

Targeted Public Distribution System

Best Practice Solution

February 2014



World Food Programme

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List of Abbreviations and Terms used in this Document

AAV	: Antyodaya Anna Yojana
APL	: Above Poverty Line
BCG	: Boston Consulting Group
BPL	: Below Poverty Line
COREPDS	: Centralised Online Real-Time Electronic Public Distribution System
DBT	: Direct Benefit Transfer
DFFD	: Department of Food and Public Distribution
EPIC	: Elector Photo Identity Card
FPS	: Fair Price Shop/s
GPS	: Global Positioning System
ID	: Identification Document
IT	: Information Technology
MIS	: Management Information System
MOU	: Memorandum of Understanding
NIC	: National Informatics Centre
NFSA (2013)	: National Food Security Act, 2013
NPR	: National Population Register
PDS	: Public Distribution System
PoS	: Point of Sale
Rs	: Rupees (60 Indian Rupees are roughly equivalent to 1 USD; all currency conversions in this document were done based on this rate)
SECC	: Socio - Economic Caste Census
SMS	: Short Messaging Service
TPDS	: Targeted Public Distribution System
UIDAI	: Unique Identification Authority of India
USD	: United States Dollars
VSAT	: Very Small Aperture Terminal
WiMAX	: Worldwide Interoperability for Microwave Access
Crore	: One crore is equivalent to 10 million
Lakh	: One lakh is equivalent to 100,000

1. Introduction

1.1 BACKGROUND

India's Targeted Public Distribution System (TPDS) is one of the world's largest food security schemes. The TPDS was created in 1997 by modifying the previously universal Public Distribution System (PDS) to improve the targeting of subsidies to people that need them the most. Beneficiaries were identified as being Below Poverty Line (BPL) or Above Poverty Line (APL), with each group entitled to the same food grains but at differing quantity and sale price. In 2000, additional classification of Antyodaya Anna Yojana (AAY) out of BPL families was included to provide dedicated food grain allotments at highly subsidised prices to the poorest of the poor. The TPDS currently serves 6.52 crore (65.2 million) BPL families including 2.5 crore (25 million) AAY families, as well as 11.5 crore (115 million) APL families¹; these numbers will change post the implementation of the National Food Security Act, 2013 (NFSA (2013))².

As is the case with many initiatives of this size and complexity, the TPDS has had mixed success in achieving its intended goals. There is significant variation in the performance of the TPDS across the country. On the whole, the TPDS is in need of strengthening to ensure that it provides its beneficiaries with the food security that was originally envisaged under the scheme. According to evaluation studies on the functioning of the TPDS, there are leakages or diversions of food grains and the TPDS subsidy does not reach all intended beneficiaries. Leakages or diversion of food grains from the system stems from issues in beneficiary identification as well as from a lack of transparency in the system that makes it possible to show issuance of food grains to beneficiaries even in cases when this may not be occurring.

A few states have made efforts to address these problems with varying degrees of success. The Central Vigilance Committee chaired by Justice D.P. Wadhwa has also made a number of valuable recommendations³ to the Supreme Court of India, based on its review of different state TPDS operations over the past few years. These recommendations form the basis of the September 2011 rulings of the Supreme Court⁴ on the computerisation of the TPDS which have been a significant driver of computerisation efforts throughout the country in recent years. However, the majority of state efforts on the TPDS are in the form of pilot projects that are at a relatively small scale. Information on the broader applicability of these pilots and the potential for their success in other parts of the country is currently limited.

The NFSA, passed by the Parliament in September 2013 and the potential expansion and adaptation of Direct Benefit Transfer (DBT) to the TPDS at some point in the future, will require significant changes to the design and operations of the TPDS.

The NFSA (2013) seeks to address the issue of food security by combining the benefits of the three largest food safety nets programmes, namely the TPDS - targeting the food insecure poor population; the Mid-Day-Meal Scheme - a school feeding programme targeting children in the age group of six to 14 years; and the Integrated Child Development Services - a supplementary feeding programme targeting pregnant and lactating women and children below the age of six. The NFSA (2013) gives up to 50% of the urban and 75% of the rural population the legally enforceable right to state food benefits under the TPDS. The TPDS is by far the largest of the three food-based safety nets under the NFSA (2013)

¹ Review of Food grains Procurement Policy," Press Information Bureau, Ministry of Consumer Affairs, Food and Public Distribution, dated December 17, 2012

² National Food Security Act 2013, <http://dfpd.nic.in/fcamin/FSBILL/Rajpatra.pdf>, accessed on 17 February 2014

³ <http://pdscvc.nic.in/report%20on%20computersisation%20of%20PDS.htm>, dated 23 February 2009

⁴ <http://dfpd.nic.in/fcamin/sites/default/files/userfiles/DetailedGuidelines.pdf> dated 14 September 2011

and serves over 800 million people across India⁵.

The past few years have seen a number of trends in the enabling environment for the TPDS. An expansion in rural infrastructure has brought electricity and data connectivity to more than 90% of India's villages⁶. The Unique Identification Authority of India (UIDAI) has biometrically enrolled more than 56 crore (560 million) Indians and is on track to enrol the entire country's population and give each person a unique Aadhaar ID number⁷. The increasing scale of hardware and software implementations in the TPDS has helped to refine equipment specification and has reduced equipment costs in addition to creating a cadre of vendors and suppliers (in government and in the private sector) with valuable implementation experience in the sector. The Government of India has adopted a number of measures to strengthen the TPDS including a revised Citizen's Charter in 2007 and the PDS (Control) Order in 2001. To guide implementation of the NFSA (2013) and the TPDS reforms enlisted therein, the PDS Control order is currently being modified. In addition, Rs. 884 crore (USD 147 million) have been allocated on cost sharing basis in the 12th Five Year Plan for Component 1 of the scheme for the end to end computerisation of the TPDS (covering digitisation of beneficiary databases, computerisation of supply chain management, setting up of transparency portals and grievance redressal mechanisms).

In light of the factors mentioned above, there is not only an urgent imperative for the large scale modernisation of the TPDS but also a great opportunity to affect significant change by leveraging recent advances in technology and infrastructure. A systematic study of different TPDS efforts

all throughout the country is required to identify best practices in system design and implementation that can be used by governments as they consider efforts to strengthen the TPDS in their respective states.

1.2 WFP'S ASSOCIATION WITH TPDS

The United Nations World Food Programme (WFP) has been in India since 1963. Over the years, in keeping with India's changing needs, WFP has transitioned its operations in India from the direct provision of food aid to a more partnership and advisory oriented role. Today, WFP focuses its efforts on leveraging its experience in India as well as its global expertise to help the government solve their most pressing food security and nutrition issues. WFP's goal in India is to support the government's food based safety nets by suggesting ways to improve their effectiveness in order to address existing levels of malnutrition and food insecurity in the country.

Over the past several years, WFP has been actively working on strengthening the TPDS through in-depth analysis of TPDS vis-à-vis food security across the country, undertaking pilot projects as well as diagnostic studies and workshops. In 2007, WFP carried out a diagnostic and solution design exercise to identify measures that could be taken to increase TPDS effectiveness. In 2008, the lessons from this effort were used to design a pilot project implemented by WFP in collaboration with the Government of Odisha in Rayagada district of the state.

The TPDS project in Rayagada was designed with the objective of testing the suitability of a number of potential TPDS solutions that were being proposed at the time. The

⁵ Estimate of 800 million people is based on current population figures, i.e. 67% of an estimated total population of 1.2 billion people.

⁶ National Electricity Plan (page 4) http://www.cea.nic.in/reports/powersystems/nep2012/generation_12.pdf; Percentage of villages electrified as of 31 December 2012 is 94.1% (Source: Ministry of Power, India <http://www.indiastat.com/table/power/26/villageelectrification19502012/449720/652501/data.aspx>); Number of villages without mobile connectivity as on October 31, 2011 is about 37,000 out of total 6.3 lakh (630,000) villages, indicating 94.2% coverage (Source: Lok Sabha Starred Question No. 23, dated on 23.11.2011; Ministry of Statistics and Programme Implementation); Plan to cover 2.5 lakh (250,000) village Panchayats: <http://pib.nic.in/newsite/erelease.aspx?relid=86524>

⁷ UID: Presentation made to National Advisory Council by Chairman, UIDAI on 26th February 2013, NPR: <http://pib.nic.in/newsite/erelease.aspx?relid=81127>

project focused on tackling the issues of up-front beneficiary identification and regular ongoing authentication in a challenging operating environment characterised by significant infrastructure challenges (poor data and road connectivity as well as a lack of electricity and suitable venues) in addition to weather and security related issues. In a pre-Aadhaar world, the Rayagada project was one of the first TPDS projects to enrol multimodal biometrics including ten fingerprints, iris (for a segment of the population) and individual facial photographs for beneficiaries across the district. Fingerprints were used for biometric de-duplication and for authentication of beneficiaries during transactions at a number of FPS using a smart card based Point of Sale (PoS) system.

A number of key solution elements that were tested as part of the Rayagada project include:

- Digitisation of beneficiary lists from ration card registers and existing beneficiary surveys (a mix of English and Oriya language data sources)
- Biometric enrolment of the entire population of the district (10 fingerprints and facial photos for approximately 10 lakh (1 million) people, with iris also scanned for a subset of the population)
- Smart Card solution with chip containing biometrics for authentication (real-time transfer of data)
- Plastic barcoded cards with biometrics on the PoS device for biometric authentication (real time transfer of data)
- Barcoded coupons collected and scanned to upload transactions on Management Information System (MIS) (without PoS)
- Automated allocation based on MIS data on previous month's off-take

The Rayagada project has provided WFP with invaluable insight and operational experience in implementing a variety of TPDS solutions. During the project, WFP identified a number of challenges associated with beneficiary list digitisation and biometric enrolment as well as best practices to overcome them. The biometric based de-duplication process conducted for

the entire biometrically enrolled population of the district identified and removed about 10 percent duplicates. Barcoded coupon and smart card based transaction systems were thoroughly evaluated and the associated costs, timelines, complexities and benefits were compared. The need for incentives to improve FPS viability, constant training and support for all stakeholders and the value of a well designed user-friendly MIS was clearly observed. The project highlighted the importance of close collaboration between the different implementation partners, including different levels of government. It also underlined the need for a well thought out plan to manage a relatively seamless transition to the new system and that the existence of strong exception handling and grievance redressal mechanisms is critical for any technological project to be successful.

The project was implemented in 370 FPS including rural blocks with barcoded coupons. Today, 33 FPS in three urban local bodies and six rural locations of Rayagada are operating PoS machines that biometrically authenticate beneficiaries using their TPDS smart cards and send transaction reports online to a web based MIS. The project was appreciated by the Government of Odisha for state-wide replication.

In keeping with its goal to support and empower governments in making their TPDS efforts sustainable, WFP transitioned full responsibility for the day-to-day operations of the Rayagada project to the Government of Odisha in December 2013.

This project has provided WFP with immense learning and a unique opportunity to share the experiences and build on the successes to guide the scale-up of TPDS computerisation.

1.3 CONTEXT OF THE PROJECT

In April 2012, WFP further consolidated its commitment to strengthen the TPDS by signing a Memorandum of Understanding (MoU) with The Department of Food and Public Distribution (DFPD), Ministry of Consumer Affairs, Food and Public Distribution. As part of this partnership,

WFP and the Department of Food and Public Distribution co-organised a 'National Cross Learning Workshop' in May 2012 to give different states an opportunity to share best practices in the TPDS and in food fortification across the country.

WFP proposed a study to identify the best practices in the TPDS throughout the country in order to create a comprehensive TPDS Best Practice Solution⁸ that could be shared with different states that were looking to implement TPDS solutions. This effort was envisaged as a means of bringing more clarity to the requirements and benefits of different potential TPDS solutions in an attempt to accelerate the pace of TPDS reforms.

A team from WFP and The Boston Consulting Group (BCG) conducted the

above mentioned study from November 2012 – February 2013. As part of this effort, the team studied TPDS pilot projects in eight states (including detailed site visits to six pilots). A variety of key TPDS stakeholders including central and state governments, beneficiaries, FPS operators, solution providers, academics and NGOs were consulted throughout the solution design process.

This document outlines the recommended TPDS Best Practice Solution resulting from the process outlined above and provides an overview of the solution features and implementation plans. WFP hopes that state governments will find this document useful in identifying the most suitable set of solutions to strengthen their TPDS. WFP would be happy to discuss ways in which they can support in TPDS reform efforts.

⁸ WFP's TPDS Best Practice Solution is also referred to as the TPDS 3S Model, with 3S representing Secure, Strengthen, Save.

2. Solution Design Approach

A systematic approach was used to study the issues faced by the TPDS and to evaluate the suitability of the various solutions currently being proposed, in order to create a TPDS Best Practice Solution.

2.1 IDENTIFICATION OF KEY ISSUES FACED BY THE TPDS

The key issues faced by the TPDS were identified to serve as the basis for the solution design exercise:

- Improper targeting and identification of beneficiaries including categorisation
- Static/ slow changing nature of beneficiary lists
- Leakage in supply chain operations due to poor tracking of stock
- Leakage at FPS due to misreporting of sales
- Poor viability of FPS
- Lack of transparency on TPDS operations to officials and beneficiaries alike
- Insufficient means of grievance redressal leading to beneficiary disempowerment

2.2 DEFINITION OF OVERALL SYSTEM DESIGN OBJECTIVES

The following objectives were defined to guide the TPDS solution design process:

- **Proper targeting of subsidy** – Ensure that deserving beneficiaries get rations according to their proper entitlement
- **Leakage reduction** – Reduce pilferage and diversion of food grains throughout the TPDS value chain; deploy a portion of savings to improving nutrition
- **Improved stakeholder convenience** – Reduce system complexity and increase ease of operations; create solution buy-in and support from consumers as well as other internal stakeholders

2.3 BENCHMARKING OF EXISTING TPDS PILOT PROJECTS TO IDENTIFY DIFFERENT SOLUTION OPTIONS

In consultation with the Department of Food and Public Distribution, eight state

TPDS pilot projects covering a broad variety of different technological solutions, implementation models and operating conditions were identified for a detailed study. The study team visited Andhra Pradesh, Chandigarh, Chhattisgarh, Gujarat, Karnataka and Odisha and interacted with a broad cross section of stakeholders across the entire TPDS value chain in each state. Specific elements of the TPDS in Haryana and Tamil Nadu were also studied in detail. A comprehensive set of processes and solution options for each segment of the TPDS value chain was assembled for analysis on the basis of the benchmarking exercise.

2.4 SELECTION OF THE MOST SUITABLE SOLUTION OPTIONS FOR EACH PROCESS IN THE TPDS VALUE CHAIN TO CREATE THE BEST PRACTICE SOLUTION

The TPDS value chain was divided into four main segments for the purpose of solution design:

- Beneficiary identification and enrolment
- Supply chain operations
- FPS transactions
- Grievance redressal

For every process under each of the four TPDS value chain segments, all the technology options identified during the benchmarking exercise were evaluated against specific success metrics for the process. The most suitable solution option (i.e. the one that best achieved the success metrics for the process) was selected as the best practice option for the process. The best practice options for each process in the TPDS value chain were combined (accounting for dependencies across processes and value chain segments) to create the TPDS Best Practice Solution. In evaluating the different solution options, the new opportunities presented by a number of recent enabling trends were kept in mind. The fast advancing coverage of the country's population by Aadhaar and the availability of

electricity and mobile coverage in more than 90% of the country's villages have opened up the potential for FPS automation and for robust beneficiary authentication at the time of transaction – something that had not previously been feasible.

