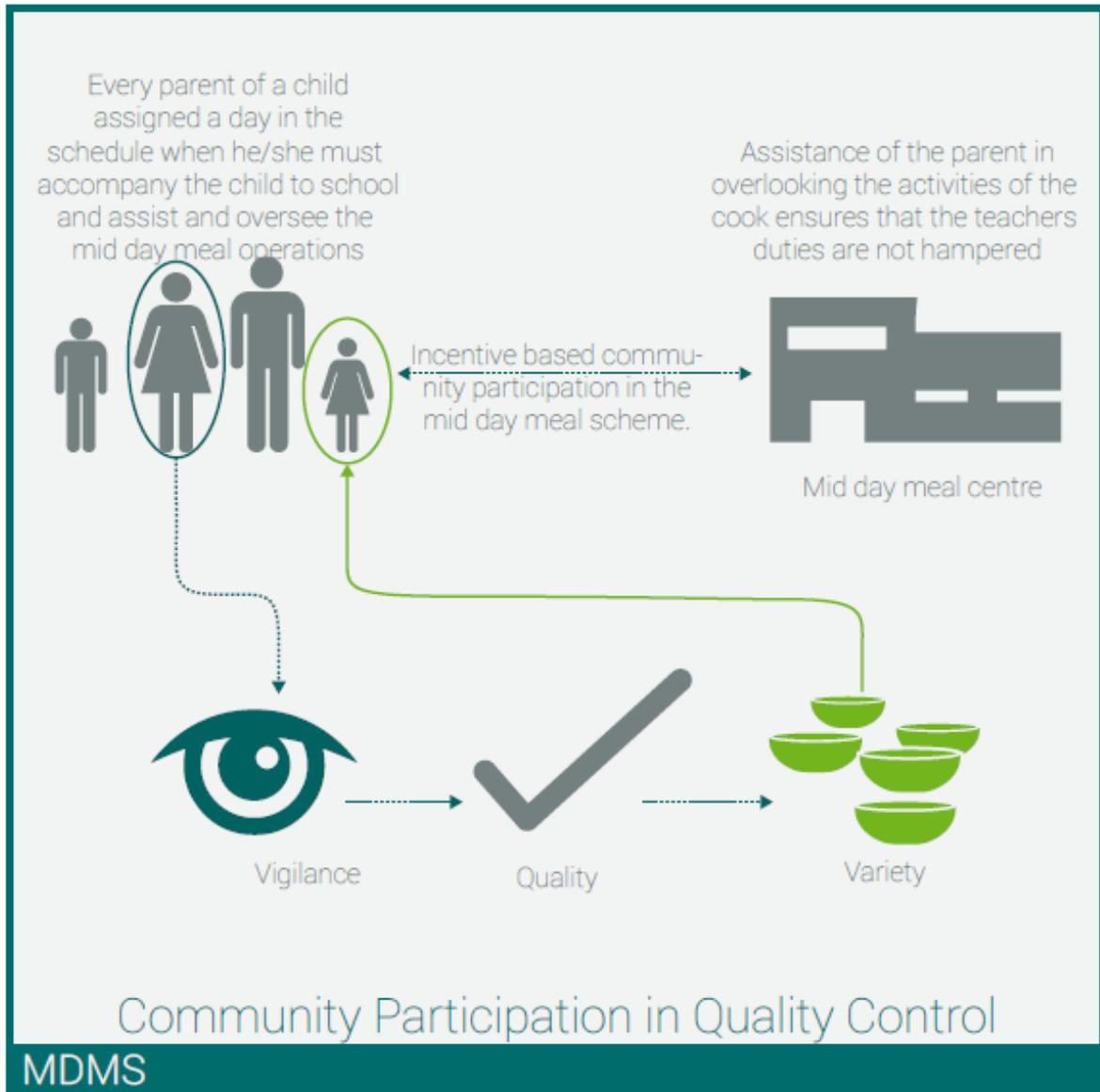
As the system works on a linear model, with the Government as the provider with subsidies etc. and the beneficiaries as the recipients of the benefits, it is not sustainable. As long as the system continues to be in this format, it may be seen as an economic burden with successive governments choosing to alter their budgetary allocations for the system. This nature of the system, makes it vulnerable to alterations based solely on the intent of cost-cutting. Additionally it provides a very attractive ground for black marketeers to flourish and pilfer through the system. There needs to be great discourse on how the system can evolve to be self-sustainable and robust.

