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Indian food and welfare schemes:

Scope for digitization towards cash transfers

Bonn, August 2017

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Definitions

- **Aadhaar**: Universal scheme under which a 12 digit unique ID is issued to all residents after collection of their demographic information and biometric identification markings (finger prints and iris scans). The Unique Identification Authority of India (UIDAI), who stores this on an online cloud based database, collects this data.
- **Aadhaar Seeding**: Process of linking Aadhaar with different government or non-government commercial activities is Aadhaar seeding. In the former, Aadhaar details are collected and stored in databases containing information on beneficiaries under different government schemes or departments. For example: collecting Aadhaar numbers of ration card holders under PDS, workers having job cards in MGNREGA or PAN card holders (for income tax purposes). Non-Government commercial activities include storing Aadhaar details by telecom service providers and banks for the corresponding user having a bank account or mobile number. Databases collecting Aadhaar information are connected to the UIDAI's online database containing stored unique IDs
- **Active Bank Account**: Any current or savings bank account with atleast one customer induced transaction undertaken in the last 12 months. Bank accounts with no such transaction done for 12-24 months are termed as inactive accounts.
- **Automation of Supply chain Management**: Computerization of the PDS supply chain which includes online tracking in real time of the movement of food grain from storage houses of the Food Corporation of India (FCI) to Fair Price Shops (FPS).
- **Bank account of entitled household or beneficiary**: The account of any member of the entitled household in any bank (that is integrated to Core Banking System (CBS)), indicated by the head of the household in the digitized beneficiary database for receiving cash transfer of food subsidy.
- **Beneficiary:** A person or households identified by the State Government to receive subsidized food grains under the normal and tide-over allocation under NFSA or food subsidy under the DBT-food.
- **Fair Price Shop**: A shop or a place where food grains are sold to beneficiaries at central issue prices (CIP) under TPDS/NFSA. Against each transaction, the FPS owner/dealer issues a sale receipt to them.
- **Fair Price shop owner**: means a person and includes a cooperative society or a body corporate or a company of a State Government or a gram panchayat or any other body in whose name a shop has been licensed to distribute essential commodities under the PDS/TPDS/NFSA.

- **Leakage of grains**: As defined in this paper, leakage is the the grain that has been off-taken from FCI godowns (warehouses) but has not reached its final consumers (as reported in their consumption patterns). The ratio of the leaked grain to total grain offtake from the FCI is the leakage ratio.
- **POS Device or Mobile Terminal**: An electronic device for undertaking Aadhar based authentication and processing of sale transactions at FPSs and for simultaneously uploading the transaction data on the designated server. The PDS (Control) Order 2015 states specifications of these two devices.
- **Public Financial Management System (PFMS)**: Web-based online transaction processing system established by the Controller General of Accounts, Ministry of Finance, Government of India for fund management, e-payment and management information system.
- **Stunting and Underweight**: These are indicators for malnutrition. Any child with height-for-age or weight-for-age z scores at least 2 standard deviations below the median for WHO growth standards is stunted or underweight respectively.

Executive Summary

The Indian Government has identified a unique opportunity in using Information and Communication Technology (ICT) based solutions to streamline its inefficient, ineffective, and expensive subsidy operations. By bringing all subsidies, mainly food and fertilizer subsidy, under the ICT platform, the government aims to make its subsidy operations and delivery mechanisms- transparent, efficient, and effective.

Food subsidy is the largest component of government's subsidy bill and is focus of the paper. Authors evaluate the possibility of substituting the existing system of subsidized grain distribution, i.e. Public Distribution System (PDS) with ICT-based Direct Benefit Transfer (DBT) system. Implementing DBT for food will imply substitution of the existing physical grain entitlement system under PDS/NFSA with a cash transfer made directly into the bank accounts of the beneficiaries.

The ongoing policy discussions and strategies for executing DBT-food in India are observed to be prescriptive in nature and suffer, *inter alia*, on two accounts. One, they view the transition of states from existing PDS to ICT based DBT food as one-disruptive change rather than as an incremental process that contributes to making a system gradually ready for the big transition. Two, by prescribing a uniform timeline for implementation in all the 36 Indian states and Union Territories (UTs), policy makers fail to acknowledge the diverse economic, social, and financial vulnerabilities in different parts of country.

The paper attempts to address this gap in political thinking and strategy formulation and present a case for a phased approach to roll out DBT in the Indian food sector. It proposes a scientific way of evaluating a state/UT's "readiness" for shifting from PDS to DBT in food. The "readiness" analysis involves studying a state's performance on three parameters: their demographics, performance of existing PDS and the current state of their banking infrastructure. Identification of these parameters draws on learning from national and international experiences in DBT for food, in particular that of Chandigarh and Puducherry (where it is completely rolled-out) that are detailed in the paper's first part.