2.5 EARLY AND FREQUENT ENGAGEMENT OF TPDS STAKEHOLDERS, EXPERTS AND VENDORS

To ensure that the Best Practice Solution was practical and implementable, perspectives were continuously taken from a variety of TPDS stakeholders including the Department of Food and Public Distribution at central level, state Food Departments with experience in TPDS pilot implementation, FPS owners and beneficiaries. Additionally, topic experts were also consulted from a broad range of backgrounds including the Central Vigilance Committee chaired by Justice Wadhwa, the National Informatics Centre (NIC), UIDAI, National Population Register (NPR), the Food and Agriculture Organisation and many experts from civil society and academic institutions. Lastly, TPDS solution providers were also consulted to understand challenges faced in prior implementations and for costing estimates for different solution components.

2.6 ANALYSIS OF POTENTIAL FUTURE CHANGES IN THE TPDS OPERATING ENVIRONMENT

The operating environment of the TPDS is constantly evolving. To ensure that the

solution is flexible and remains a viable alternative for the foreseeable future, potential policy changes and government studies that could have a significant impact on TPDS were studied and the solution was evaluated for its flexibility to these changes.

The solution is compatible with the NFSA (2013); its provisions need some adjustments in the processes defined for beneficiary identification and its categorisation into priority and general groups.

The ongoing debate on use of Direct Benefit Transfer (DBT) in TPDS has immense potential. The proposed solution is easily adaptable and changes can be incorporated to pilot various DBT options.

2.7 NATIONAL LEVEL 'SOLUTIONS WORKSHOP' TO SOLICIT FEEDBACK FROM KEY TPDS STAKEHOLDERS

The Department of Food and Public Distribution and WFP co-organised a TPDS solutions workshop on 6 February, 2013 to get feedback from key TPDS stakeholders. The workshop was attended by representatives of a number of state governments as well as those from NPR, UIDAI, NIC, academia and the non-profit sector. Participants discussed key learnings from the state TPDS pilot benchmarking effort and brainstormed upon a number of key TPDS issues. Feedback from the Solutions Workshop was incorporated into the TPDS Best Practice Solution described in this document.

3. Recommended Best Practice Solution

The TPDS Best Practice Solution was designed to achieve the three main objectives previously laid out for the TPDS:

- Proper targeting of subsidy
- Leakage reduction
- Improved stakeholder convenience

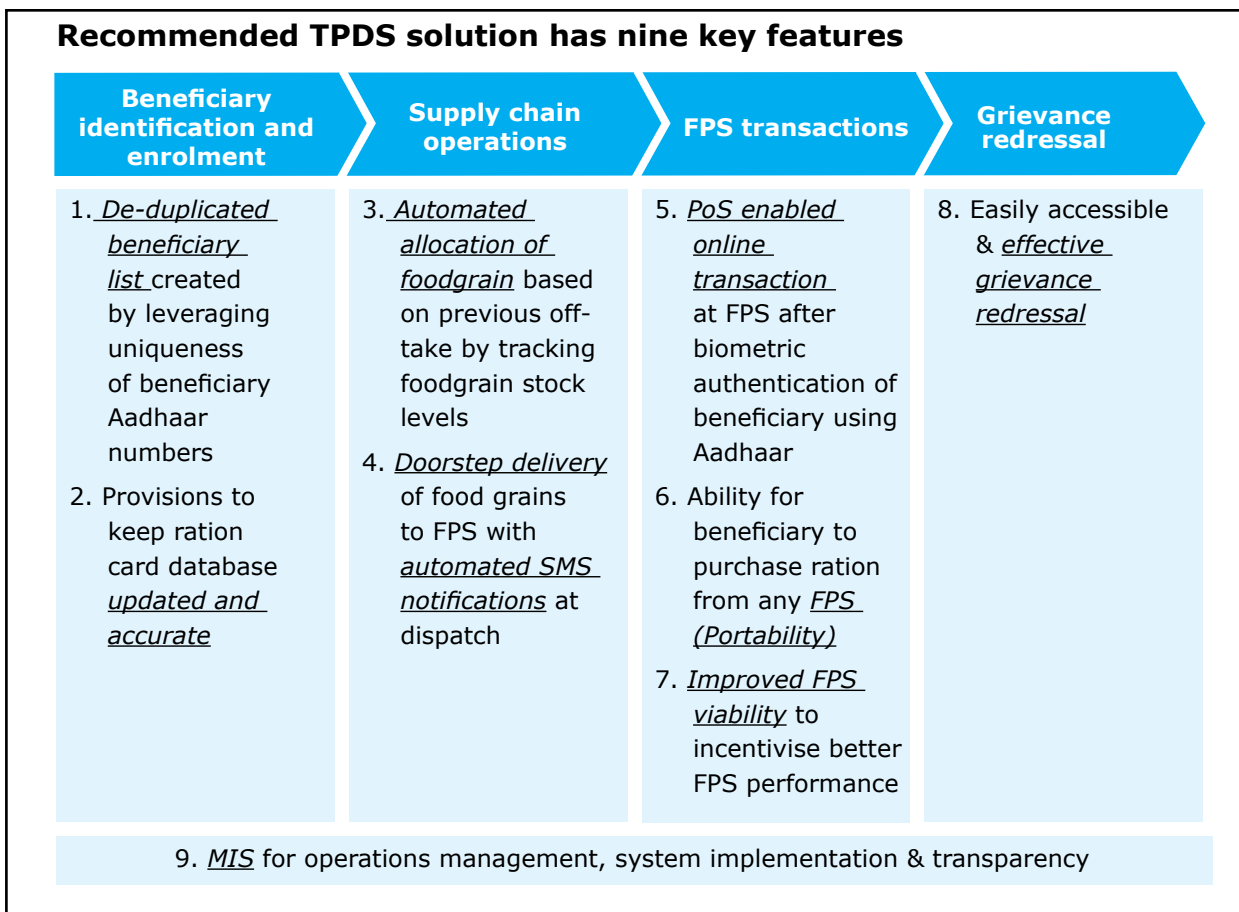
As shown in Figure 1, the recommended TPDS Best Practice Solution has nine key features:

- De-duplicated beneficiary list created by leveraging uniqueness of beneficiary Aadhaar numbers
- Provisions to keep ration card database updated and accurate
- Automated allocation of food grains based on previous off-take by tracking food grains stock levels

- Doorstep delivery of food grains to FPS with automated SMS notifications at dispatch
- PoS enabled online transaction at FPS after biometric authentication of beneficiary using Aadhaar
- Ability for beneficiary to purchase ration from any FPS (portability)
- Improved FPS viability to incentivise better FPS performance
- Easily accessible and effective grievance redressal
- MIS for operations management, system implementation and transparency

The solution is designed to be as flexible as possible to adjust to specific state requirements and conditions prevailing in different states. We recommend

Figure 1: Overview Of Features In Recommended TPDS Best Practice Solution



implementing all the above mentioned features to ensure a holistic approach to strengthen all aspects of the TPDS. However, the solution is designed to be as modular as possible in order to allow for implementation in a phased manner if operating constraints so require.

3.1 DE-DUPLICATED BENEFICIARY LIST CREATED BY LEVERAGING UNIQUENESS OF BENEFICIARY AADHAAR NUMBERS

An accurate beneficiary list populated only by unique, real and correctly classified beneficiaries is the foundation of a well functioning TPDS. The NFSA (2013) necessitates creating an updated digitised beneficiary list, finalised using an objective criteria and leveraging the Aadhaar platform for better targeting. A state can choose to address this issue depending on its appetite for complexity and the given timeline keeping in mind the window of 365 days provided by the Act. The different options for states are:

- **Option A:** Replace existing ration cards and allow left out beneficiaries to apply for new cards if they are on the beneficiary list (but did not have a ration card)

In July 2013, the Government of India issued guidelines on the population in each state to be covered under TPDS as per NFSA (2013). This provides state governments an opportunity to reduce bogus (duplicate and fake) ration cards as well as shadow ownership. This can be achieved by giving new cards after de-duplication and authentication to beneficiaries who previously held ration cards. States can reduce exclusion errors by allowing eligible beneficiaries who previously did not have cards to apply. Further, inclusion errors can be minimised by cancelling the cards of ineligible beneficiaries so that the resultant final beneficiary list is within the coverage mentioned for that particular state as per NFSA (2013). This might not be the best way but offers an advantage of speedier implementation of the Act.

- **Option B:** Completely overhaul the system by using a new survey as the basis of beneficiary classification

Reduce bogus (duplicate and fake) ration cards, shadow ownership, inclusion and exclusion errors by using a comprehensive, updated survey with revised classifications as the basis of issuing new ration cards after de-duplication and beneficiary authentication. The states can either use the Socio-Economic Caste Census data or define a set of inclusion and exclusion criteria.

The first step for either of these options is the digitisation of beneficiary lists to put beneficiary data in a standardised searchable database format along the lines of suggestions made by NIC. The source data for the digitised beneficiary list will depend on which one of the above mentioned options is chosen by the state.

The next step is to remove duplicate and fake cards from the list. For this purpose, biometric de-duplication provides the best results in terms of accuracy and reliability. Biometric based de-duplication is superior to a number of other methods such as de-duplication based on text (e.g. father's name, address etc.), Elector Photo Identity Card (EPIC), electricity connection numbers and property ownership records that have been tried out by states with varying degrees of success. The reliability of these other methods is highly dependent on data quality which is sometimes poor and their applicability is often limited by the fact that they do not cover the entire target population in many areas e.g. EPIC numbers only cover the adult population of the area that is eligible to vote. On the other hand, biometric based de-duplication relies on biometrics which are available with nearly all beneficiaries (rare cases may not have fingerprints, which may be covered through exceptions), leverage the inherent uniqueness of fingerprints (10 fingerprints create a nearly unique combination) and are difficult to manipulate or falsify in comparison with other ID sources as there is no manual input. It is therefore recommended that fingerprint based biometrics be used for de-duplication. Other methods may be used as an initial screen if desired as a temporary measure in areas where biometric enrolment is currently low, but de-duplication using biometrics should

then be done as soon as higher biometric enrolment rates are achieved.

Biometric based de-duplication however, necessitates the need for biometric records of all beneficiaries to be available – something that UIDAI and NPR are currently in the process of undertaking across the nation. Some pilot projects have undertaken biometric enrolment independently (Rayagada in Odisha and in Chandigarh) in a pre-Aadhaar world, but in light of the increasing coverage of Aadhaar (56 crore/560 million people have already been registered); it is recommended that states leverage this existing platform. The benefits of using the Aadhaar platform for biometrics include not only standardised, high quality data and the fact that de-duplication is carried out all across the nation, but also the significant saving of cost for states as Aadhaar is funded by the Government of India. The fact that states do not have to enrol biometrics separately and do de-duplication on their own also saves a significant amount of time and reduces the complexity for the state implementation significantly. Another benefit of using Aadhaar over other proprietary biometric enrolments is that the Aadhaar platform provides the possibility to do quick online, real-time authentication that can be very useful for enabling beneficiary authentication at the FPS.

To facilitate the use of Aadhaar for de-duplication, the unique ID (Aadhaar) number issued for each beneficiary has to be mapped onto the digitised ration card database. This process is called 'seeding'. 'Seeding' of digitised TPDS beneficiary lists with the Aadhaar numbers removes duplicate entries as one individual can only have one Aadhaar number. After Aadhaar enrolment and seeding is completed in an area (this will be a phased process to give beneficiaries enough time to enrol themselves in Aadhaar and for seeding to take place), any entries in the beneficiary list that remain unseeded can be safely assumed to be either duplicate entries or fake and ghost entries. This process has

yielded significant savings in the Aadhaar based TPDS pilot in East Godavari district through a significant reduction in the number of ration cards after seeding.

Based on experience with biometric enrolment in Rayagada, Odisha and the Aadhaar based pilot in East Godavari, the best way to achieve FPS automation is to switch to the new system once biometric enrolment has crossed 80% of the beneficiary population in a state or union territory. A grace period of three to four months should be provided for the remaining beneficiaries to get biometrically enrolled and seeded, after which their manual entitlements should be stopped. Doing so provides an incentive for people to get enrolled. Without this, enrolment may not reach 100% completion within a reasonable timeframe. Adequate exception management measures should be in place to ensure that no rightful beneficiary is deprived of their allotment but a limited grace period is essential for the transition to the new system.

Once duplicates, fakes, ghosts and bogus cards have been identified and removed from the beneficiary database, it is recommended that the state governments distribute new ration cards to beneficiaries to replace old ration cards. To reduce shadow ownership of cards, it is advisable to distribute ration cards only after biometric authentication of the beneficiary at the point of disbursement. The Aadhaar platform provides the ability to do biometric authentications in real time against data that resides on the UIDAI servers. Additionally, the old ration cards should be collected during distribution of new ration cards and transactions should be discontinued on old ration cards after a sufficient grace period to ensure that rightful beneficiaries are not deprived of their rights.

Significant success has been demonstrated in removal of bogus cards by biometric de-duplication in the East Godavari (Andhra Pradesh) and Rayagada (Odisha) pilots⁹. East Godavari carried out an Aadhaar based biometric de-duplication of the digitised

⁹ Data based on field visits and discussion with pilot implementation officials

ration card list and was able to eliminate 7.4% of the ration cards which were bogus. This has resulted in savings of around Rs. 45,000 (USD 750) per FPS¹⁰ (more details are provided in Section 5 on Financial Feasibility). In the Rayagada pilot, 10.9% of total ration cards which were bogus have been eliminated based on a biometric de-duplication carried out across the district.