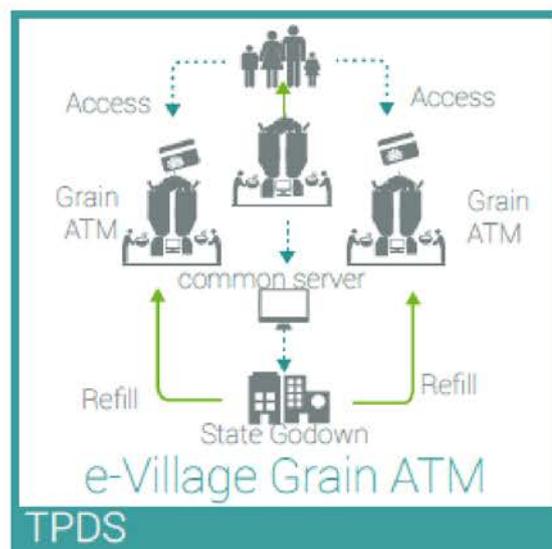
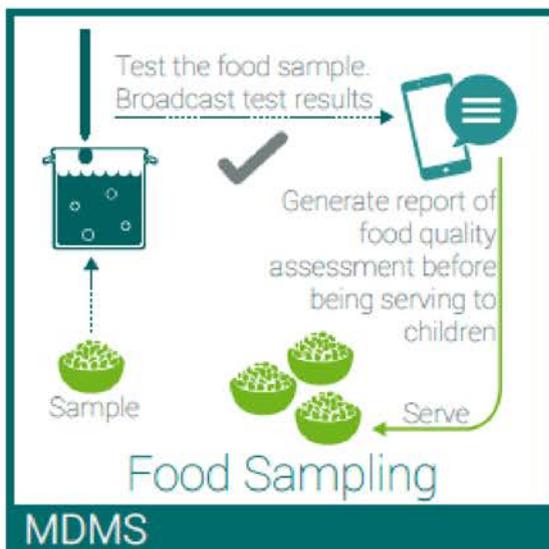
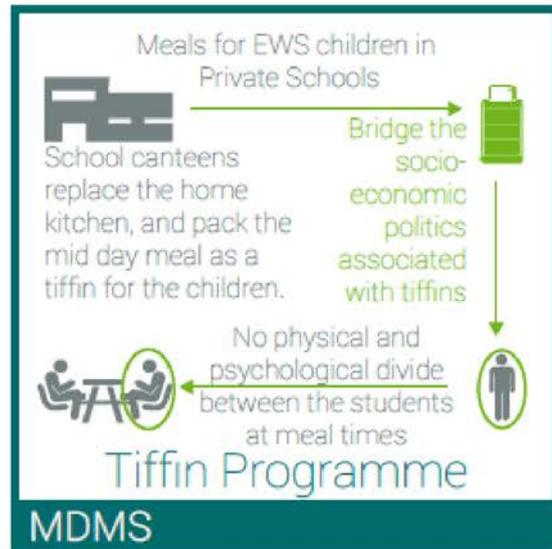
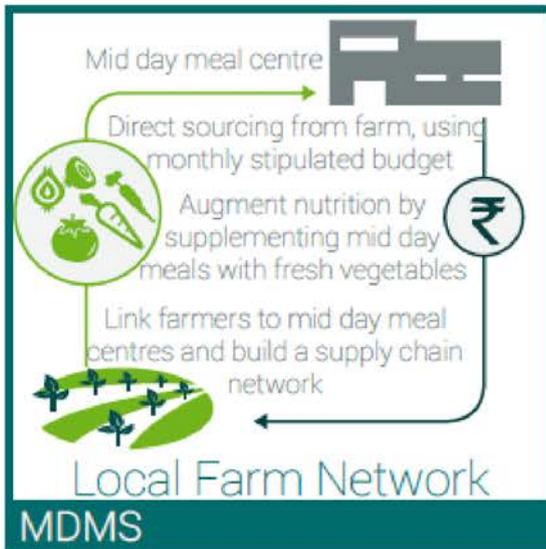
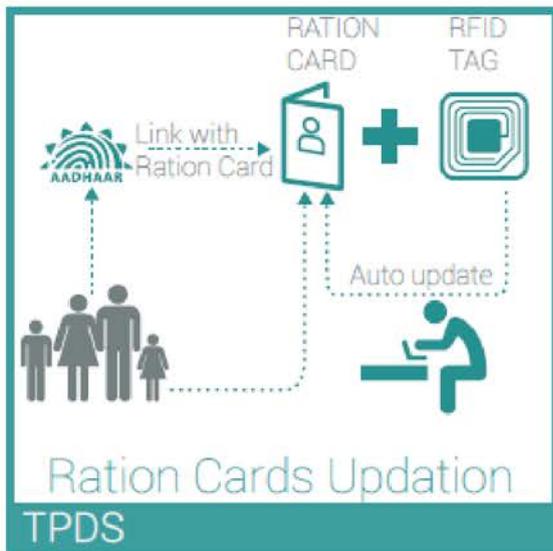
3. How can the intended beneficiaries be empowered to help themselves to extract maximum benefits from the system?