The analysis reveals that in the next five years i.e. by 2022, all Indian states and UTs can replace their existing PDS with DBT-food. We divide the 36 states/UTs into four Phases. The states that are most ready for DBT transition (Phase 1) are Punjab, Goa, Delhi, Daman and Diu, Chandigarh and Puducherry and they may make this shift in the next one year i.e. by 2018. In the second phase are six states- Haryana, Tamil Nadu, Andhra Pradesh, Telangana, Karnataka and Kerala- who may transition to DBT by 2019. States with a very high share of nation's poor and malnourished and/or have high banking infrastructural deficits, are put into the Phase 3 and these 11 states are Madhya Pradesh, Chhattisgarh, Rajasthan, Jharkhand, Bihar, Odisha, Uttar Pradesh, West Bengal, Dadra & Nagar Haveli, Maharashtra and Gujarat. These states may take about three and half years (i.e. by 2021) for implementing DBT-food. The last phase

comprises of 13 states (Arunachal Pradesh, Assam, HP, J&K, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, A&N Islands and Lakshwadeep) that have been given a special category status by Union Government and the erstwhile Planning Commission. These 13 states have a low population density, or are geographically located in remote areas, and/or are socio-politically and economically sensitive areas.

The states in Phase 3, 4, and 5 are given more time before they implement DBT-food so that they address their existing infrastructural deficits. For these states, the paper proposes an interim phase consisting of a reformed PDS employing IT solution for identity verification of beneficiaries.

For cities, towns, urbanised areas in states in the last three Phases whose performance on the three parameters is better than their respective states, the paper proposes a hybrid approach whereby they can shift more quickly to DBT even as the rest of the State puts in place the PDS reform package.

Overall, a phased approach with PDS reforms, maximum digitization and use of ICT and JanDhan-Aadhaar-Mobile (JAM) technologies and a secure criteria-based preparation for a shift to DBT in food is proposed in the paper.

In order to make the transition from PDS to DBT-food successful, specific policy recommendations are made in the paper. Some of these recommendations are:

1. *Open market grain availability*: This will make or break the transition. Unless the Centre and the states ensure availability of enough food grains in the open market, the transition to DBT food is unlikely to be successful;
2. *Inclusive financial integration*: Even if we have adequate availability of food grains in the open market, if the banking infrastructure is not *inclusive*, DBT food will not deliver. Thus, simultaneous efforts are required to increase the number of bank branches, ATMs and BCs. There is a need to include Post offices, cooperative banks and even large PACS (which currently are not part of the core banking system) into this system;
3. *Innovations in payment channels:* Apart from vertical expansion of the banking network, we also recommend horizontal expansion of payment channels;
4. *Hedge farmers' market risks*: As a consequence of DBT food when the MSP procurement operations are scaled-down, the Centre and states should together work towards creating and facilitating deep and wide alternative markets for farmers to sell their surplus food grains;
    a. *Provision of an unconditional cash transfer to the farmer:* The government may also consider, in the longer run, substituting the existing input subsidy support for agriculture (including fertiliser subsidy) and output price support to farmers with a cash transfer made directly into the farmers' bank accounts;

5. *Introduction of policies to complement the system*: In order to avoid diversion of the transferred cash towards vices, government should ensure that the entire economic system grows up to meet the increased demand that is likely to result from greater disposable incomes with a household. In particular, there is a need to ensure commensurate increase and stable supply of high-value food, education and healthcare services;
6. *Adequacy of the food subsidy amount*: If instead of MSP in the food subsidy formula (1.25*MSP – CIP), we can have the Economic cost, then the current problem of "inadequacy" of the food subsidy transfer amount, faced in Chandigarh and Puducherry, may be resolved; and
7. *Leadership and political will*: Political motivation in the States to implement the DBT or reforms in the PDS is a vital factor determining the future of PDS reforms.

Overall, DBT has the potential to make way for a system of social security or universal basic income, a special income support- provided to every citizen- whose size can be adjusted to his or her needs and vulnerability. Although the concept of basic income is still at its infancy even in the most developed countries, the path to creating such a system has to be through the DBT. Notwithstanding initial problems in implementation and the problems of labour markets that DBT may trigger, a cash transfer systems has become a potent tool in the government's armoury of social welfare. As the country transitions from its low income position to becoming the world's fastest growing economy in a few years, a cash transfer system delivering a social security transfer to all can promote a growth process that is inclusive, efficient and sustainable.