3.2 PROVISIONS TO KEEP RATION CARD DATABASE ACCURATE AND UPDATED

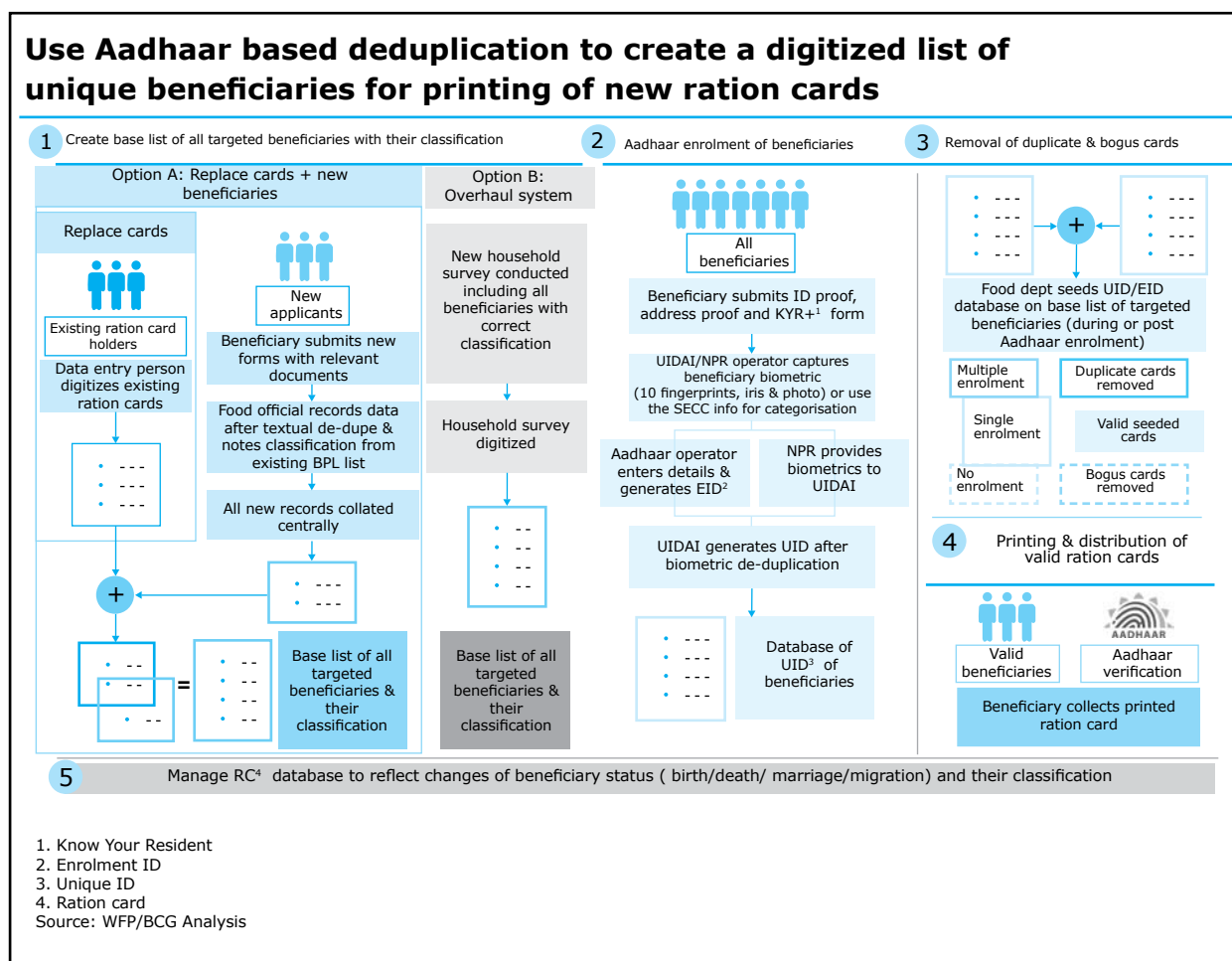
In order to ensure that the ration card database remains accurate and updated with the latest details, it is recommended that easily accessible facilities be provided to beneficiaries to allow for modifications to ration cards that are automatically reflected

in the ration card database. The range of modifications allowed can vary according to the state's requirements. Some potential changes include:

- Allowing previously left out beneficiaries to request ration cards
- Update of ration cards to account for births, deaths, marriages etc.
- Allowing for migrants to request new ration cards
- Change of address etc.

The benefits of having an established facility to continuously update ration card databases are manifold. Doing so, allows regular updates to ration card details, while providing significant convenience to beneficiaries. It also provides an avenue

Figure 2: Schematic of Recommended Solution – De-duplicated Beneficiary List Created by Leveraging Uniqueness of Beneficiary Aadhaar Numbers with Provision to Update Ration Card Database



¹⁰ 'Public Distribution System – The Aadhaar Way', report on the TPDS pilot project implementation in East Godavari district, Andhra Pradesh

to ensure that the beneficiary lists remain up-to-date, especially in locations where the previous BPL surveys were carried out more than a decade ago and have remained the same ever since.

As is already the case in a number of states, a block level office which manages update of ration cards and beneficiary lists is recommended. This office can also be used for other management tasks for the TPDS in the block, potentially doubling up as a walk-in grievance redressal centre as well. Other options to consider are using Panchayat (local government) offices or Common Service Centres for this purpose. The suitability of a particular option for this will depend on the specific situation in the state. Figure 2 provides a schematic overview of best practice solution recommendations covered under sections 3.1 and 3.2.

3.3 AUTOMATED ALLOCATION OF FOOD GRAIN BASED ON PREVIOUS OFF-TAKE BY TRACKING FOOD GRAIN STOCK LEVELS

Field visits, interviews with TPDS stakeholders and analysis of records shows that the actual off-take of food grains from FPS is significantly lower than the standard allocation to the FPS, i.e. all beneficiaries do not purchase their share of ration each month, especially in the APL category. This is apparent from the fact that a few states have been able to significantly reduce their APL allotments without apparent inconvenience to beneficiaries. Current manual and paper based procedures for food grain allocation and reconciliation of sales reports leave significant scope for manipulation and misreporting of transactions at FPS as well as closing balance stocks at the end of the month. This results in zero closing balances in a large number of shops and close to the full allocation being sent to the FPS each month. The additional grain (over and above the actual off-take) is available for diversion at a significant profit.

To tackle this issue, it is recommended the Food Department ensures that allotment to each FPS is made automatically on the

basis of verifiable transactions at the FPS that result in accurate food grain stock status reports that are available centrally (this is done through the use of PoS devices at FPS which operate in online mode and update each transaction on the Food Department servers. More details are provided under point 3.5 of this section). The benefits of doing this are substantial, which has been demonstrated in pilot projects such as the Chhattisgarh Centralised Online Real-Time Electronic Public Distribution System (COREPDS) pilot¹¹. Allocation based on off-take, have resulted in significant operational improvements due to automation and central management of the supply chain.

Under the traditional system, allotments are done on a monthly basis based on the previous month's off-take. However, under the portability paradigm proposed as part of the best practice solution (more details provided under section 3.6), allotment will no longer necessarily be on a monthly basis. As beneficiaries can choose which FPS they want to buy their rations from, allotment will now need to be done on a dynamic basis. Every time the stock levels in an FPS fall below a pre-defined threshold value, it will automatically trigger an allotment based on the previous off-take and a message will be sent to the FPS owner to submit payment for the allotted food grain amount. Once payment is made, the food grain can be dispatched to the FPS.

To simplify the payment procedure for the FPS owner, it is advised that the state government establish tie-ups with local banks. The bank should be linked to the Food Department's account at the back end, allowing the FPS owner to directly submit the requisite payment without having to travel to the central Food Department offices. This would save the FPS owners a significant amount of time and effort and would accelerate the process of payment while allowing for easier tracking of payment status than the current manual paper based methods.

¹¹ COREPDS: <http://cg.nic.in/pdsonline/corepds/EnglishVersion/frnNavigationPageEnglish.aspx>

3.4 DOORSTEP DELIVERY OF FOOD GRAINS TO FPS WITH AUTOMATED SMS NOTIFICATIONS AT DISPATCH

Effective monitoring and control over the vast TPDS supply chain is a tough task to carry out manually. This leads to opportunities for pilferage, late delivery of food grains to FPS which causes inconvenience to consumers and an overall lack of transparency in the system's operations for all stakeholders including food officials. To address these issues in the TPDS supply chain, it is recommended to have end-to-end computerisation which allows for real-time stock tracking of food grain at all points, thus checking leakage, aiding in better control over operations while providing information to the relevant stakeholders about status of grain delivery.

For reducing leakage during the delivery, it is recommended to install electronic weighbridges linked to computers at the state warehouses. This allows for accurate weighing of food grains for delivery, with the attached computer ensuring all information gets logged onto the system without human intervention. However, it is advisable to keep the inbound weighing at FPS optional, with the FPS owner taking full responsibility for any future mismatch once he or she accepts the delivery. The rationale for this is that the process of weighing can be cumbersome and tough to manage with a small weighing machine at the FPS, thus the FPS owner should have freedom to accept the delivery if he/she has confidence that the quantity delivered is as stated. Additionally, it is recommended that vigilance committees be involved in the verification of grain delivery to FPS to ensure checks. Any mismatch in grain quantity dispatched from warehouse and final sales would automatically reflect in the sales report. A PoS device at the FPS will allow tracking of sales at the FPS (more details are provided under point 3.5 of this section), while also allowing for the biometric based verification of grain delivery by the state government authorities, FPS owner, Panchayati Raj Institutions, vigilance committees etc.

For ensuring better control over delivery schedules of grains and to provide

significant time and cost saving to FPS owners, it is recommended that the state do doorstep delivery of food grains to the FPS, i.e. managing all grain transportation operations internally via the Food Department or Civil Supplies Corporation. The problems of erratic delivery scheduling - currently faced when transportation from state warehouses to FPS is under the control of FPS owner - will be addressed. This will give the government more control over when food grains are transported to the FPS, thereby ensuring grain availability at the FPS at all times. Additionally, doorstep delivery also gives the FPS owner a financial incentive in terms of cost saved for not having to arrange transportation. The state government should ensure that proper contracts are negotiated and that the transporters are operating properly.

For ensuring proper operations on the part of the FPS owner and transporter, it is recommended that SMS notifications be automatically issued and communicated to all beneficiaries and vigilance committee members at the point of truck dispatch from warehouse with details of grain quantities, departure date and time as well as vehicle numbers. Beneficiaries should be able to opt in for notifications, thus being able to not only check grain delivery, but also to have better visibility of stock availability at the FPS. For improving convenience of the FPS owner, it is recommended that automatic SMS notifications be issued to them when stock levels reach re-order point, which is automatically tracked via the PoS device based on transaction data. The SMS should contain information on the amount of money to be deposited to dispatch subsequent delivery from the warehouse. After FPS owner deposits money to the bank, an automatic trigger goes to the warehouse to dispatch the requisite quantity of grain to the FPS.

Global Positioning System (GPS) tracking of food trucks is often proposed as a means of strengthening supply chain operations by preventing diversion of vehicles during grain deliveries to the FPS. This involves installation of a dedicated GPS device on the transportation vehicle which provides real-time information on the location of

the truck, which can be tracked from a central location. To automate the tracking process, dedicated routes can be defined for the truck and the GPS tracker issues a notification if there is any deviation from the defined route.

However, there are significant issues with GPS tracking as it is prone to manipulation without providing an effective check on pilferage:

- GPS tracking devices can be easily removed from trucks owing to external installation. To manipulate the system, the removed device can be attached onto a proxy vehicle to mirror the truck route.
- Pilferage can occur from trucks which are standstill en route to the FPS – tracking via GPS is not effective here as the location and route will be shown to be correct.
- If there is mismatch in delivered quantity at the FPS (assuming that the correct route is followed according to GPS data) resolution of the issue still

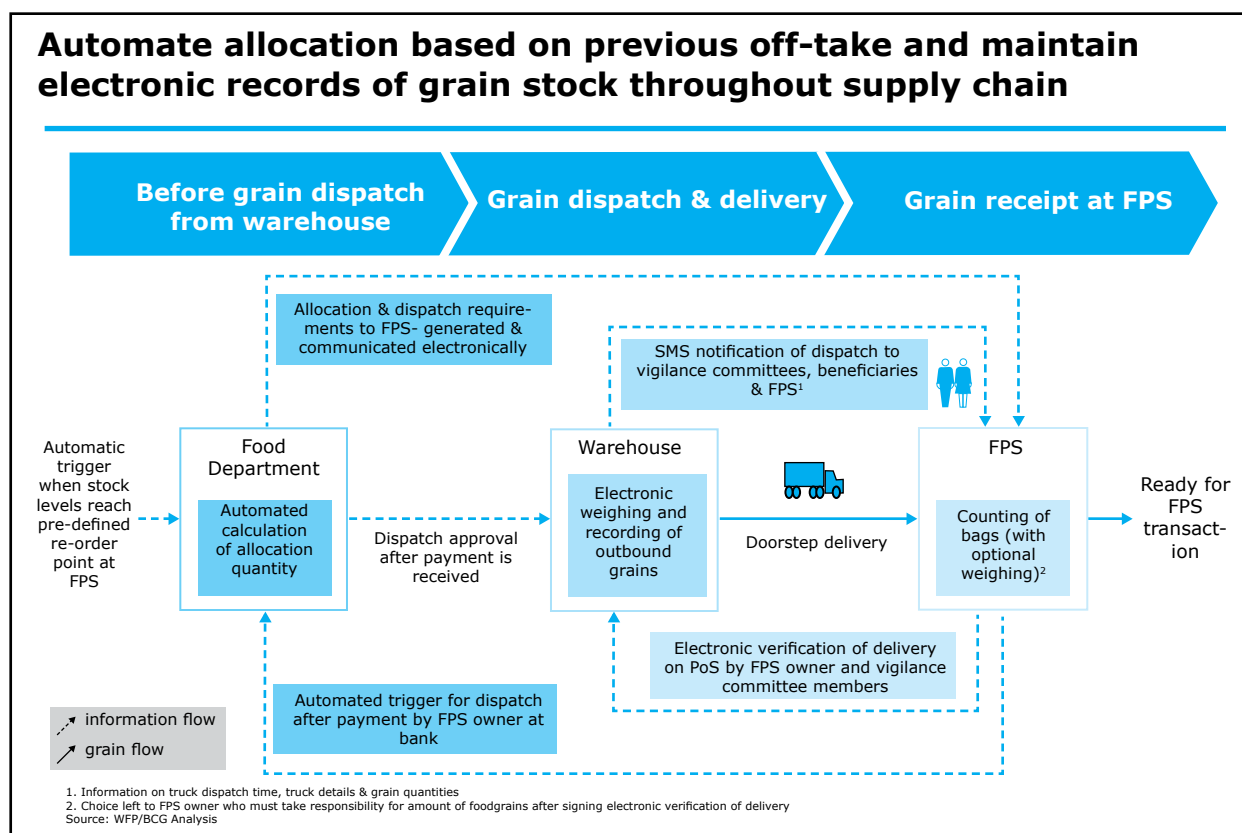
requires manual intervention by officials. Thus, value added by GPS tracking is minimised.

Additionally, there is significant increase in operational complexity if GPS tracking has to be implemented and managed:

- Installation of devices is expensive as each vehicle needs a dedicated device. Additionally, the fleet of trucks changes frequently due to new contracts, availability of vehicles, breakdowns etc. which significantly increases cost of device installation.
- Central tracking facility and IT systems need to be developed, tested and maintained which adds operational complexity.

For the reasons mentioned above, the recommended TPDS Best Practice Solution does not include GPS tracking as a solution option. Figure 3 provides a schematic overview of the recommendations covered under sections 3.3 and 3.4.

Figure 3: Schematic Of Recommended Solution – Automated Allocation Of Food Grain Based On Previous Off-Take By Tracking Food Grain Stock Levels, Doorstep Delivery Of Food Grains To FPS With Automated SMS Notifications At Dispatch



Real-time, online end-to-end computerisation of the supply chain has been demonstrated successfully in the Chhattisgarh COREPDS pilot¹² where allocation for the subsequent month is done online automatically once the stock at the FPS reaches below a pre-defined level. The transactions are recorded via the PoS device at the FPS. After the online trigger reaches the warehouse, the warehouse official issues a payment 'challan'¹³ which the FPS owner can conveniently pay at the nearest bank. Following online payment, doorstep delivery is triggered to the FPS along with SMS notifications to the registered beneficiaries. The online and dynamic nature of supply chain allows COREPDS to successfully facilitate on-demand, reliable and timely delivery of food grains to the FPS facilitating portability.

3.5 POS ENABLED ONLINE TRANSACTION AT FPS AFTER BIOMETRIC AUTHENTICATION OF BENEFICIARY USING AADHAAR

The primary challenge faced by the TPDS in operations at the FPS is the significant potential for misreporting of sales. Under the current paper based system, it is possible to report sale of higher quantity than actually sold as well as to report sales that did not even occur. To make operations at the FPS more transparent and more difficult to misreport, it is recommended that a PoS device be utilised for FPS transactions with internet enabled biometric authentication (Aadhaar based). The PoS device should be connected to an electronic weighing machine. It is advised that as an additional feature, the PoS be voice enabled in the local language to improve convenience of beneficiaries with poor literacy levels.