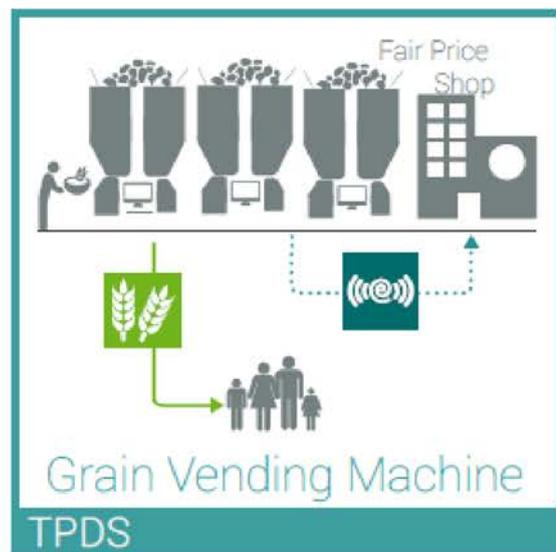
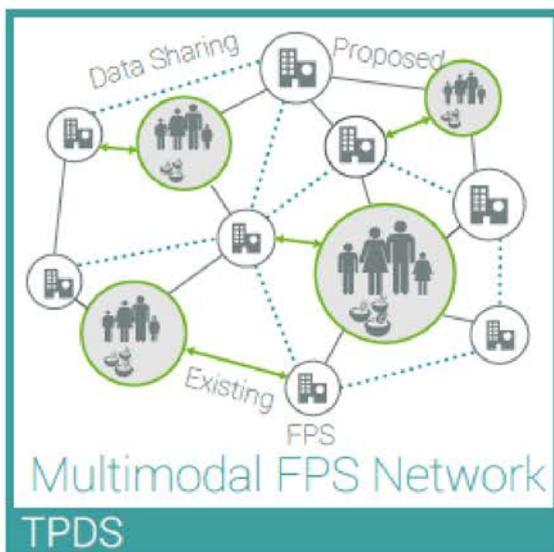
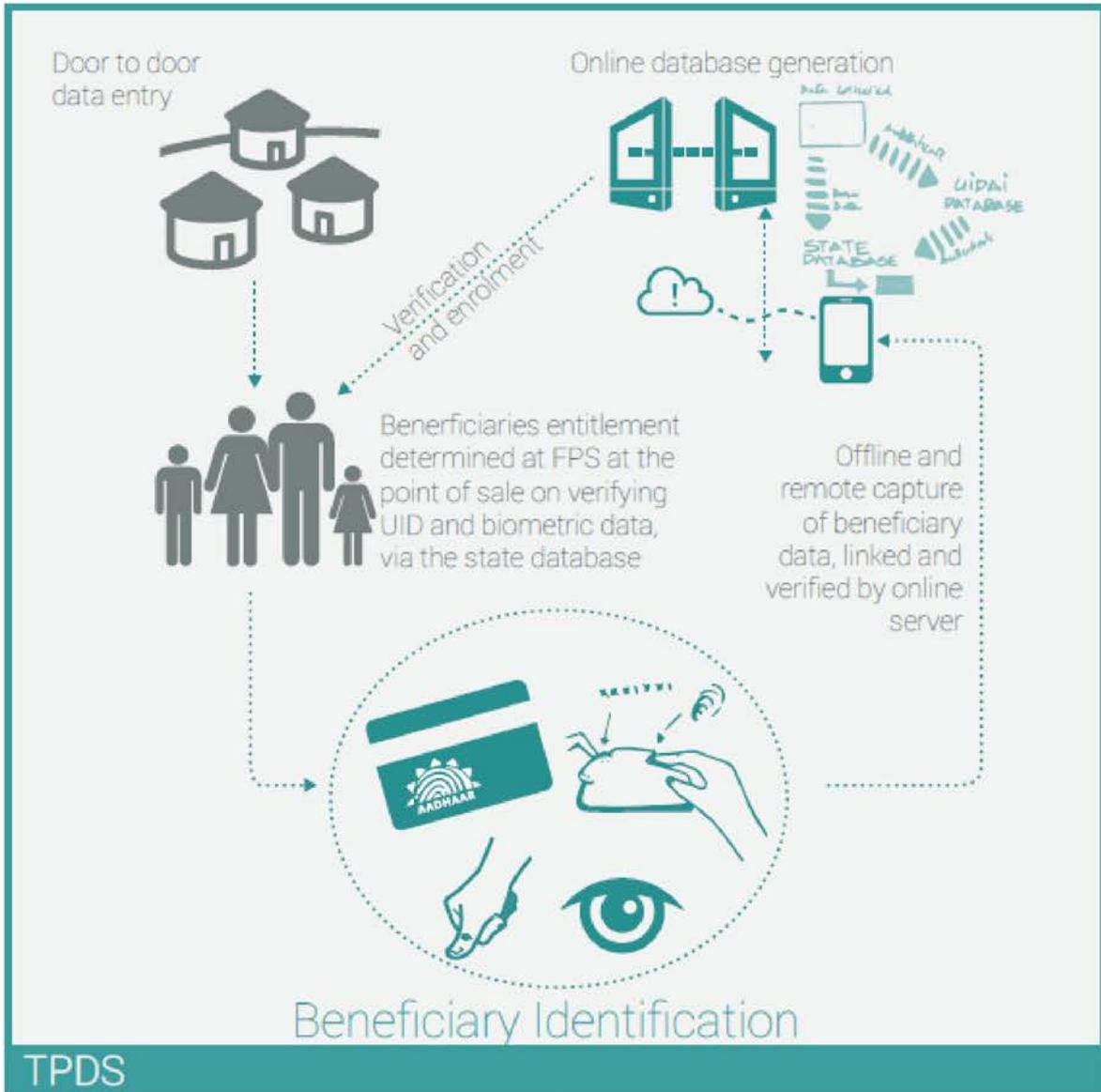
The current food security system in India treats the beneficiaries as needy and provides solutions similarly. The success of the system depends on the maximum utilisation of the intended services by the targetted beneficiaries. This requires beneficiaries' education and awareness, personal health monitoring and basic hygiene and sanitation practices.