Keywords: National Food Security Act (NFSA), FCI, Cash Transfers, CCTs, Financial Inclusion, direct benefit transfer (DBT), Public Distribution System (PDS), Indian agriculture, Aadhaar, JAM, Grain Leakages

JEL Classification: Q18, Q01, I38, E64, D61, H53

Background: India's Welfare System

India is home to the largest population of poor in the world as also the largest number of malnourished children (World Bank and Hungama 2011). The erstwhile Planning Commission of India estimates 22 percent[1] of Indians (close to 270 million persons) as poor[2], which is greater than the population of Indonesia (the 4th most populous country in the world).

Despite rapid economic growth in the last two decades with much success in the manufacturing and services sectors, the country continues to be largely agrarian. Nearly 47 percent of the Indian workforce is employed in Agriculture (in 2015-16 as per Labour Bureau[3]) and it contributes about 17.5 percent (in 2015-16) to the country's GDP. Low productivity, dependence on monsoons rains for irrigation, absence of agri-extension services, lack of markets and supporting infrastructure such as pre-cooling and cold storage facilities, value-chains etc., and insufficient investments in research and development have gradually made Indian farming financially non-viable.

An average Indian spends close to half (about 46 percent) of his monthly consumption expenditure on food alone and cereals are still the most important component in the food basket. With a large and growing number of people to feed in an economy that is agrarian and highly vulnerable due to volatility in food prices and the role of private sector and international trade is restricted, the burden of adjustment falls on the Government. The framing of India's Constitution in 1950 provided for creation of a welfare state. Article 47, included in the Directive Principles of State Policy, stated that, "*State shall regard the raising of the level of nutrition and the standard of living of its people and the improvement of public health as among its primary duties*". Later, when the concept of National Planning was adopted in 1955, a socialist pattern of society and model of development was put in place. Having suffered numerous famines, droughts, and exploitation by private players during history (Saini and Kozicka 2015), the government adopted a paternalistic approach to welfare, regulating mostly all aspects affecting its country's citizens.

Current scenario

As per the Union Budget 2016-17, there are 950 welfare schemes run by the Central Government and this number multiplies if we add state-level schemes (Economic Survey 2016-17). In terms of budget allocation, these central schemes together account for about 5 percent

[1] World Bank estimates India's poverty to be 33 percent of the total population in 2011 i.e. higher than that of the Planning commission. This is due to differences in the methodology for estimation and the poverty line used. World Bank uses the international poverty line at USD 1.25/day to compute the number of poor

[2] Estimated based on the Tendulkar Methdology (2012)

[3] As per NSSO's Employment and Unemployment situation in India (2011-12), this share is 49 percent and as per Census 2011, it is 55 percent.

of the country's GDP and close to half of this allocation is meant for just 11 schemes that include Public Distribution System (PDS), sale of fertilisers at low prices, Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), mid-day meal scheme, LPG, several pension schemes, National Health Mission, and Integrated Child Development Services' Schemes (ICDS). While some of these schemes deliver cash directly to their beneficiaries, others deliver subsidized goods and services for consumption (See Figure 1)