A PoS device connected to the weighing machine addresses both the issues, ensuring transaction logging while verifying correct weight of sale to beneficiaries. Online biometric authentication allows for authentication of the beneficiary, thereby reducing the scope for the FPS owner to

manipulate sales records. Over 90% of India's villages now have data connectivity (largely through mobile connectivity) and other mechanisms such as landlines, Very Small Aperture Terminal (VSAT), Worldwide Interoperability for Microwave Access (WiMAX) etc. can be used to supplement connectivity in the remaining areas. Aadhaar enabled pilots in tribal areas in East Godavari district and in mountainous regions of Tripura have demonstrated that online Aadhaar authentication is possible even in remote areas in less than one minute in most cases. A robust contingency plan with comprehensive exception management is recommended to ensure that issues with connectivity or authentication (e.g. manual labourers sometimes face issues due to the impact of their work on their fingerprints) do not deprive rightful beneficiaries of their food grains.

An online based transaction system also allows for flexibility in changing entitlement quantities and commodities (e.g. if the food basket is expanded to provide better nutrition) and only requires updates to be done to the central system. Additionally, if allocation to different ration card classifications changes in the future, ration cards will not have to be reprinted and instead changes can be made to the central system itself. Aadhaar based authentication allows for portability for migrant population without additional setup, as biometric data is stored centrally.

The online PoS device facilitates easy tracking of stock levels at the FPS, which can be leveraged to improve supply chain operations by closing the information loop that feeds the allotment triggering mechanism, as detailed in section 3.3.

A variety of solutions have been piloted for strengthening FPS transactions across different states, including barcoded coupons and smart cards. These solutions have certain merits, but an online Aadhaar based biometric solution using a PoS device was found to be the most suitable option across a broad range of criteria.

¹²Data based on field visits and discussion with pilot implementation officials

¹³Challan is a commonly used term for an official form or document, such as a receipt, invoice or summon

Figure 4 provides a schematic of the recommended TPDS Best Practice Solution for transactions at the FPS.

Other solution options that were analysed for FPS transactions include barcoded coupon and smart card based options. There are two potential variants of the barcoded coupon based system:

- Coupons that are issued to the beneficiary in one block that last 12-24 months (this option was tested out in rural FPS at Rayagada, Odisha).
- Coupons that are issued on a monthly basis (like the system currently being rolled out in Gujarat which uses computer and internet enabled village centres to issue coupons after biometric authentication of the beneficiary).

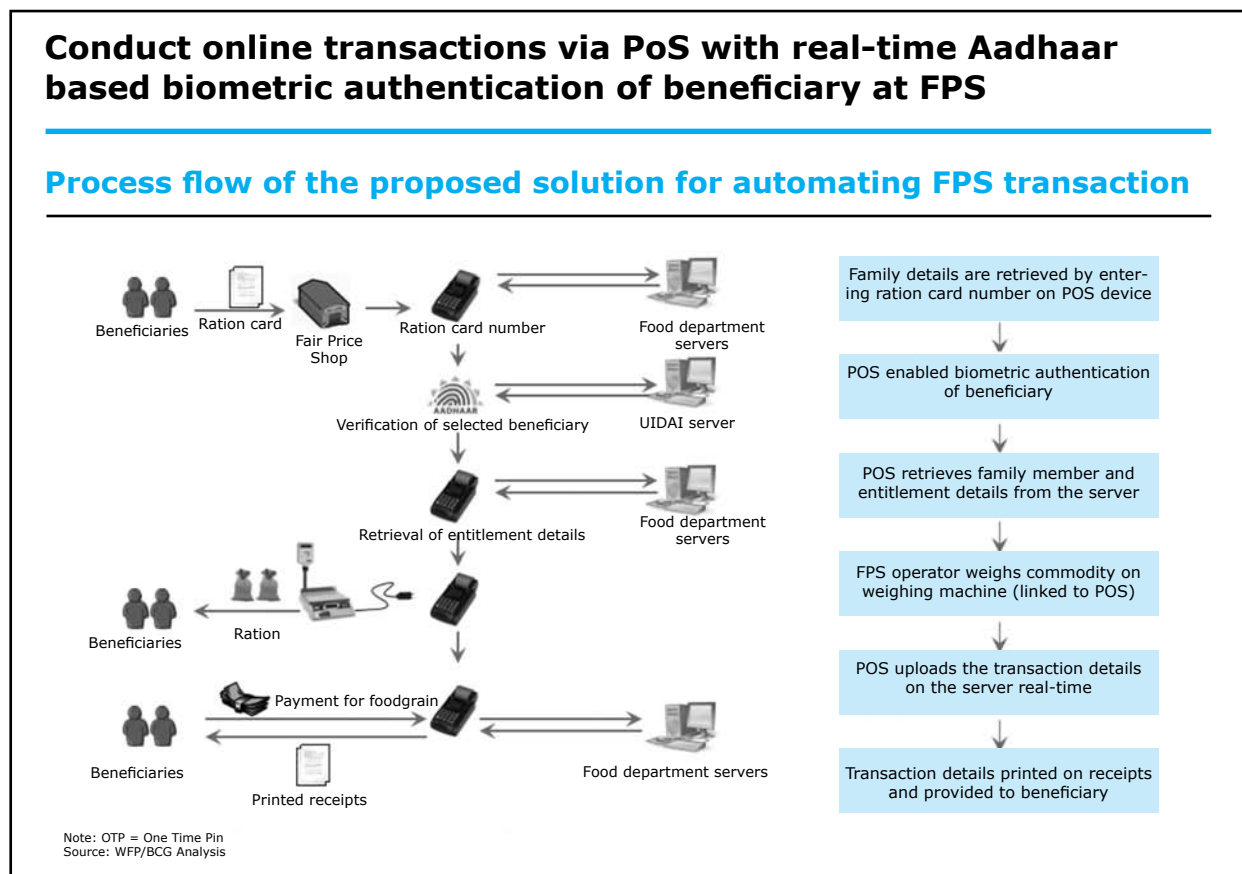
Under both these solution options, beneficiaries collect unique barcoded coupons, which are then used for transactions at the FPS. These coupons then

need to be scanned in order for the actual off-take to be tracked in the system.

Coupon based systems face a number of issues:

- Coupons can get lost, stolen or mutilated. Since scanning the coupon is the only way in which the transaction can be verified, the loss or destruction of the coupon prevents the information loop from being completed. This is a significant drawback for coupons that are issued in bulk for extended periods of time.
- Coupon printing is a significant recurring expense. This expense is even larger in case of coupons that are designed to be non-replicable.
- The cost and complexity of distributing coupons on a monthly basis can be prohibitive, especially in areas which do not have the village level infrastructure to distribute coupons.

Figure 4: Schematic Of Recommended Solution – PoS Enabled Online Transaction At FPS After Biometric Authentication Of Beneficiary Using Aadhaar



- The cost and complexity of collecting and scanning coupons quickly enough to enable the next month's allotment to be done on the basis of the previous month's off-take is significant. Trying to run a system that allows portability (more details are provided under point 3.6 of this section) based on barcoded coupons would be very challenging.
- Finally, once coupons are issued, changes in entitlements cannot be made as the coupon cannot be modified after printing. This is particularly an issue in the case of coupons that are issued in bulk.

Figure 5 provides a summary of the comparison between the two barcoded coupon options and the recommended TPDS Best Practice Solution

Smart card based solutions are the other option that is often proposed for FPS

transactions. All beneficiaries are provided with a smart card with a memory chip that can be used to store beneficiary details, transaction data as well as (in some cases) biometric information. Smart cards require PoS devices at the FPS in the same way as the recommended best practice solution.

One of the main benefits of smart cards is their ability to store multiple types of data. This makes the smart card highly suitable for offline transactions. Even limited FPS portability can be enabled in offline mode using smart cards. This is not possible under the recommended TPDS Best Practice Solution. However, as previously stated connectivity is increasingly available even in the remotest villages (more than 90% of India's villages have mobile connectivity and for the remaining a combination of landline, VSAT and WiMAX can be used). Using a redundancy based approach in which each

Figure 5: Comparison Of Barcoded Coupon System With Proposed Solution

Recommended solution reduces leakage and increases customer convenience more effectively than barcoded coupon systems		
Coupon book issuance after one-time authentication¹	Coupon issuance on a monthly basis after biometric verification²	Recommended TPDS solution
✗ The system efficiency to reject ineligible beneficiaries/fake transactions is low. Anybody with the possession of coupons and ration card can transact at FPS, which may not belong to them	✗ Biometric authentication required for printing. However anybody can make transactions on it once it has been issued – main purpose of beneficiary identification during sales not addressed	✓ Online biometric authentication is required for making a transaction at FPS – therefore, only the eligible beneficiaries can make the transaction at FPS
✗ Additional efforts required by beneficiary to keep the coupons safe for 12 – 24 months	✓ Only ration card needs to be carried. Coupon gets issued monthly after biometric verification	✓ Only ration card number is required for initiating the biometric transaction at FPS
✗ The system is not capable of incorporating entitlement changes dynamically – reprinting and redistribution of coupons required	✓ Entitlement details are retrieved from servers on a monthly basis. System can dynamically update any changes in entitlement	✓ Entitlement details are retrieved from servers on a monthly basis. System can dynamically update any changes in entitlement
✗ Poor transaction logging – cannot determine actual quantity sold by FPS which may lead to misreporting, leakage and under-weighing	✗ Poor transaction logging – cannot determine actual quantity sold by FPS which may lead to misreporting, leakage and under-weighing	✓ Proper transaction logging and due to weighing machine linked to PoS, reduced avenues of misreporting and under-weighing
✓ The overall time taken for the transaction at FPS is low - FPS owner weighs the commodities and collects the coupon	✓ The overall time taken for the transaction at FPS is low - FPS owner weighs the commodities and collects the coupon	✗ Time taken for a completed transaction at FPS will be slightly higher – online biometric authentication and weighing linked to PoS
✗ Tough to track real-time stock levels at FPS(difficult to create daily MIS)	✗ Difficult to carry out real-time stock checks and audits at FPS(difficult to create daily MIS)	✓ Real-time tracking of transactions and stock can be done through MIS due to online logs
✗ Difficult for illiterate and blind people to fully understand the transaction details.	✗ Difficult for illiterate and blind people to fully understand the transaction details.	✓ Local language voice interface guides beneficiaries (illiterate and blind people) through transaction procedure
✗ Distribution of new coupons may require multiple visits for beneficiaries and significant cost to state	✗ Infrastructure needed at block level for monthly distribution of coupons.	✓ No additional infrastructure needed apart from PoS at FPS

1. System similar to that used in WFP implemented pilot in Rayagada, Odisha
2. System similar to that used in Gujarat TPDS

Figure 6: Comparison Of Smart Card Based System With Proposed Solution

Recommended solution has significant advantages on a majority of key parameters over smart card based system	
Smart card based system	Recommended TPDS solution
<p>✗ Data stored locally on the smart card (biometrics, transactions)</p> <ul style="list-style-type: none"> • Susceptible to synchronisation errors with data stored on servers versus data stored on card 	<p>✓ Biometric data stored securely on servers</p> <ul style="list-style-type: none"> • All data is stored in central location - synchronisation related errors greatly reduced
<p>✗ Biometric data updating process is complex</p> <ul style="list-style-type: none"> • The beneficiary goes to enrolment camps for providing biometric data (UIDAI/NPR camps, if Aadhaar based) • The updated biometric data then needs to be stored on the chip of smart card, requiring beneficiary to travel to food office 	<p>✓ Biometric data updating process is simpler</p> <ul style="list-style-type: none"> • Beneficiary provides his biometric at UIDAI/ NPR ongoing camps (at taluka level) which gets automatically seeded to ration card number
<p>✗ The amount of data that can be stored on smart card is low- number of beneficiaries, transaction logs limited in number</p>	<p>✓ As transaction is happening online, no data stored locally. Therefore, any amount of data can be stored on servers</p>
<p>✗ The chip of the smart card has a life of 3-5 years, after which a new smart card has to be given - high recurring cost</p>	<p>✓ Biometric authentication requires no external token. Paper ration cards a backup - significantly longer life and lower cost</p>
<p>✗ Only those members who have their biometric data stored on chip can transact at FPS (limited data on chip)</p>	<p>✓ Anybody in the family (as per ration card) with an Aadhaar number can transact at FPS</p>
<p>✗ Entitlement details often stored locally on the chip; therefore, unable to update and changes in entitlements dynamically - requires multiple visits of beneficiary to food office</p>	<p>✓ Entitlement details retrieved from the server for every transaction; therefore, able to update any changes in entitlements dynamically</p>
<p>✓ Portability can be implemented in offline mode also because biometric data, entitlement data and monthly transaction history can be stored on smart card</p>	<p>✗ Portability tough to implement in offline mode as real-time information is required for transaction logging (Can be resolved with exception management process)</p>
<p>✓ Easier to switch between online mode and offline mode as some data can be stored on the chip if the data connectivity is not good</p>	<p>✗ Tough to operate in offline mode as biometric verification generally takes place online (Can be resolved with exception management process)</p>
<p>✓ Very low transaction time</p> <ul style="list-style-type: none"> • No need to enter the ration card no. manually on the PoS 	<p>✓ Low transaction time</p> <ul style="list-style-type: none"> • Manual entry for ration card number (or through scanner) • Biometric verification (typically takes few seconds)

FPS has at least two possible connectivity mechanisms can ensure minimal downtime. Moreover, the recommended solution incorporates a robust contingency plan to allow for transactions to continue even if connectivity were to fail. This ensures no denial of service to rightful beneficiaries under any condition.

While smart cards do have their merits, in a comparative analysis against smart card based solutions the recommended online Aadhaar enabled PoS based solution proved to be more suitable. In locations in which connectivity is available, smart cards offer no clear additional benefit in comparison with the recommended TPDS Best Practice Solution but do have a number of specific

issues. Some of the issues that have been observed with smart card based solutions (in Rayagada, Odisha) include:

- Smart cards cost Rs. 50 - 100 (USD 0.83 - 1.66) (cost of physical card and cost of personalisation) and have a limited life (two to five years depending on usage). This has significant upfront and recurring cost implications for the system.
- The pace of rollout of the system is dependent on how fast smart cards can be personalised and distributed. This can slow down implementation of the FPS transaction system compared with an Aadhaar based system in which the rate determining step is the seeding of

the beneficiary database but there is no physical token required to be handed over to the beneficiary.

- Like all other physical tokens, smart cards can get lost, stolen or damaged. Experience from Rayagada, Odisha shows that card damage and loss can be a significant issue from an operational, cost and consumer convenience standpoint. Additionally, if connectivity to support online application is good, the use of smart card is redundant.

3.6 ABILITY FOR BENEFICIARY TO PURCHASE RATION FROM ANY FPS (PORTABILITY)

A number of problems in the TPDS stem from the significant power imbalance between the FPS owner and the beneficiary. Under the current system, the beneficiary is attached to a single FPS regardless of its performance or service quality. FPS owners often use this lack of freedom of beneficiaries to their advantage resulting in a host of issues including poor quality of service, under weighing of grains, misbehaviour and poor treatment of beneficiaries, claims of no stock availability and the FPS being open for only a few days in the month. There are no disincentives in place for these issues that FPS owners need to think about. Additionally, FPS owners are not financially incentivised for good performance, as their profit is limited by the number of ration cards attached to the FPS regardless of how well they manage their operations.

To counter this issue, statewide FPS portability is recommended, under which beneficiaries can purchase food grains from any FPS of their choice. The benefits of portability are significant. The power balance shifts towards the beneficiaries through free-market dynamics enabled by the provision of choice. Beneficiaries can take their business to an FPS that ensures proper service quality, thereby weeding out poorly performing FPS over time. Also, beneficiary convenience is increased as they can now easily purchase ration at desired locations, which can sometimes be an issue because of address changes and relocations. In the long term, portability could be made

available at a pan-India level leveraging the Aadhaar platform which stores data centrally. This would help serve the needs of the migrant workforce who presently have no means of getting ration if they relocate temporarily. States and union territories should pursue portability depending on the maturity of their IT systems and capability to ensure dynamic availability of food grains across the target locations.