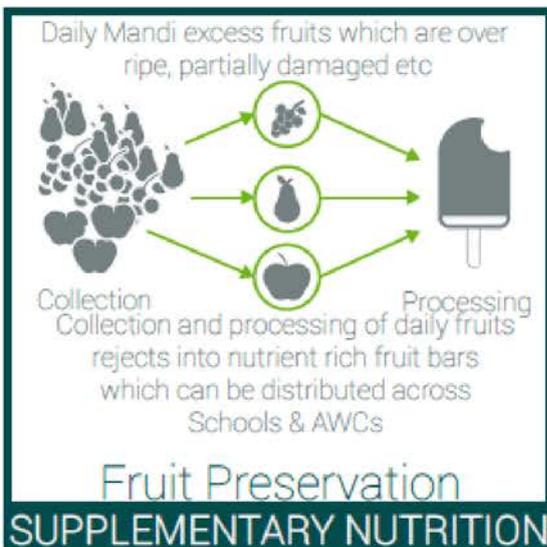
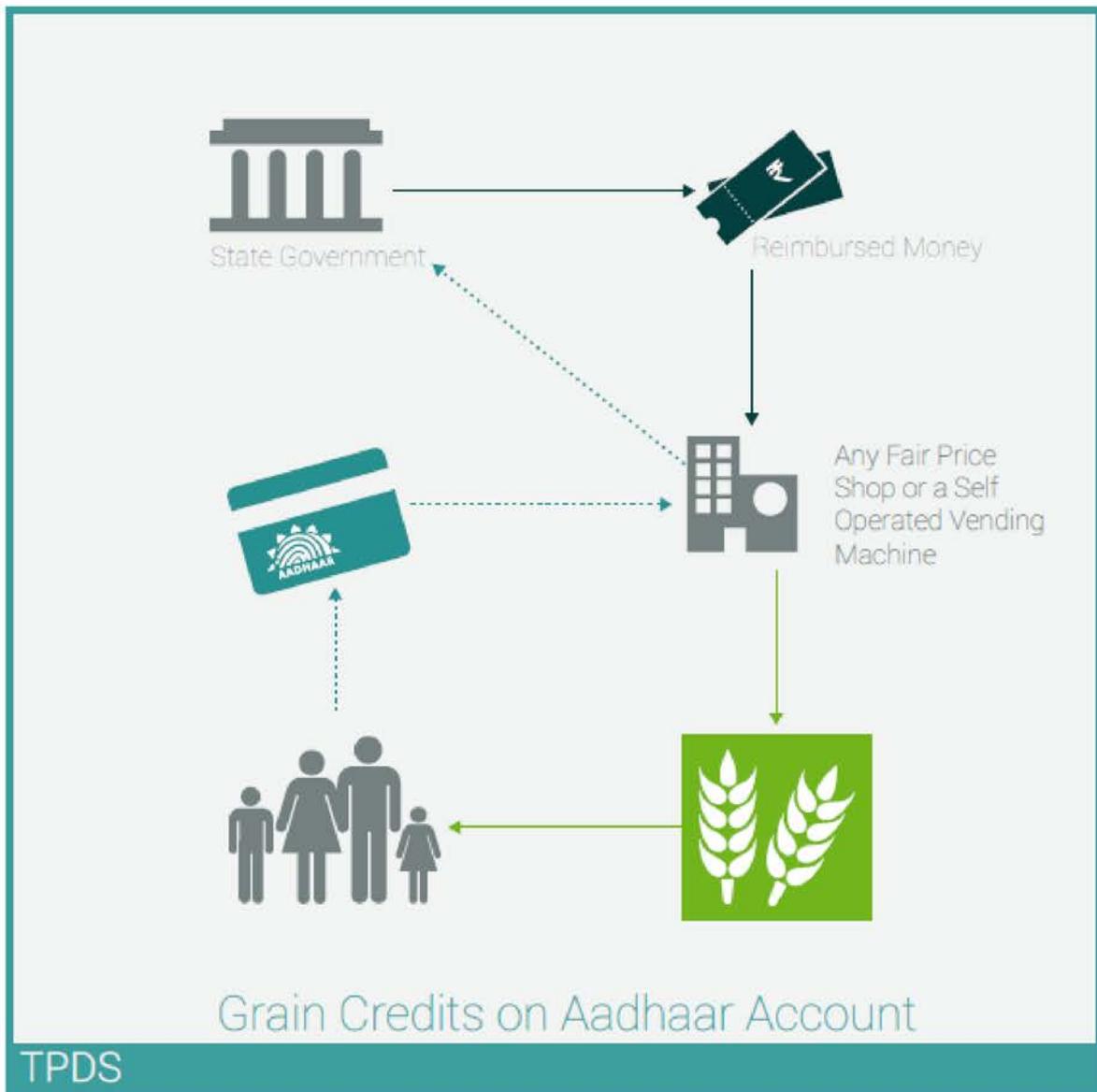
These questions became the starting point of designing macro to micro, present to future proposals that can address these concerns and help inform future policy formations. As mentioned earlier in the paper malnutrition can only be eradicated and food security be achieved if there is availability, accessibility, affordability, adequacy and utilisation of food from the nation to an individual. In the quest for tackling malnutrition it is often forgotten, that food consumption is an affair best experienced fresh and not just in the form of homogeneous processed energy dense food bars or solutions. But the process of providing large scale fresh food is ridden with poor quality concerns. Thus one solution cannot suffice in this system. The following are some of the proposals, which cover a range of solutions from system, service, product, communication, interaction to experience design.