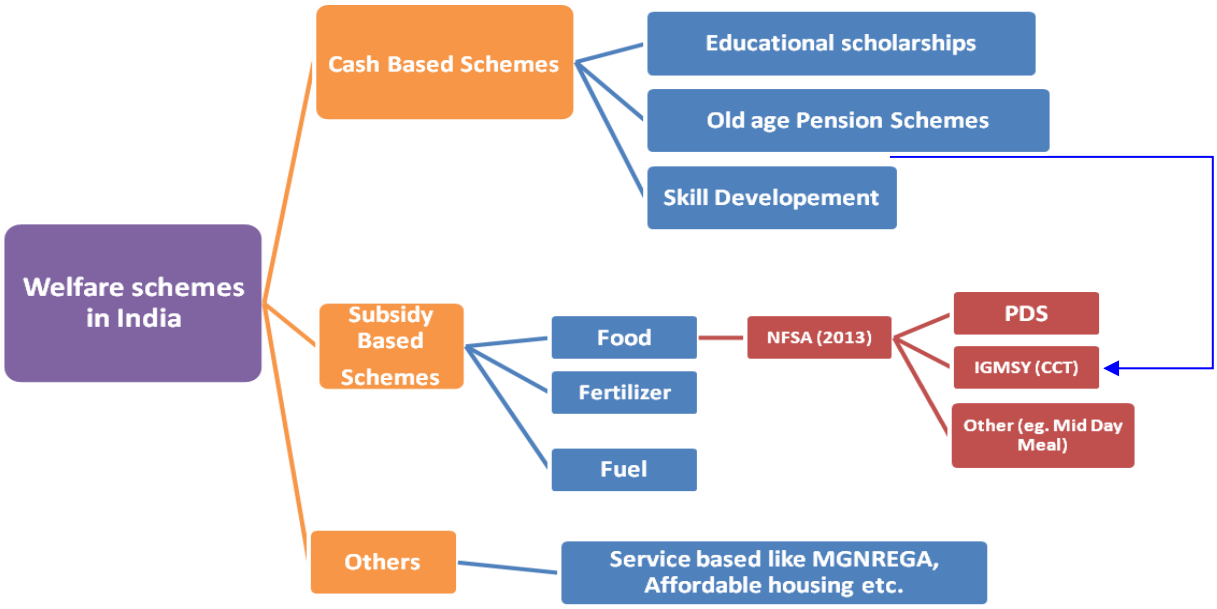

Figure 1: Welfare in India*

Note: PDS= Public Distribution System; IGMSY (CCT)= Indira Gandhi Matritva Sahyog Yojana (a conditional cash transfer scheme); MGNREGA= Mahatma Gandhi National Rural Employment Guarantee Act
Source: Authors' drawing
*As on Feb, 2017

Most of these schemes operate unique delivery chains but lack effective channels monitoring the flow of benefits to individual beneficiaries/households and for grievance redressal. For example, payments under the Janani Suraksha Yojana[4] scheme to beneficiaries are made through a multitude of intermediaries like ASHA workers, doctors, hospitals, primary health centres etc. Evaluation and assessment of this scheme reveals payments being diverted in this long supply chain (UNFPA 2009).

These inefficiencies and inefficacies have resulted in significant wastage of fiscal resources, which has not gone unnoticed by the Government. 'Leakages' in welfare schemes have

[4] Cash based scheme for promoting institutional delivery under the National Rural Health Mission (Ministry of Health, GoI)

consistently raised India's expenditure on welfare. Of these schemes, the largest expenditure is for subsidies on the three Fs— food, fuel and fertilizers— which alone account for close to 2% of the GDP[5], amounting to INR 2.31 lakh crores in the financial year, 2016-17.

Of this, food subsidies were the largest component (54 percent). In rupee terms, this is equivalent to INR 1.09 Lakh Crore[6]. This has been more or less the same case for the last decade. Between 2007-08 and 2016-17, food has had the highest share in the total subsidy bill incurred by the central government for most years (41 percent on an average).

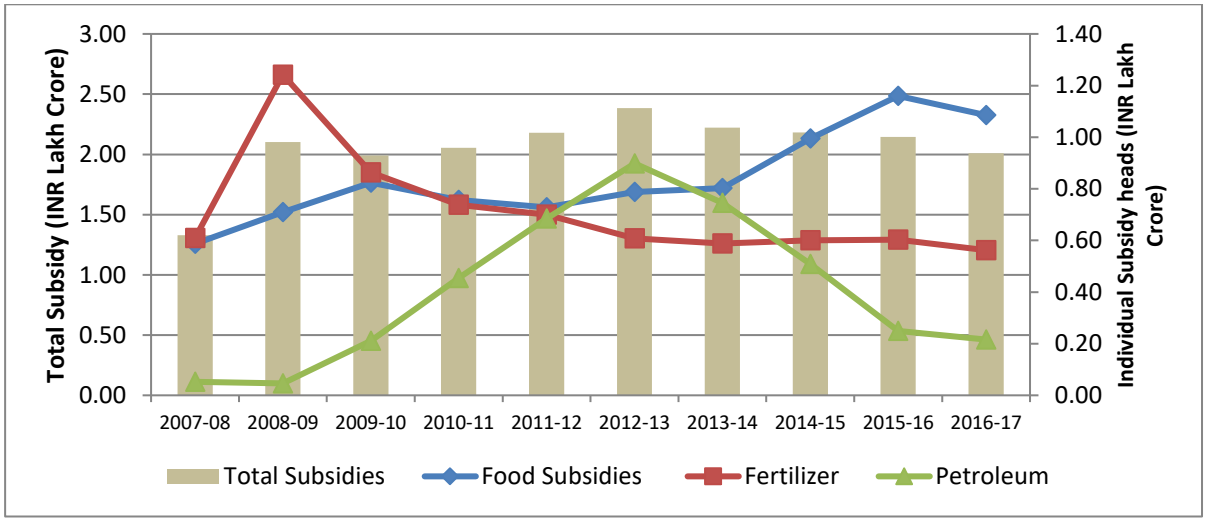

Figure 2: Trends in Food Subsidy in 2011-12 Prices (INR Lakh Crore)

Source: Budget Documents of Central Govt
Note: Subsidy expenditure deflated using national GDP deflator with base 2011-12

Figure 2 shows that between 2007/08 and 2016/17, while the total subsidies grew about 1.5 times, food subsidies grew 1.8 times (in real terms). The most important component of food subsidies is the subsidy given under the Public Distribution System (PDS). Thus, the key to reforming India's welfare system starts with the PDS and hence the focus of this paper.