Creating competition among FPS owners has been demonstrated to yield significant improvements in the TPDS, as is evidenced by the COREPDS pilot in Raipur, Chhattisgarh.

Facilitating portability places a number of demands on the TPDS. A system that enables portability needs to be able to:

- Uniquely identify and authenticate beneficiaries at any FPS
- Determine beneficiary's entitlement and family details at any FPS
- Track beneficiary's previous purchase history in real time
- Replenish food grain at the FPS dynamically based on stock levels

The recommended Best Practice Solution addresses all these requirements by having an online biometric based system for identification (Aadhaar), online storage and retrieval of beneficiary details and transaction history. It is also enabled through an end-to-end computerised supply chain with real time tracking of grains and doorstep delivery.

Portability is recommended in both urban and rural settings. There are a few constraints for portability in rural settings due to FPS which are spread across a larger area (as compared to urban settings which have a large number of FPS in a small area), but the benefits in terms of consumer choice and the incentive and disincentives for FPS performance due to competition are still significant. In rural areas, given the longer distance over which food grains need to be transported, longer lead times may need to be built into the supply chain by triggering

replenishment at FPS at higher stock levels than in urban areas where replenishment can occur at much shorter notice.

To ensure that the option for FPS portability remains viable and practical in rural settings where distances between shops are usually larger, a mobile FPS can be operated to supplement existing FPS. This would be in the form of a state run truck selling TPDS commodities that visits villages on a weekly basis.

Significant success around portability has been seen in the COREPDS pilot at Chhattisgarh¹⁴; implemented in around 170 FPS in Raipur city. A large number of beneficiaries purchase food grains from FPS other than the one which they are assigned to - a phenomenon which is widespread in the urban FPS clusters but also seen in rural FPS. FPS with good performance and service have seen the number of ration cards purchasing from them increase substantially, even up to four times the number of cards originally assigned to the FPS. Additionally, poorly performing FPS have been weeded out of the system; about 20 FPS have cancelled their licenses due to very low sales, attributed to poor service quality at the FPS.

3.7 IMPROVED FPS VIABILITY TO INCENTIVISE BETTER FPS PERFORMANCE

The TPDS has seen significant changes over the past decade. However, the commission structure for FPS in many states has remained the same for a number of years. This is a major cause for concern for the implementation of any measures to strengthen the TPDS. Any TPDS solution will need the support and collaboration of FPS owners in order to be successful, especially solutions that will close loopholes that can currently be exploited to divert food

grains. Implementing a TPDS solution will require learning (through training) on part of the FPS owner to operate a new system. Also the responsibility for maintenance of any PoS devices and for ensuring proper transaction logging rests with the FPS owner. Given that the FPS owner serves as a focal point in the value chain, it is important to address the issue of FPS viability.

Analysis reveals poor financial conditions of FPS operations throughout large parts of the country¹⁵:

- Rs. 1.5 lakh (USD2,500)¹⁶ subsidy¹⁷ flows through a typical FPS from which the commission for the FPS owner is Rs. 3,200 (USD 53)¹⁸ – merely around 2% of the subsidy amount
- Only 40% of FPS can earn revenue more than costs¹⁹
- Only 23% of FPS are able to generate more revenue than investments²⁰
- Even if costs of transport, labour and rent for the FPS were fully subsidised, it would still not result in more than 70% of FPS being profitable.

Given these facts, it should be no surprise that many FPS owners indulge in pilferage to ensure that their efforts give returns.

It is recommended that viability be improved to incentivise FPS to perform honestly and with better service quality. Thus, FPS owners should be provided with incentives to improve the viability of their operations. In addition to higher commissions (something that has been tried out in states like Chhattisgarh and Gujarat), measures like subsidisation of FPS rent and doorstep delivery have also been tried. In addition to financial incentives, measures to streamline processes to save time and paperwork for FPS owners should also be considered in consultation with FPS owners.

¹⁴Data based on field visits and discussion with pilot implementation officials

¹⁵Based on a typical FPS having 472 ration cards, taken as an average across all states (Source: Ministry of Consumer Affairs, Food and Public Distribution, Govt. of India (13357))

¹⁶Based on average figures across multiple states for entitlements of wheat, rice and sugar to APL, BPL and AAY beneficiaries; does not account for Kerosene sales.

¹⁷Based on economic cost of supplying grain minus price obtained from sales

¹⁸Based on typical commission structure across states and revenues from sale of gunny bags

¹⁹Planning Commission report on Performance Evaluation of Targeted Public Distribution System, March 2005

²⁰Criterion used: profit must exceed 12% interest on investment

Improvements in FPS viability are essential to get support for reforms from one of the key stakeholders in TPDS (the FPS owner) and attempts to bring FPS owners into the fold by providing them with an attractive return for good service and performance is imperative.

3.8 EASILY ACCESSIBLE AND EFFECTIVE GRIEVANCE REDRESSAL

The recommended TPDS Best Practice Solution provides for a strong grievance redressal mechanism. This is in line with the National Food Security Act which requires a grievance redressal mechanism as integral part of TPDS operations. The Act provides for a two tier grievance redressal mechanism comprising of District Grievance Redressal Officers and State Food Commissions.

An effective grievance redressal system has two main components:

- Logging and tracking of complaints with proper details
- Proper and timely resolution of the complaint

It is recommended that multiple channels be made available for logging and tracking of complaints for the convenience of stakeholders:

- Physical letters
- Website
- Toll-free helpline
- Public meetings

The system should give each complainant a unique identification number that is communicated to the stakeholder (via SMS, e-mail or toll-free helpline). While logging the complaint, all necessary details should be captured. Confidentiality and anonymity of the complainant should be ensured wherever appropriate and possible.

An important responsibility rests on an assigned grievance redressal manager, who acts as facilitator for forwarding valid complaints to the relevant authorities and ensures that action is taken if the authority does not respond adequately within the stipulated time for resolution. The grievance redressal manager should be senior enough

to be able to execute his or her duties without pressure from government officials. A senior retired government employee with a support staff would be an ideal candidate. Follow up and resolution of complaints should be tracked through the MIS.

To ensure that the system runs smoothly, participation of vigilance committees is recommended. These should be formed at all levels (state, district, block and FPS) and should regularly review the functioning of the TPDS. Social audits should also be carried out periodically to have institutional checks on system operations, as well as to sensitise and mobilise beneficiaries.

Figure 7 provides a schematic overview of the grievance redressal system outline.

3.9 MIS FOR OPERATIONS MANAGEMENT, SYSTEM IMPLEMENTATION AND TRANSPARENCY

An effective MIS fulfils three major criteria:

- Capture all appropriate data in an accurate and timely manner
- Convert the captured data into analysis and present usable reports to the relevant stakeholders as well as determine trends in data over time to present analysis for long-term improvement of TPDS
- Ensure that the relevant authorities follow up with the required action, which can be facilitated by providing incentives and disincentives to stakeholders.

The main feature of such an MIS is that relevant reports should be accessible to all stakeholders – food officials, TPDS agencies, FPS owners and even beneficiaries. Access to information should be based on what information is relevant for which stakeholder.

The MIS should be used to enable and monitor inspections by providing officials with the reports that they need for physical verification and also by tracking the completion and results of different inspections as per defined protocols.

Figure 7: Schematic Of Recommended Solution – Easily Accessible And Effective Grievance Redressal

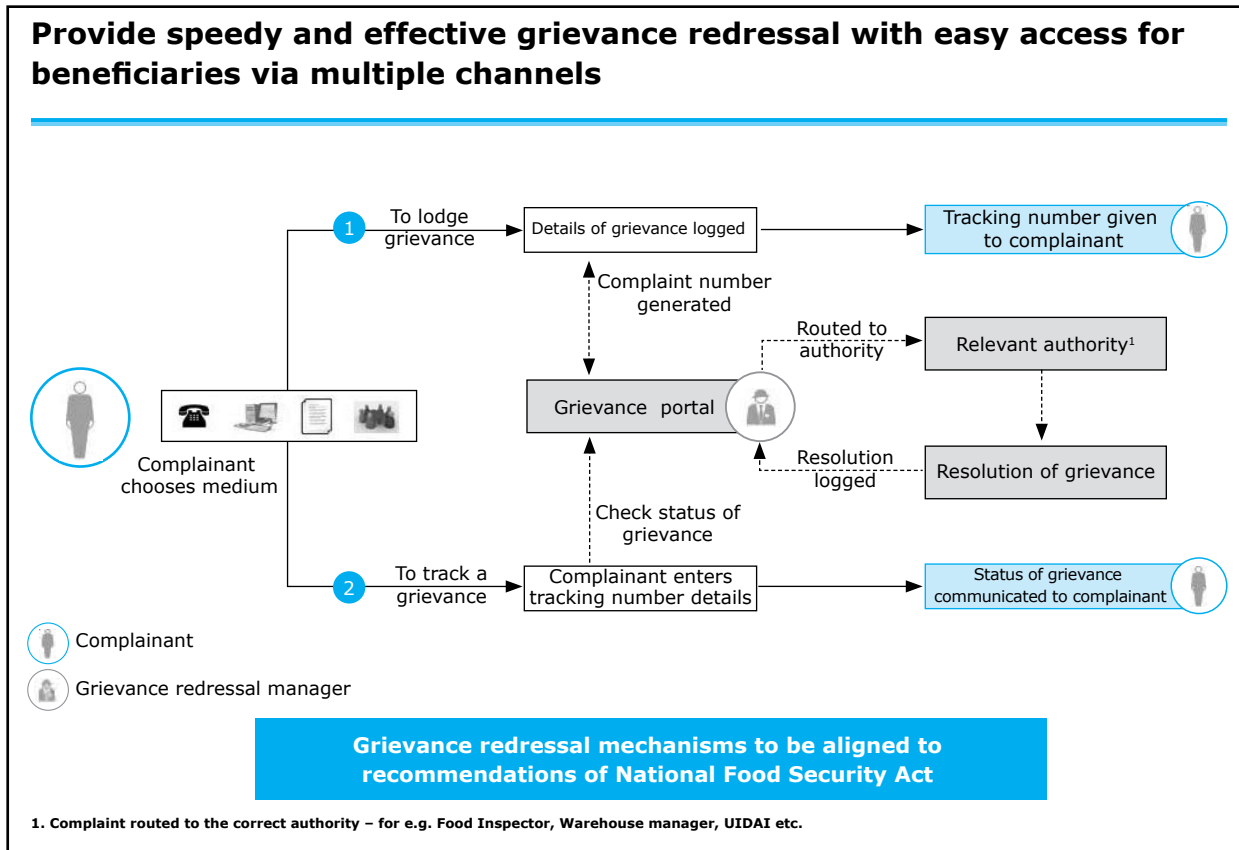
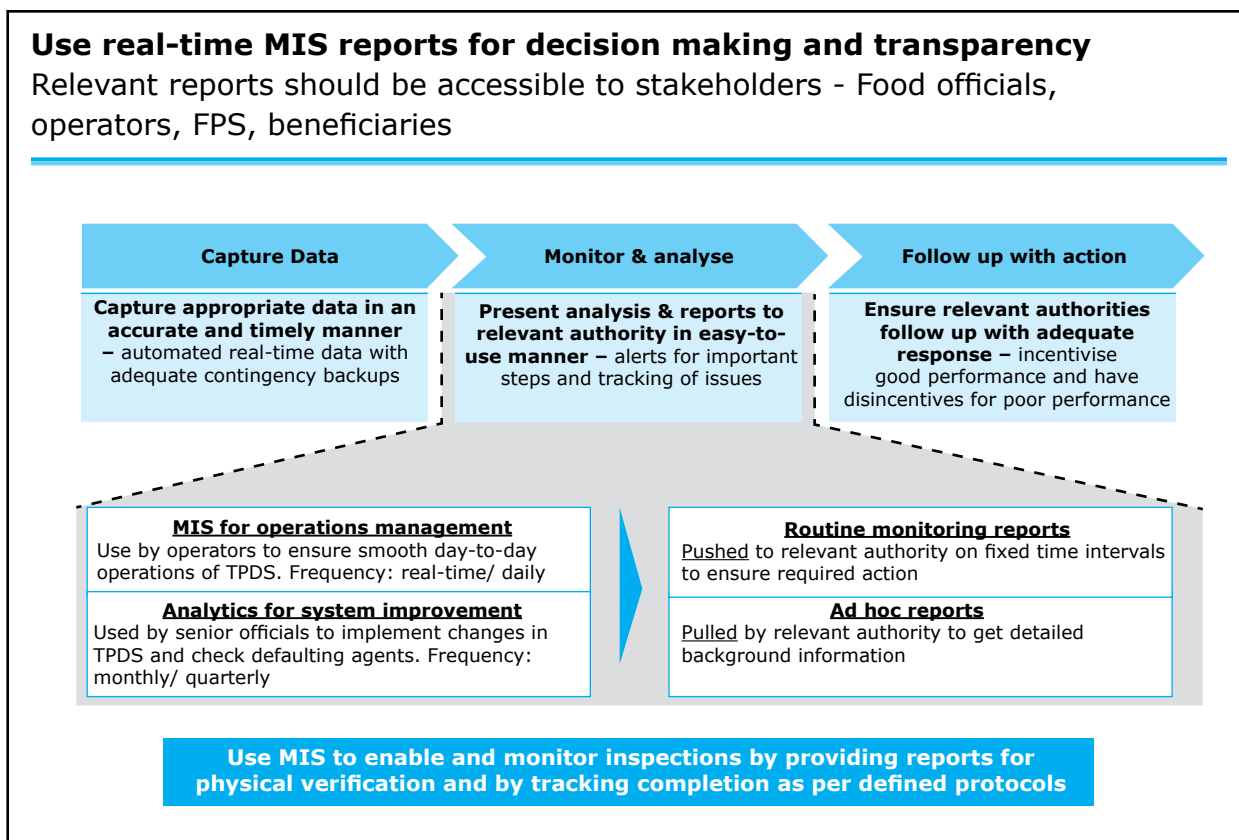


Figure 8: Schematic Of Recommended Solution – Structure And Salient Features Of The MIS



As shown in Figures 8 and 9, the design of the MIS should include the following categories of reports/ analysis:

- Reports for operations management (to ensure smooth day to day functioning of operations)
- Analytics for system improvement (to improve system over time)

These categories should each have two types of reports:

- Routine monitoring reports (pushed to the relevant authority with all necessary information to ensure action)
- Ad hoc reports (reports that can be generated by the authorities if required to get additional background information).

The MIS should also track the actions taken by the authorities based on the data and reports.