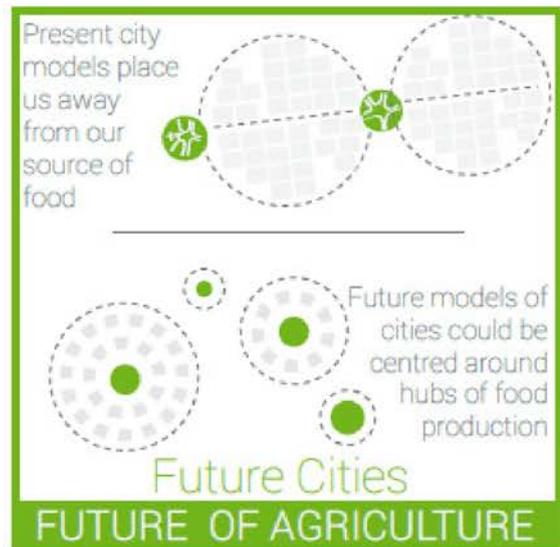
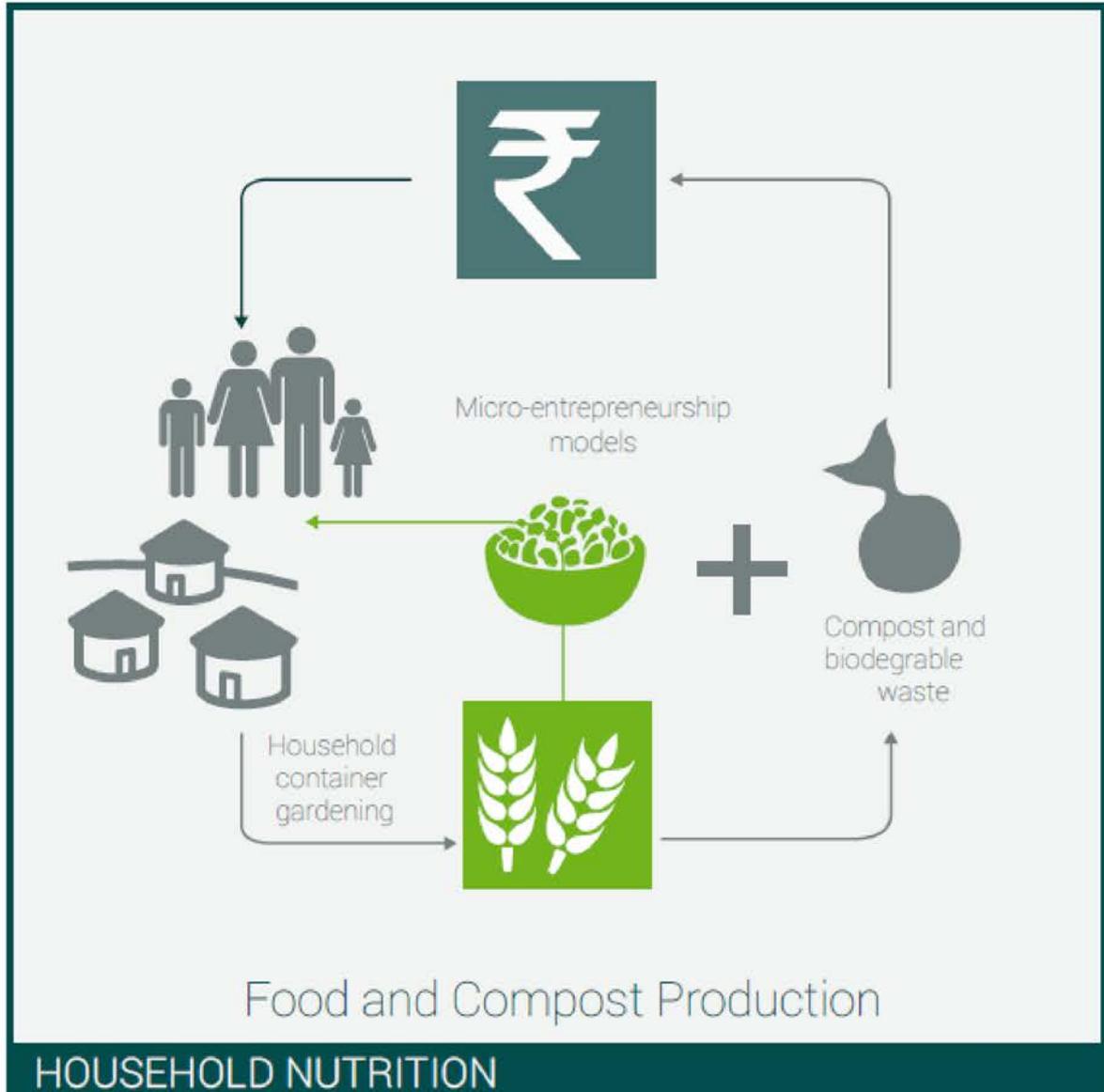
Systemic intervention proposals for achieving food security in India