The paper is divided into 4 sections. Section I briefly discusses the history and evolution of PDS. In Section II, the concept of cash transfers, its history and national and international experiences are presented and analysed. The DBT-food experience of the two UTs- Chandigarh and Puducherry- is also analysed in this Section. The evaluation of the states for their readiness for DBT-food is done in Section III and the policy recommendations emanating from all the Sections are presented in Section IV.

[5] DBT Mission (2016)
[6] In 2011-12 prices

Section I: The Public Distribution System[7]

The British government, in 1939, introduced the concept of food rationing in India which eventually led to the basic principles of the public distribution system (PDS) being developed in 1942. The death of four million people, due to starvation, during the Bengal famine of 1943 (Sen, 1981) gave political legitimacy to the PDS. Since then, it has been one of the most stable elements of the Indian food policy, delivering food security to most poor people across India.

The System

Under the PDS, the government distributes grains (mainly rice, wheat, coarse cereals) to beneficiaries at subsidized prices, called the central issue price (CIP), through a network of fair price shops (FPS) spread throughout the country. The government procures the distributed grain from the farmers at a minimum support price (MSP)[8].

The PDS is run jointly by the central and state governments. The identification of beneficiaries is based on their economic vulnerability. Using poverty estimates from the Planning Commission, the Central Government estimates the number of poor people in the states and Union Territories. The state governments have to identify the poor families and create the supporting infrastructure (including FPSs, delivery trucks etc.) to ensure a timely, transparent and effective delivery of grains to them. Upon identification, beneficiaries are issued a ration card that is used to record the beneficiary's entitlements and his actual grain offtake. The Food Corporation of India (FCI), set up in 1965, is the central government's primary agency for procuring, storing, and distributing grain in this system. In recent years, some States have taken up the role of procurement and they claim subsidy directly from GoI under decentralised procurement scheme (e.g. M.P., Chhattisgarh, and Andhra Pradesh).

Evolution of PDS

In the initial years up until late 1950s, PDS delivered grains only in urban food-scarce areas. As agricultural production grew with the Green Revolution in the mid-1960s, tribal areas and areas with widespread poverty were included. By 1992, the PDS became universal with all citizens having the right to receive food from it. However, the system was found to be ineffective in hilly and desert regions as in remote villages where the large majority of India's poor lived. In order to streamline and strengthen the PDS, the Central Government, in consultation with the state governments identified such areas and expanded the PDS infrastructure to deliver subsidized food to all in these inaccessible areas. This system was referred to as the Revamped Public Distribution System (RPDS). Later the Targeted Public

[7] See Saini and Kozicka (2014) for a more elaborate description of the evolution of the PDS in India

[8] Before the beginning of a crop's marketing season, GoI declares its MSP. It is the price at which the Government of Indian offers the farmer for a crop. The MSP is declared for 23 crops each year.

Distribution System (TPDS) replaced the RPDS in June 1997. While the RPDS targeted 'all in the poor areas', the focus of the TPDS was on 'poor in all areas'.

At the start of the TPDS, food grain was distributed to only Below Poverty Line (BPL) and Above Poverty Line (APL) categories. This included, 60 million poor families identified by the Central Government and who received a total of 7.2 million metric tonnes (MMT) of grain annually, under the scheme. In December 2000, the Government of India launched the Antyodaya Anna Yojana (AAY) scheme whose beneficiaries were one crore of the poorest of the poor, to whom the food, mainly rice and wheat, were distributed at highly subsidized prices. The TPDS thus had three categories of beneficiaries – APL, BPL and AAY. The quantity of grains and CIP varied across these categories.

Driven by socio-political motivations, several state/UTs have expanded the PDS system. This has happened in largely four ways: by increasing the coverage of population, expanding the TPDS basket of commodities, reducing CIPs below that fixed by the Central Government (sometimes even selling it for free), and by any combination of the above three. States/UTs like Chhattisgarh, Tamil Nadu, West Bengal, J&K, Puducherry, are some examples where such extensions are widespread.

Current System

In 2013, the system of TPDS underwent a transformational change with the passage of the National Food Security Act (NFSA). The Act combined existing schemes such as the TPDS, Indira Gandhi Matrutva Sahyog Yojana[9], and other welfare schemes like the mid-day meal (distribution of a mid-day meal to school-going children in government schools) under the umbrella of NFSA. The three types of TPDS beneficiaries were replaced by two categories of beneficiaries, i.e. priority beneficiaries (PB), and AAY beneficiaries. Close to 67 percent of India's population is covered by the Act that is to deliver close to 62 MMT of grains to about 813.4 million people. Close to 100 million NFSA beneficiaries are AAY beneficiaries and the remaining, that is priority beneficiaries, are the sum of the BPL and some APL individuals from the TPDS[10].