It is recommended that stakeholders who actively participate in the process to bring

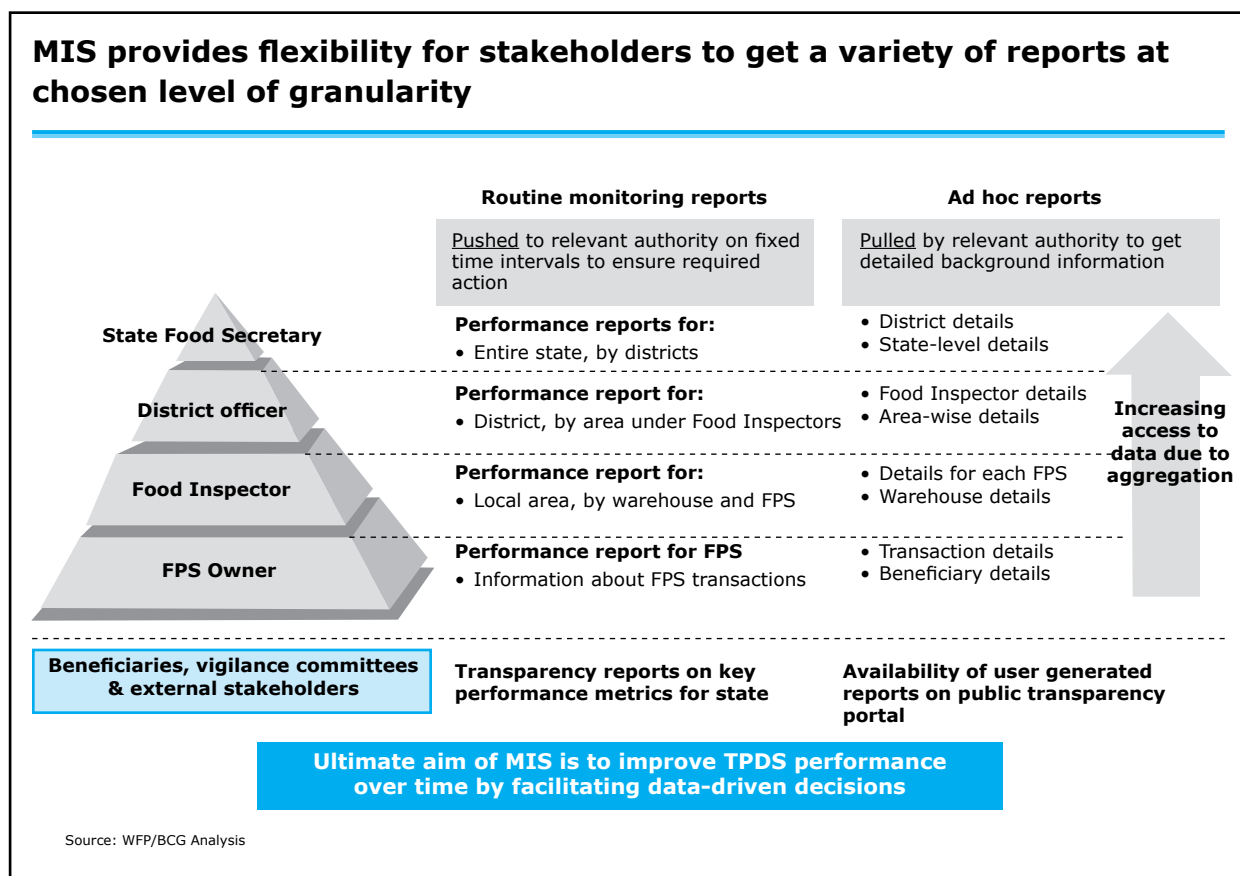
about system improvement be provided incentives to recognise their efforts and reward good performance. Similarly, poorly performing stakeholders should be brought to attention and corrective actions should be taken in a transparent and fair manner. Lastly, relevant information and reports should be made available to the beneficiaries and vigilance committees via a public transparency portal.

3.10 SUMMARY OF THE RECOMMENDED TPDS BEST PRACTICE SOLUTION

The recommended Solution combines the most suitable options for every process in each of the four TPDS value chain segments. Figure 10 provides a high level summary of the TPDS Best Practice Solution that combines the nine features described in sections 3.1 to 3.9.

As illustrated in Figure 11, the recommended TPDS Best Practice Solution targets all the key success factors identified for a successful TPDS system.

Figure 9: Recommended MIS Design And Flexibility Of Access



3.11 ROBUST CONTINGENCY PLAN

Given the significant diversity in operating conditions for TPDS while also realising that all situations cannot be predicted in advance, it is recommended that a detailed contingency plan be prepared for ensuring the continuous smooth operation of the system. The guiding principle should be that genuine beneficiaries should not be denied service and that technology should be implemented to simplify processes rather than serve as a hindrance to the provision of service to beneficiaries.

Considering the technological nature of the TPDS Best Practice Solution, it is inevitable that issues may arise around machine operations, breakdowns and technical glitches. It is essential to have a list of solutions for all major contingencies, with a default base case for all remaining ones. The guiding principle of designing contingency plans should be to first aim at resolving issues at the point of problem itself, by virtue of training to operators and FPS owners and providing detailed yet simple operation manuals. If the issue cannot be

resolved, then backup measures should be used to ensure that there is no denial of service to beneficiaries. This may result in manual operations or cost to the state to repair equipment, resulting in avenues for system inefficiencies (such as leakage etc.), but the advantage of implementing technological solutions far outweighs the short term problems with operations of devices.

Contingency planning should cover two categories:

- 1. System related contingencies** (issues with machine operations or machine breakdown, software or hardware issues, electricity or data connectivity failures etc.):
 - **Implementation phase:** Detailed surveys on electricity and data connectivity for all FPS should be undertaken to determine feasibility for operations. In case of significant gap from desired availability and reliability levels, backup measures should be taken, such as installing solar powered generators for electricity backup and

Figure 10: Schematic Of Recommended Solution – End-to-end Design

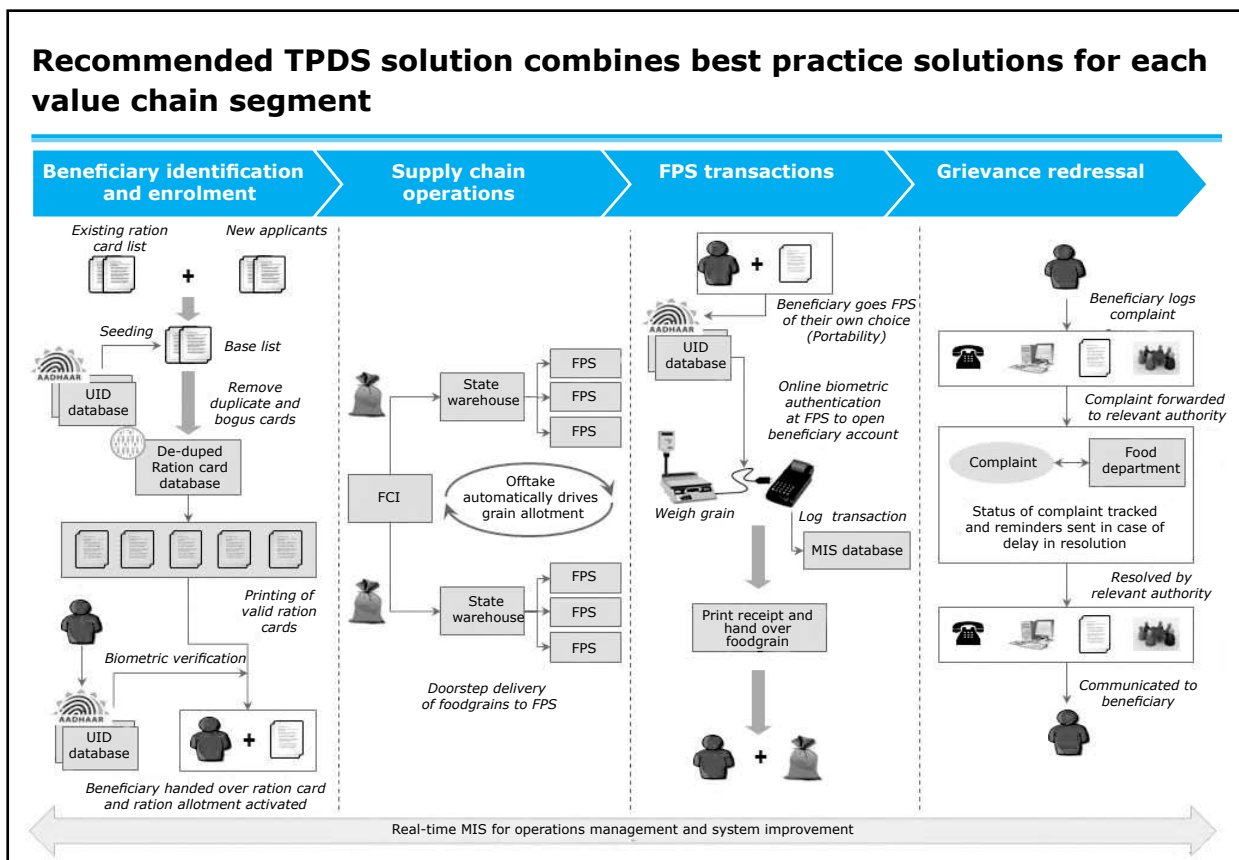
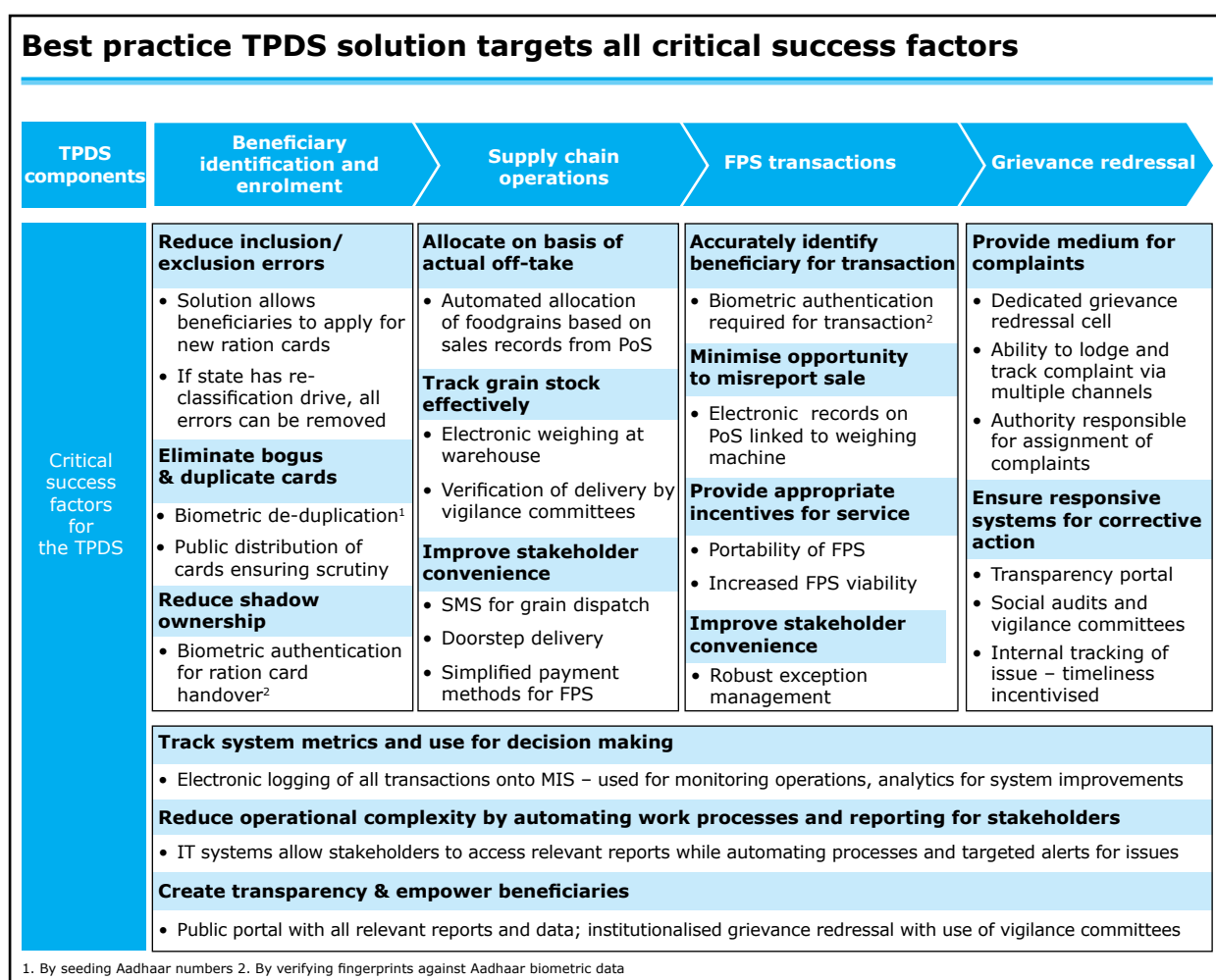


Figure 11: Overview Of Solution Efficacy In Addressing Critical TPDS Success Factors



installing WiMAX towers or dedicated broadband line for data connectivity.

- Operations phase:** To counter the diverse range of potential operating issues, a detailed contingency plan is required. For situations where data connectivity is temporarily unavailable, devices and computers should store the data in offline mode, followed by a batch upload of data when connectivity resumes. In case of unavailability of electricity, power backup for computers and rechargeable batteries for devices is recommended. In case of device breakdown, quick corrective action is needed to repair or replace the device, while temporarily using manual mode of operations for convenience of beneficiaries.

- Process related contingencies** (e.g. poor fingerprints, multiple persons with same name in household, insufficient stock levels at warehouse, lack of

sufficient transportation to FPS, PoS operations etc.):

- During beneficiary digitisation and enrolment, contingency measures must be in place to account for a variety of scenarios that take place, to ensure that beneficiaries are not caused inconvenience and elimination of beneficiaries from the lists is done only after proper verification.
- For supply chain operations, it is critical that orders be dispatched on time and notifications reach the beneficiaries, with proper verification of the delivery at the FPS. In case automated or electronic systems are not working, a manual procedure must be put in place to ensure that operations are not hampered and food grain availability is maintained at the FPS as far as possible.
- At the FPS, it should be the primary aim to ensure that the beneficiaries get their intended food grains, regardless of the

situation. Hence, contingency measures must be built in for FPS operations which account for any adverse situations while ensuring that all data is ultimately logged on to the MIS which forms the basis for subsequent month's allocation to the FPS.

All occurrences of contingency scenarios should be logged onto the MIS, which can be tracked and analysed to prevent misuse of the contingency scenarios and take corrective action. Recurring problems observed can also be addressed with permanent operational solutions, such as installing additional backup infrastructure.

Additionally, incentives for all stakeholders should be designed in such a way as to reduce the potential gain from indulging in malpractices or bypassing standard procedures and protocols for operations. Linking all payments through a central system with visibility and authentication of data is a key method to achieve this, apart from others.

Detailed contingency plans have been developed for all aspects of the solution design under system related contingencies and process related contingencies, which can be made available on request.

3.12 FLEXIBILITY TO POTENTIAL ECOSYSTEM CHANGES

The proposed Solution is highly adaptable to a range of potential changes in the ecosystem, as is described below. The flexibility of the solution stems from having modularity among components – there is no process that is locked down with regards to information or change. Since all systems are managed centrally, the modification needs to happen only at one location and not requiring a complete overhaul for every change. Lastly, since the entire system is recommended to be operational online, the changes can be synchronised in real-time without significant amount of efforts on part of the stakeholders.