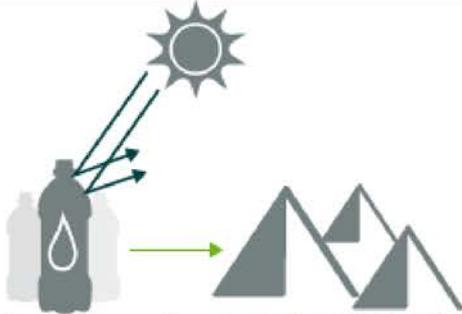












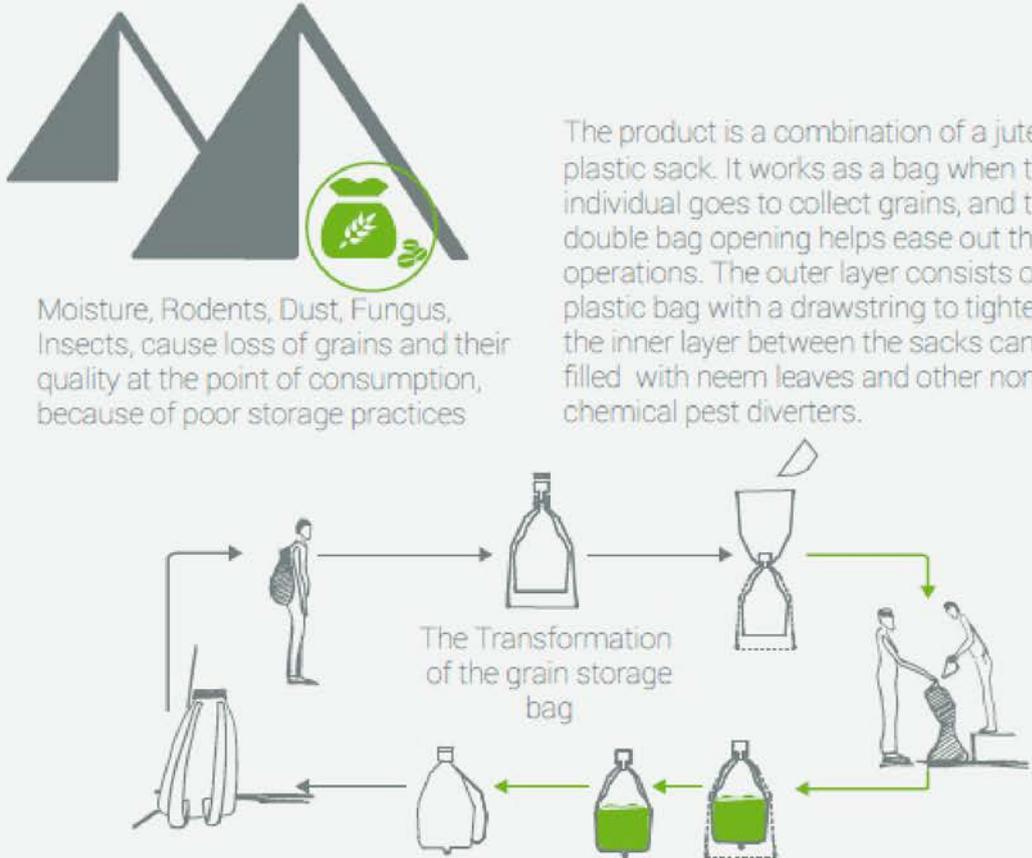
Solar Water purification using PET bottles and utilizing it to assist household clean water access, and assisting in nutrition utilisation in the body

Water Purification
ASSISTING NUTRITION



Urban Agricultural Inserts

Agri Pods
FUTURE OF AGRICULTURE



Moisture, Rodents, Dust, Fungus, Insects, cause loss of grains and their quality at the point of consumption, because of poor storage practices

The product is a combination of a jute and a plastic sack. It works as a bag when the individual goes to collect grains, and the double bag opening helps ease out the FPS operations. The outer layer consists of the plastic bag with a drawstring to tighten it, the inner layer between the sacks can be filled with neem leaves and other non chemical pest diverters.

The Transformation of the grain storage bag

Drawstring pulled and outer bag tightened

Neem leaves put in the space between the two layers

Grain Storage
HOUSEHOLD NUTRITION



Food for thought

This project led to the exploration of various points of interventions that could answer the questions that came from the study.

For example one of the solutions proposed ways of community training and participation in systems vigilance, monitoring and quality control in the mid day meal scheme. There by making the beneficiaries not just the recipients of services but also active stakeholders in its efficient functioning. One of the solutions looked at training school going children as the nutrition knowledge bearers of impoverished and malnourished households, by integrating class-room education with school meal programs and social studies. Another proposal looked at leveraging information and communication technologies to uniquely identify beneficiaries and avoid duplication of records in the targetted public distribution system. And also use the same technology to provide timely notifications to users regarding the status of the service.

A key proposal looked at avoiding subsidised grains in the market and instead linking grain credits to every beneficiaries unique identification account. The prospect of scaling up household

nutrition was explored along with a proposal of micro entrepreneurship models, by integrating household container gardening with composting. A product based solution looked at the design of a low cost food grain storage product, which would prevent rodent and microbial infestation and contamination of stored food grains.

This was an academic project that concluded with multiple system design concepts within the designated time frame. The project attempted to conceptualise a comprehensive solution space, and applying systemic design thinking to look at scaling up nutrition beyond the scope of the current food schemes implemented in India. But beyond the scope of this project, the current ground reality is very different. Two years after the National Food Security Act of India was passed, hunger is still a very relevant concern in India.

To summarise, nation-wide malnutrition needs all the attention and thoughts that it can get as it is a wicked problem that is not just an individual's concern nor is it an individual concern.

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