Unlike the practice in the TPDS, the CIPs for both categories of beneficiaries are same and fixed at INR 3 and INR 2 per kilogram, for rice and wheat, respectively. Their entitlements, however, differ. While a PB now received five kilograms of food grain per month (per person), an AAY household still received his pre-NFSA entitlement of 35 kilograms per family per month. All 36 states and Union Territories have implemented the NFSA as on date.

[9] A conditional cash transfer scheme for pregnant women

[10] As per the accepted number of beneficiaries estimated by GoI under the scheme

Reforms in the PDS

Movement from the PDS to the RPDS, and later to the TPDS, and the NFSA in 2013, have all been part of government's drive to target the PDS more accurately. In addition, the government has been undertaking reforms to make the TPDS operations transparent, its targeting effective and the resource-use more efficient.

The Central Government began a scheme of end-to-end computerization of PDS operations in 2012 aiming to modernize and improve eight major aspects of the PDS supply chain. These were: digitization and Aadhaar seeding of ration cards, online allocation of food grains (from Central Govt to States, States to districts and districts to FPS), computerization of supply-chain management, creation of a transparency portal, creation of an online grievance redressal mechanism, ensuring a 24-hour toll free helpline and using ICT based tools like the electronic point of sale (ePoS) device to record transactions.[11] Later, this computerization drive was combined with government's nine-point action plan, which included the review of APL/BPL beneficiary lists, taking action against those involved in leakages, ensuring display of beneficiary lists at FPS, guaranteeing doorstep delivery of food grain, making certain the timely availability of food grains, and also undertaking training of members of the FPS level vigilance committee.

As per the TPDS reform agenda of the government, states and UTs had to undertake reforms that can be clustered under three heads:

- Steps to be taken to improve the efficacy of the system: the *nine-point action plan*,
- Steps for making the system transparent and modern under *computerization of operations* and
- Steps that the states/UT governments had to undertake to *smooth TPDS operations*.

Steps under each cluster are detailed in Table (1) below.

The progress of implementation of these reforms is different for different states and UTs. As on March 2017, the ration card data had been digitized in all 36 states/UTs: about 77 percent of ration cards had been seeded with Aadhaar, with states/UTs such as Andhra Pradesh, Chhattisgarh, Delhi, Telangana, Rajasthan reporting 100 percent seeding. Close to 30 states/UTs, are allocating PDS grains online now and 20 have computerized their supply-chain management systems.

[11] http://dfpd.nic.in/computerisation-of-tpds-pd.htm

Because of these continuous reforms, about 6.3 crore ineligible and ghost ration cards were identified and deleted from the list of PDS beneficiaries. Rates of grain leakage from the PDS have reduced from 54 percent in 2004-05 (Himanshu and Sen 2013) to 40-50 percent in 2011-12 (Gulati and Saini 2015 and Dreze and Khera 2015). The Economic Survey 2016-17 states that 40 percent of the bottom 40 percent of the country's population was excluded from the PDS in 2011-12 but reforms have led to a significant increase in the share of PDS subsidy received by the bottom 40 percent since 2011-12.

Table 1: PDS reforms

Computerization of Operations	Nine-Point action Plan	Measures to smoothen operations
• Digitization of Ration Cards • Aadhaar Seeding in RCs • Online Allocation of foodgrains • Computerization of Supply-chain Management • Transparency Portal • Online Grievance Redressal • Toll Free Helpline Numbers • Operational ePoS	• Review of BPL / AAY list • Ensure leakage-free distribution of foodgrains by taking action against guilty • Involvement of PRI members • Display of BPL/AAY list on the FPS • District and FPS-wise allocation of foodgrains put on website for public scrutiny • Doorstep delivery of foodgrains • Timely availability of foodgrains at FPS • Training of members of FPS level Vigilance Committee • Steps taken towards Computerization of TPDS operations	• Adoption of Citizen's Charter by State/UT Governments • Deletion of bogus/ineligible ration cards by the State/UT Governments • Monthly Certification by village panchayat/ urban local bodies/ women's self-help groups on delivery on TPDS foodgrains at FPS • Number of FPS allotted to various groups in the States/UTs • Action against defaulters who issued/ possessing bogus ration cards • Wheat flour distribution • Training program - taken up • Public awareness campaign taken up

Source: DFPD

In order to give a fillip to the reform process, in 2015, the Department of Food and Public Distribution (DFPD)[12] released two notifications: *Cash Transfer of Food Subsidy Rules* and *Food Security (Assistance to State governments) Rules.* As per these notifications, Central Government offers the state and UT governments, two choices for reforming their respective PDS machinery going forward:

1. Either replace the existing PDS (distributing grains) with DBT i.e. direct payment of subsidy into the identified beneficiary's account; or

[12] Under Ministry of Consumer Affairs, Food and Public Distribution, GoI

2. Fully computerize and reform its PDS operations and distribute food grain using Aadhaar-based biometric authentication process or ePoS. This option will be referred to as Aadhaar enabled PDS or A-PDS going forward from here in the paper.