The NFSA (2013) has significant impact on the TPDS e.g. change in percentage of population covered, changes in classification and per-person allotment of food grains. The proposed solution can easily adapt to these and other potential changes in the future. The online system based on Aadhaar enrolment can scale up to cover all beneficiaries. Classification is mapped online and can be easily modified centrally. Information is stored for

Figure 12: Overview Of Solution Flexibility Towards Potential Future Changes In TPDS

Best practice solution is flexible to adapt to potential changes in TPDS ecosystem		
Ecosystem changes	Impact on TPDS	Proposed solution addresses these issues
National Food Security Act (NFSA)	Increase in the number of beneficiaries covered under TPDS	Scalable to include all persons enrolled in Aadhaar/NPR easily
	Changes in beneficiary classification	Online retrieval of entitlement during transaction allows changes in back-end
	Per-person allotment of food grains	Easily incorporated as each person will have unique ID (Aadhaar #)
	Increased focus on the nutritional value of food	Flexible to incorporate changes in food basket modifying allotment in back-end
Direct Benefit Transfer (DBT) in TPDS	Transfer of cash to directly to the account, based on actual transaction and off-take	Transfer money based on electronic record of actual off-take mapped to each FPS & beneficiary after biometric authentication of beneficiary at FPS
	<ul style="list-style-type: none"> • <u>Transfer to FPS owner</u> – based on actual off-take from FPS • <u>Transfer to Beneficiary</u> – based on actual purchase of ration 	

individuals (Aadhaar number); hence per person allotment can be implemented while the dynamic supply chain can also support diversifying of the food grains under TPDS wherever required.

Direct Benefit Transfer (DBT), if considered would involve electronic transfer of subsidy into the account of either the FPS owner or beneficiary based on the actual off-take and transaction history. This technical modification can be easily added onto the TPDS Best Practice Solution as transaction

history for each FPS and beneficiary/ration card is already recorded by the electronic PoS device and uploaded to central systems after biometric authentication.

In conclusion, the proposed TPDS Best Practice Solution can address all major issues facing the TPDS currently, but requires a focused effort over time from the state governments and all stakeholders to ensure proper implementation to yield benefits.

4. Implementation Plan

A detailed implementation plan has been developed for the recommended Best Practice Solution. The implementation plan provides indicative project timelines, roles and responsibilities for different stakeholders, details of IT systems, MIS design as well as implementation of best practices. A brief overview of these major components is described below. Specific elements of the implementation plan will vary from one location to another and some customisation for the specific environment and goals of the state will be required.

4.1 IMPLEMENTATION TIMELINES

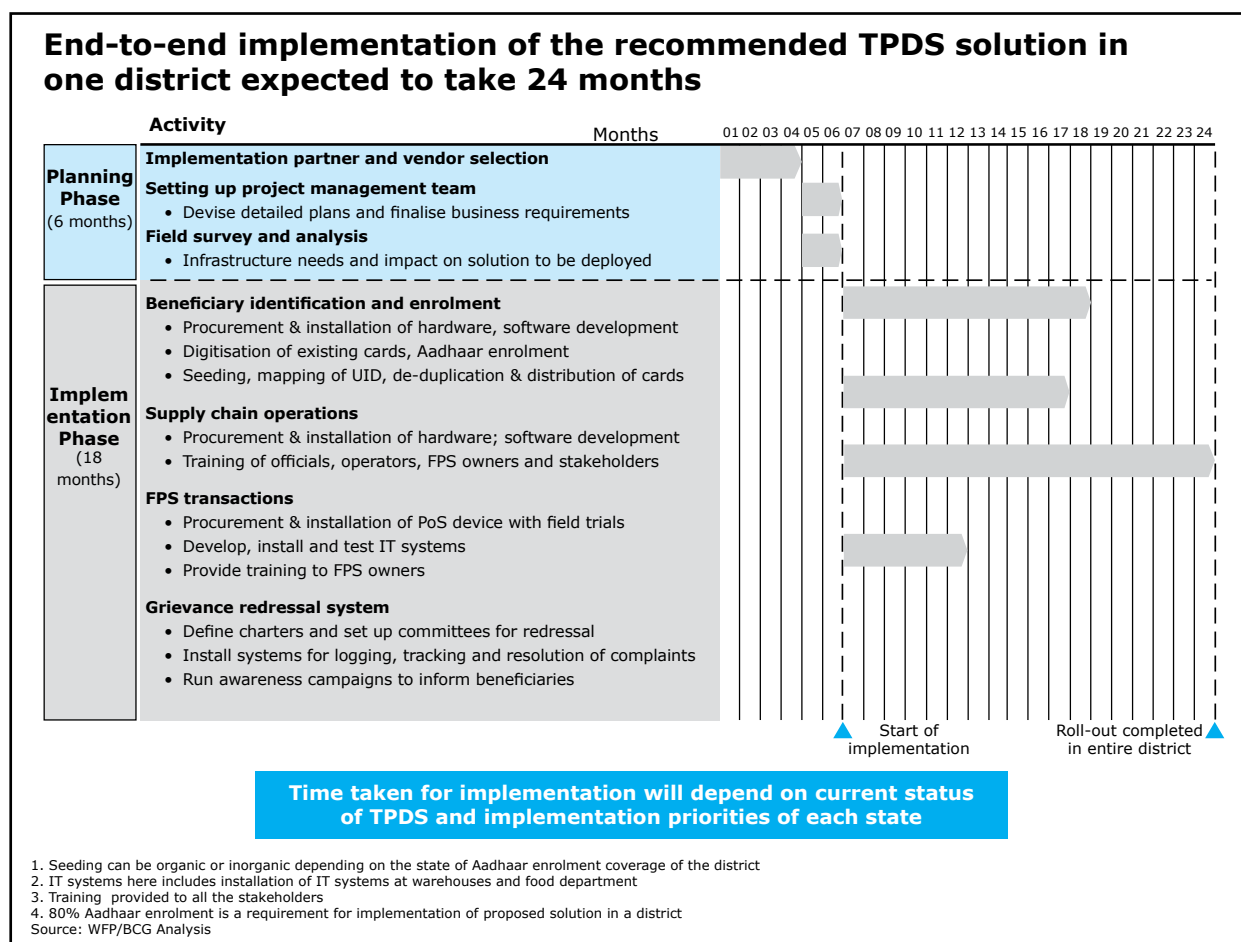
The recommended prototype would take approximately 24 months to be implemented. This includes end-to-end strengthening of the TPDS, assuming the starting point to be a district with no

modernisation efforts. If the chosen district has already implemented certain activities, the time taken will be adjusted accordingly. Implementation of the solution has been divided into two phases:

1. Planning Phase

Prior to launching, a set of activities needs to be carried out to ensure proper preparation and to modify the recommended solution to best suit local conditions and implementation goals. These activities are expected to typically take approximately six months. The activities include selecting implementation partners, vendors, setting up project management teams and conducting field surveys. These will allow the authorities and stakeholders to have a significantly better understanding

Figure 13: Estimated Timelines For Implementation Of Recommended Solution Across One District



of the ground conditions and requirements for implementation.

2. Implementation Phase

Having established tie-ups with partners and vendors and understanding the location specific requirements, implementation of the TPDS Best Practice Solution can commence. It is recommended that all activities are carried out simultaneously, so as to reduce overall time taken while also facilitating field trials at the overall system level. The activities for each value chain component as listed in Figure 13 include procurement and installation of hardware and devices, development and testing of software, training of officials, operators and FPS owners.

4.2 BUILDING PARTNERSHIPS AND INTERNAL CAPABILITIES

A large number of activities need to be carried out in order to implement the TPDS Best Practice Solution. It is recommended that a clear demarcation of responsibilities

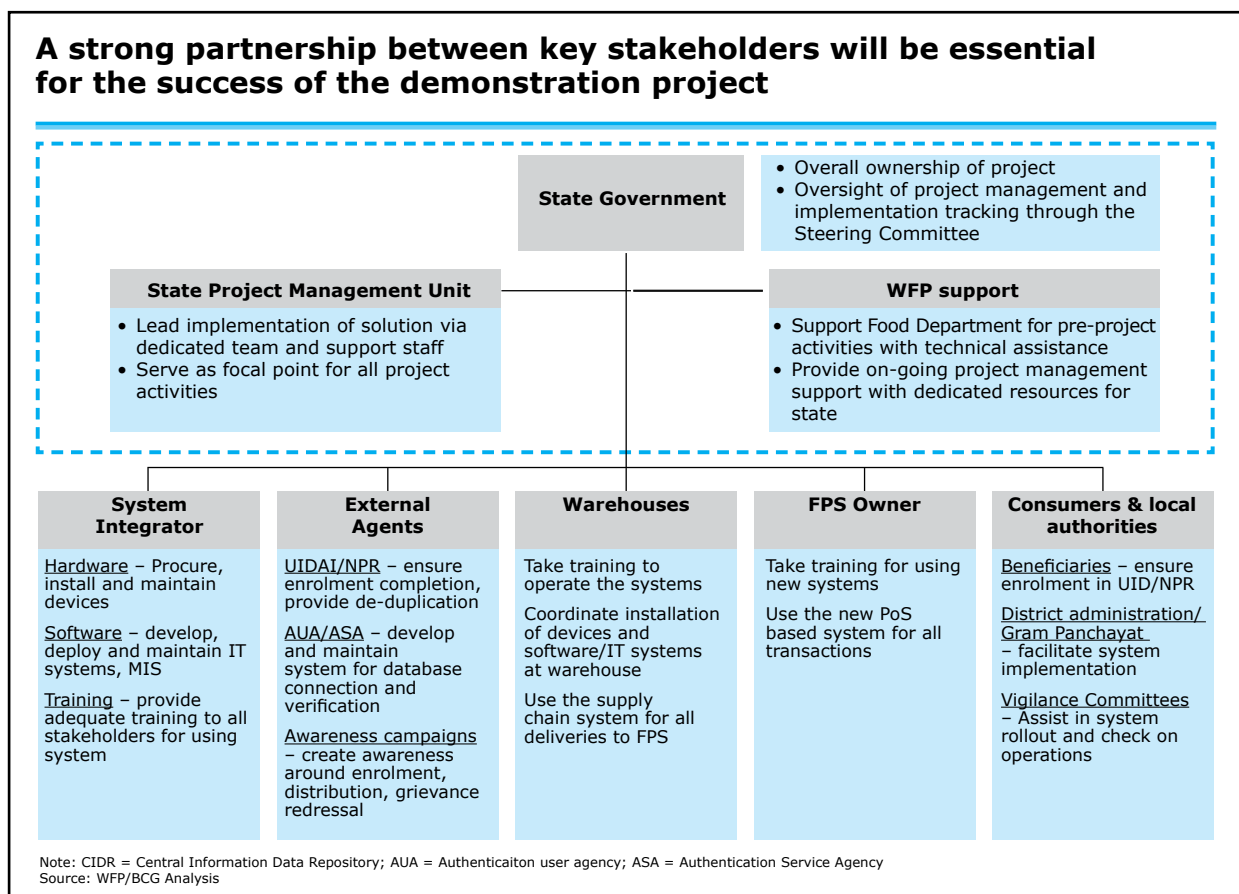
be done and partnerships and relationships with vendors be established prior to commencing, as it is critical for the smooth implementation of the solution.

Detailed yet precise agreements need to be signed with system vendors to ensure timely rollout of activities at the desired quality level and cost. However, sufficient flexibility should be provided in the contracting procedure to allow for modifications in the solution design if required, as more specific information becomes available during the implementation process.

Additionally, agreements need to be established with UIDAI to enable access to their data and biometric authentication platform. The state Food Departments will also need to build internal capabilities and significant training will be required for all officials, operators and stakeholders.

Figure 14 provides an overview of the recommended organisational roles and responsibilities of different TPDS stakeholders during the implementation phase.

Figure 14: Recommended Organisational Roles And Responsibilities For Implementation Of The TPDS Best Practice Solution



5. Financial Feasibility

In order to ensure the sustainability of the implemented solution, financial viability is very important. An overview of the costs and potential savings from the TPDS Best Practice Solution is provided below:

5.1 ESTIMATION OF COSTS

The costs for implementation were estimated using data from a variety of sources. The process included benchmarking against existing TPDS pilots in various states, feedback on costs from relevant TPDS stakeholders and vendors, accompanied by secondary research leveraging reports, research and prior project management experience.

Total costs of implementation are estimated for a sample district based on the average operating environment of a typical district in India (median size of 15 lakh (1,500,000)²¹ people having 3 lakh (300,000)²² ration cards covering 630 FPS²³ and three warehouses²⁴, with a district Food Department office overseeing operations).

The cost for the proposed Solution was structured under two categories:

- **One-time setup cost** – initial costs required for installation of system and setting up for launch. These costs are one time investment and will form the backbone of all operations. The major expenditures here include hardware and infrastructure, IT systems, contracts with vendors & external agents, training of stakeholders and overall project management apart from other expenses.

- **Recurring operating cost** – annual operating costs required for a fully functional end-to-end TPDS solution for the sample district. These costs will be borne annually by the state. The major expenditures here include maintenance of devices, transportation (doorstep delivery), utility costs, contracts with vendor or external agencies and overall on-going operations team among other expenses.

As was the case with implementation timelines, cost estimates will require customisation to the district's requirements and will vary according to prevalent conditions, geography, number of beneficiaries and FPS etc.

Additionally, the costs indicated here are for a pilot project in one district of the state. If and when the solution is scaled up across multiple districts, one-time setup cost per district would decrease by approximately 10%²⁵ owing to the fact that certain software, IT systems and infrastructure can be re-used for a large number of districts. Also, it is recommended that the states leverage existing NIC platforms for software and IT systems (e.g. Common Application Software) to ensure standardisation and reduce development costs where possible.

The total one-time setup cost for a district is estimated to be Rs. 3.6 – 4.4 crore (USD 600,000 – 730,000) covering all value chain components, while the recurring operating cost are estimated to be Rs. 3.6 - 5.2 crore (USD 600,000 – 867,000) per district per

²¹ Median population of a district, 2011 Census

²² 4.9 members per household (2011 Census) resulting in 3.06 lakh (306,000) households; 98% household possess ration cards (Source for number of ration cards in India as of 31 March, 2012: Ministry of Consumer Affairs, Food and Public Distribution, Govt. of India (13357); number of households taken from 2011 Census)

²³ 472 ration cards typically attached to an FPS (average data from multiple states) thus mapping onto 630 FPS for 3 lakh (300,000) ration cards in the district (Source: Ministry of Consumer Affairs, Food and Public Distribution, Govt. of India (13357))

²⁴ Average number of FPS covered per warehouse is 220, taken as average from multiple states (Andhra Pradesh, Chhattisgarh, Gujarat, Haryana, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh & West Bengal) Source : Ministry of Consumer Affairs, Food and Public Distribution, Govt. of India. (13301)

²⁵ Approx. Rs. 50 lakh (USD 83,000) of costs can be re-used in the form of IT hardware and grievance redressal setup, additional 10% due to lesser implementation time and improved rates of contracts with vendors

annum²⁶. Approximately Rs 2 – 3.5 crore (USD 330,000 – 580,000) per annum of the recurring operating costs are direct and indirect incentives to improve FPS viability which is essential for the sustainability of the solution. These incentives are in the form of PoS based transaction linked incentives of Rs 5 per ration card transacted through the PoS per month (Rs 1.6 crore/ USD 267,000 per annum) and doorstep delivery (Rs 0.4 – 1.9 crore/USD 67,000 – 317,000 per annum). The distribution of these costs is given in Figure 15.

For the total one-time setup cost for a typical district, it is estimated that:

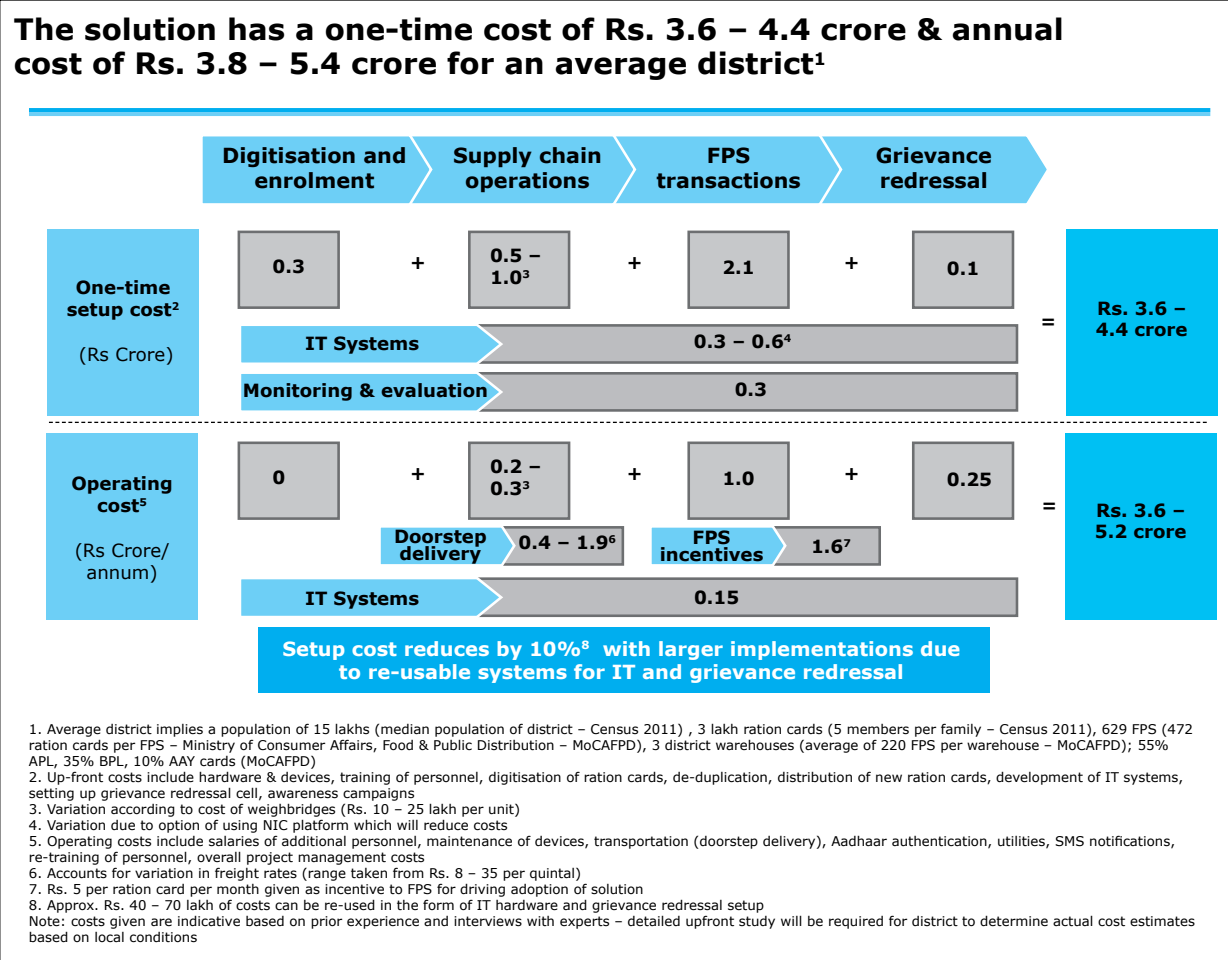
- Rs. 0.3 crore (USD 50,000) will be required for digitisation and enrolment
- Rs. 0.5 – 1.0 crore (USD 83,000 – 167,000) required for supply chain operations (depending upon cost of weighbridges)

- Rs. 2.1 crore (USD 350,000) required for FPS operations (largely to purchase PoS devices)
- Rs. 0.1 crore (USD 16,700) required to set up the grievance redressal system
- Rs. 0.3 – 0.6 crore (USD 50,000 – 100,000) required for the IT system (depending upon choice of state to leverage existing NIC platform)
- Rs. 0.2 crore (USD 33,000) required for monitoring and evaluation of the implementation

For the recurring operating costs for a typical district, it is estimated that:

- Rs. 0.2 – 0.3 crore (USD 33,000 – 50,000) required for supply chain operations
- Rs. 1 crore (USD 167,000) required for FPS operations

Figure 15: Overall Cost Requirements For The TPDS Best Practice Solution



²⁶For estimation of the recurring cost, it is assumed that only one transaction per card will be considered for incentives; irrespective of multiple transactions to avoid misuse.

- Rs. 0.25 crore (USD 42,000) required for operating the grievance redressal system
- Rs. 0.4 – 1.9 crore (USD 67,000 – 317,000) required for doorstep delivery, depending upon the freight rates in the district
- Rs. 1.6 crore (USD 267,000) required for FPS incentives, given at Rs. 5 per transaction conducted via the PoS to drive adoption of the solution
- Rs. 0.15 crore (USD 25,000) required for running the IT systems annually

The proposed Solution has the potential to bring about significant benefits for the state government, both financial (due to saving of grains) and non-financial (due to improving experience of all stakeholders).

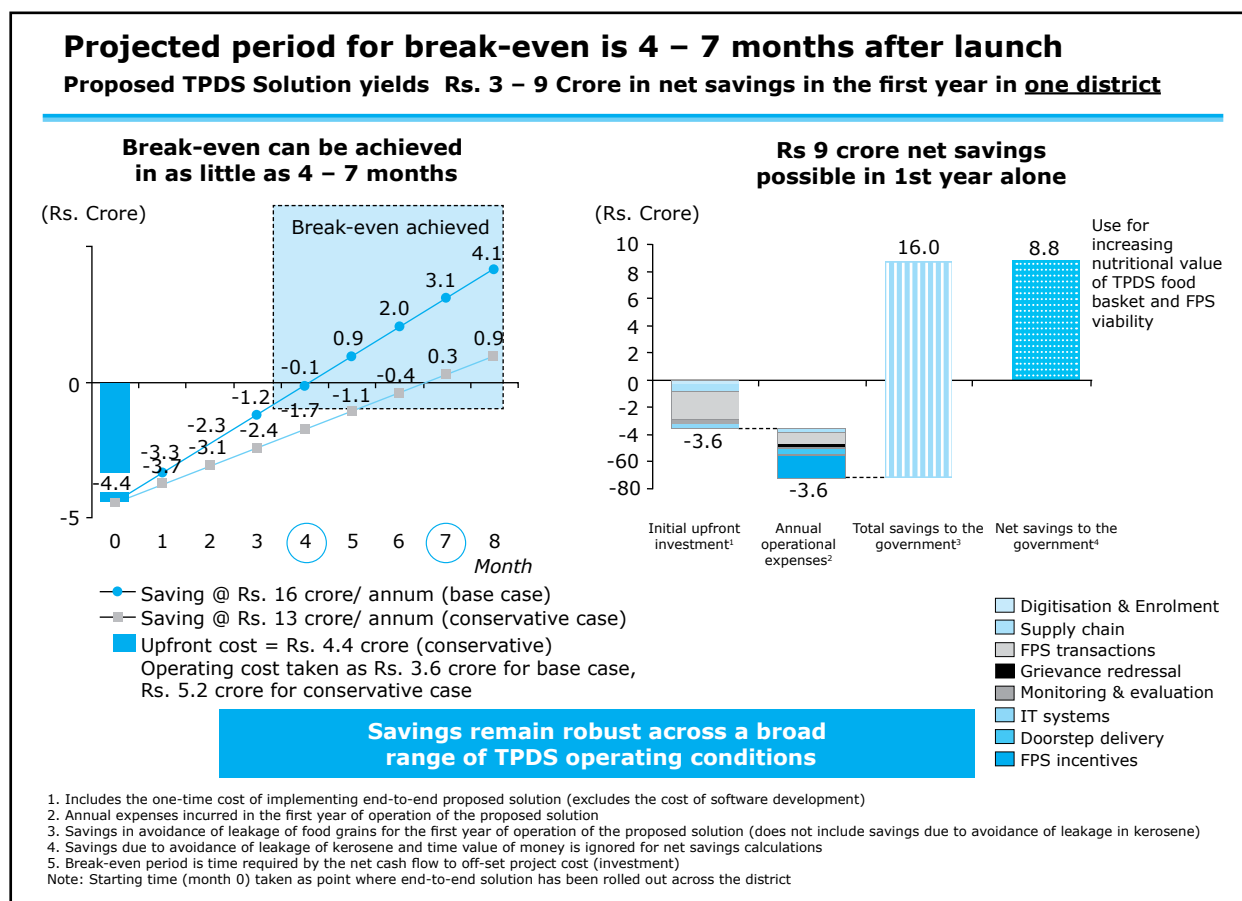
Detailed costing estimates are available for each component, which can be made available on request.

5.2 CALCULATION OF FINANCIAL SAVINGS

The recommended solution can realise substantial saving of money for the Food Department, due to:

- Better targeting of beneficiaries –** reduction in number of duplicate and ghost cards (by process of biometric and textual de-duplication and biometrically authorised distribution of cards) results in grain saved which would have otherwise been allocated to bogus cards. In a typical district, it has been observed that 7.4 – 10.9% of existing ration cards are bogus, elimination of which over a base of approximately 3 lakh (300,000) ration cards will amount to grains not being sold through the TPDS, thus saved by the government. This translates into an estimated Rs. 7.3 – 10.7 crore (USD 1.2 – 1.7 million) per district per year²⁷.

Figure 16: Projected Period For Break-Even Of Investment And Annual Savings For District



²⁷ 7.4% -10.9% of cards taken as duplicates and ghost cards (based on data from East Godavari and Rayagada, Odisha TPDS pilots); elimination of all bogus cards assumed post biometric de-duplication resulting in grain saving from 22,000-33,000 ration cards each month for each district.

2. Proper logging of sales at FPS with biometric authentication – there is significant mismatch found in the actual off-take from FPS and the reported off-take, which occurs due to paper based records which can be manipulated easily. Having all transactions via PoS device with biometric authentication of beneficiaries will drastically reduce such malpractices from the system. In a typical district, it has been observed that actual off-take for APL quota of grains is generally much lower than reported, by a factor of 21% - 34% for the allocated quantity. Proper transaction logging eliminates scope of misreporting, thus saving equivalent grain amount for the government. This translates into an estimated Rs. 5.7 – 5.9 crore (USD 950,000 – 983,000) per district per year²⁸.

Hence, a total of Rs. 13.2 - 16.4 crore (USD 2.2 - 2.7 million) can be saved per district per year by implementing the solution. Accounting for the additional recurring costs mentioned above, a net annual saving of Rs 8.1 – 12.9 crore (USD 1.3 – 2.1 million)²⁹ is possible in a typical district.

The calculations here are based on average values obtained from field visits and research of existing TPDS issues and pilots. The calculations will vary according to local operating conditions and state specific constraints, but serve the purpose of providing a detailed estimate reflecting typical operating conditions.

5.3 BREAK-EVEN ANALYSIS AND PAYBACK ON INVESTMENT

Based on the cost estimated and savings calculations, the investment by the Food Department will generate enough savings to become financially viable within a period

of four to seven months of commencement of full scale end-to-end operations of modernisation. At the higher end, the savings projected at the end of first year of operations could be as high as Rs. 9 crore (USD 1.5 million) for a typical district.

It is recommended that the above savings be invested in increasing margins for FPS owners (an essential implementation requirement) as well as in improving the nutritional content of the TDPS food basket.

Note that the current analysis does not include savings realised due to kerosene sales, inclusion and exclusion errors as well as under-weighting of grains at FPS. Factoring these would increase the quantum of savings.

At the national scale, the proposed TPDS solution could be implemented throughout the country for a one-time investment of Rs 2,500 – 3,000 crore (USD 417 – 500 million). The potential savings (net of operating costs as well as of incentives that would improve the income of a typical FPS by Rs 3,000 – 5,000 (USD 50 – 83) per month) from a nationwide implementation of this solution are in the range of Rs. 6,500 – 10,000 crore (USD 1 - 1.6 billion) per annum. This is equivalent to nearly 8% - 12% of the country's food subsidy for 2013-14 and represents a 4 – 7 month payback period. Some of these savings could be re-invested to augment the nutritional value of the TPDS basket of goods.

Analysis from the East Godavari pilot³⁰ shows that approximately Rs. 45,000 (USD 750) can be saved per month from each FPS due to elimination of bogus cards and Aadhaar based online biometric authentication at the FPS via the PoS device. This saving will accrue to the

²⁸ Mismatch in off-take of APL quota of rice and wheat is significant (21% for wheat, 34% for wheat as observed from field visits and interviews with stakeholders). Eliminating misreporting for APL off-take will save this mismatch in off-take and sales report each month in each district.

²⁹ These figures are pre-NFSA (2013) implementation and likely to change depending on whether the state allotment has increased or decreased as compared to the current situation. These factors will become clearer when state specific calculations are undertaken to customise the model.

³⁰ 'Public Distribution System – The Aadhaar Way', report on the TPDS pilot project implementation in East Godavari district, Andhra Pradesh

respective State Government and also the Government of India depending on how the subsidy burden is shared.

It is well understood that these estimates may vary due to local operating requirements. Hence a thorough analysis

was done to check for financial feasibility in conditions which may be highly unfavourable and tough. The analyses show that even in locations with half the bogus cards and half the issues in transaction reporting the proposed solution still yields large quantum of savings for the Food Department.

6. Conclusion

Addressing TPDS issues by implementing the TPDS Best Practice Solution will yield a number of significant benefits for state governments:

1. Satisfied and empowered beneficiaries

The overall experiences of beneficiaries will improve significantly as many features are designed for ensuring proper and quality service to them. The right amount of food grains will be available at the right time for all targeted beneficiaries by virtue of proper identification and ensuring improved operations of the supply chain. By providing the right incentives to the FPS operators, quality of service for beneficiaries should increase as well. Additionally, a proper recourse mechanism for addressing grievances of all stakeholders will resolve any other issues with system performance.

WFP also recommends investing a portion of the savings from solution implementation to augment the nutritional content of TPDS rations as a way of improving the nutritional status of beneficiaries.

2. Better aligned FPS operators

FPS serves as the focal point of TPDS operations, hence it is important to provide adequate incentives to improve operating conditions and drive adoption of reforms. Towards this end, increased commissions will result in improved viability for the FPS, while good business practices are incentivised by portability as beneficiaries will prefer to purchase from FPS with higher quality and reliability of service.

Installation of electronic PoS devices reduces the ability to misreport sales and indulge in pilferage thus yielding significant savings for the state

government. However, above mentioned incentives are a pre-requisite for the same; else system may be opposed by FPS owners.

3. Easier and more effective system management for government officials

The task of management of the vast TPDS is quite complex for officials and government operators. Providing relevant information in a timely and usable manner is the primary aim of the solution. By implementing recommended systems and developing a robust MIS, reliable and real-time data will be made available to all stakeholders. This can be leveraged for operational improvements and ensuring transparency. The reduced complexity for all stakeholders will thus improve overall satisfaction and reduce complaints.

The recommended TPDS Best Practice Solution combines the best practices observed in a variety of pilots across the nation combined with rigorous research and analysis. It is designed to address all existing critical issues around TPDS including the issue of FPS viability (essential for the long term sustainability of the solution), while also being adaptable to a wide variety of operating conditions and potential future changes. States need to modify recommendations according to their requirements and operating conditions prior to implementation and also develop detailed system modules, operational guidelines and contingency plans.

Having designed the detailed solution design, WFP will be happy to discuss a partnership with state governments to customise the solution for their needs while helping establish partnerships with vendors and other implementation partners. WFP will also consider partnering with interested states to roll out the recommended solution in pilot districts.



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