While both, the DBT and APDS are examples of how technology can optimize the operation of welfare schemes, the former is more closely linked to the Centre's digital technology umbrella ICT initiative called JAM or Jan Dhan, Aadhaar and Mobile. Despite clear differences, both APDS and DBT are confused to be the same. In must be understood here that DBT is the practical exponent of income support programs using ICT whereas APDS still falls under the category of 'in-kind' programs. In later sections, we will discuss the efficacy and efficiency of DBT and how the A-PDS can serve as a bridging medium-term policy. The next two sections look at details of these two systems.

Aadhaar-based PDS (APDS)

The APDS is an upgraded form of the existing PDS incorporating technology-based solutions to increase the operational and cost efficiency of the system. It ensures that food grains are released only after a family member is authenticated biometrically.

Last-mile delivery of food grains under the APDS is through a Point of Sale (PoS) device (Figure 3) that is connected to a cloud-based repository containing ration card information (operated by the state) and Aadhaar card information (operated by UIDAI[13]).

Figure 3: PoS machine in Andhra Pradesh

Source: Govt. of Andhra Pradesh

All PDS beneficiaries are required to seed their ration cards with Aadhaar numbers under this system. The biometric readings on the PoS at the FPS are compared with the Aadhaar card data and upon matching, the entitlements are released to the beneficiary. The entire process

[13] UIDAI stands for Unique Identification Authority of India, an agency set up by the Central Government in 2009. The UIDAI is mandated to assign a 12-digit unique identification number to all citizens of the country. This number will be based on the individual's biometric and demographic data.

of identification and authentication is expected to complete within a few seconds. End-to-end computerization of the PDS thus is a necessary condition for APDS, which can check both, ineligible individuals from obtaining food grains and corrupt FPS dealers or other stakeholders in the PDS supply chain from diverting or pilfering food grains. The system enables both states and the Centre to track the flow of food grains on a real-time basis.

The Central Government in the Food Security (Assistance to State governments) Rules notified in August 2015 offered to support installation of PoS devices in FPS.

Progress of implementation of APDS

As of March 2017, ten states had automated FPSs and implemented the APDS. These are—Andhra Pradesh, Gujarat, Daman and Diu, Madhya Pradesh, Tamil Nadu, Chhattisgarh, Rajasthan, Jharkhand, Dadra & Nagar Haveli and Haryana. Of these states, Andhra Pradesh has been the model state for APDS; it was the first to automate all its FPSs and has also adopted innovative practices to improve the system, some of which are:

- Use of iris scans as an alternative to finger prints
- Option to send one-time passwords to registered mobile phones in case of failure to authenticate biometrically.
- On-the-spot registration for beneficiaries without Aadhaar or whose authentication failed through both biometric and OTPs
- Special antennas for FPS to improve internet connectivity
- Battery-charged PoS devices to allow operation during power outages.

In other states, pilot surveys are underway to identify practices that will improve the delivery of food grains under the APDS. Gujarat, for example, has decided to optimize costs by using laptops and tablets instead of PoS devices. In Jharkhand, a system of deferred authentication has been introduced which enables beneficiaries biometric readings to be authenticated at a later period if there are power outages. In Karnataka, a pilot to test Interactive Voice Response Systems (IVRS) as 'coupons' has been initiated in Bengaluru to enable beneficiaries to obtain food grains by showing a unique code sent by SMS and by voice to the registered mobile number. Madhya Pradesh has introduced an offline mode that verifies beneficiaries on a weekly basis (rather than in real time) in districts where internet connectivity is poor.

While the APDS is making progress, we have identified a few problems associated with the use of ePoS machines or APDS. These are:

1. <u>Problem with biometric authentication at FPS</u>: This problem was highlighted in Rajasthan, Gujarat, and Karnataka where fingerprints of the elderly and of those engaged in manual work, could not be read by the PoS devices. This necessitated

multiple visits by beneficiaries to the FPS[14] causing inconveniences and redundancies like loss of a day's job of a daily wage labourer, longer queues and delays in release of grains to others etc. As a solution, many FPS dealers have started to manually register such beneficiaries to allow quick resolution of the problem, but this re-opens doors for frauds and rent-seeking involving the use of bogus and/or duplicate ration cards;

2. Poor internet connectivity: This disrupts the process of verification in real time and leaves open opportunities for grain diversion and pilferage by FPS dealers since information on PoS sales is not sent to the main PoS server operated by the state Govt. Madhya Pradesh's use of the 'offline mode' is an innovative solution that may need to be scaled up to national level;
3. Lack of continuous power supply: The ePoS can work in the offline mode if internet access is not available, but the absence of power stalls the system completely. Some states have promoted installation of solar panels to circumvent this problem but the idea is still at a nascent stage. The absence of an economic and sustainable solution, will delay adoption of the APDS and the FPS will continue to operate in its old and 'leaky' ways.
4. Lack of financial and administrative resources and trained personnel: Insufficient funds for the ePoS purchases, installation and training of personnel at the FPS for working on it restrict the progress of the APDS. Similarly, confusion about the state's financial obligations towards issues such as maintenance of devices often results in damage to the devices, without any scope for replacement.

We now look in detail at the second alternative of reform suggested by the Central Government i.e. direct benefits transfer (DBT) for food. After understanding the DBT process, we document learning from international and national experiences and evaluate the scope for DBT in food in India.

Direct Benefits Transfer System in India

Globally, cash transfers are generally of three kinds – Conditional, Unconditional, or Stamps/Vouchers. Table 2 gives the salient features of each type.

In India, cash transfers schemes are generally either conditional or unconditional as stamps or vouchers have not generally found favour in policy actions[15].

[14] http://www.ndtv.com/opinion/yes-aadhaar-is-a-game-changer-in-wrecking-welfare-schemes-1434424

[15] Only select states have used stamps for brief periods. Andhra Pradesh, Bihar and Tamil Nadu experimented with Food stamps/coupons. However this system failed in all three states and has been discontinued. See Pritchard and Choithani (2015) and Virmani (2006)

Table 2 Summary of the three types of cash transfer programs

Conditional (CCTs)	Unconditional (UCTs)	Stamps/Vouchers
• Beneficiaries receive cash subject to compliance with conditions • Used to link short-term liquidity requirements with long-term development of human capital • Conditions are mainly related to health and education	• Beneficiaries receive cash unconditionally • Beneficiaries are free to spend the amount received • Suitable for supplementing just consumption needs • Ideal for areas where there is lack of resources (e. g. health centres)	• Beneficiaries are provided with stamps/cards/vouchers which carry a monetary value. • Can be redeemed for only goods specified by the implementing agency • Ideal for influencing the consumption pattern of beneficiaries

Source: World Bank (2014)

Purpose of any cash transfer could be:

- To provide income support to encourage certain behaviour: For example scholarships for studies, vaccinations in children, general health care of girls, senior citizens, pregnant and lactating mothers etc.
- To provide subsidy for supporting purchases of essential products like food, fuel, agricultural inputs, etc.
- To provide direct income in the hands of beneficiaries identified based on economic vulnerabilities like old age people get pensions, unemployed people get unemployment benefits

In 2013, when Government of India introduced the Direct Benefits Transfer (DBT) it was viewed as a way to simplify the delivery chain of benefits under various welfare schemes. This system is based on a digital platform of payments where the cash subsidy (or benefit) is to be transferred directly into the Aadhaar-linked bank account of identified beneficiary. This system allows implementing agencies and beneficiaries alike to track flow of funds for various schemes through a single interface, enabling both transparency and efficiency.

The step-wise operations under DBT

This process requires identification of beneficiaries, correcting for inclusion and exclusion errors, estimating the cash transfer amount, creating a virtual platform and physical

infrastructure for transferring cash and ensuring smooth withdrawal of money from the bank. The process of fund flow in the DBT thus involves broadly three activities - Verification, Preparation, and Payment. All three activities are managed by an electronic fund management system set up by the Ministry of Finance, called the Public Financial Management System (PFMS)[16].

PFMS has been developed to enable implementing agencies such as states, the Central Government, and local bodies to - (i) maintain information in a uniform format containing beneficiaries (names, addresses, Aadhaar card and bank account information); (ii) initiate payments through banks to beneficiaries, and, (iii) to allow these agencies to track the flow of payments to each household/individual. This should improve the efficiency of implementation across various schemes of the government (see figure 2).

For example, prior to its introduction (and of the DBT) the centrally-sponsored scheme, Janani Suraksha Yojana, distributed benefits by cash or cheque through the long delivery chain that we have already acknowledged and thus permitting 'leakage'/diversion of funds away from the system. The long delivery chain created opportunities for rent seeking and because the ministry was unable to monitor the disbursal of funds to the beneficiary, the scheme's welfare effects were assessed to be diminishing overtime (UNFPA, 2009). Now, under DBT this supply chain gets simplified and the PFMS allows for tracking these payments and ensuring that they go to the correct beneficiaries (See Figure 4).

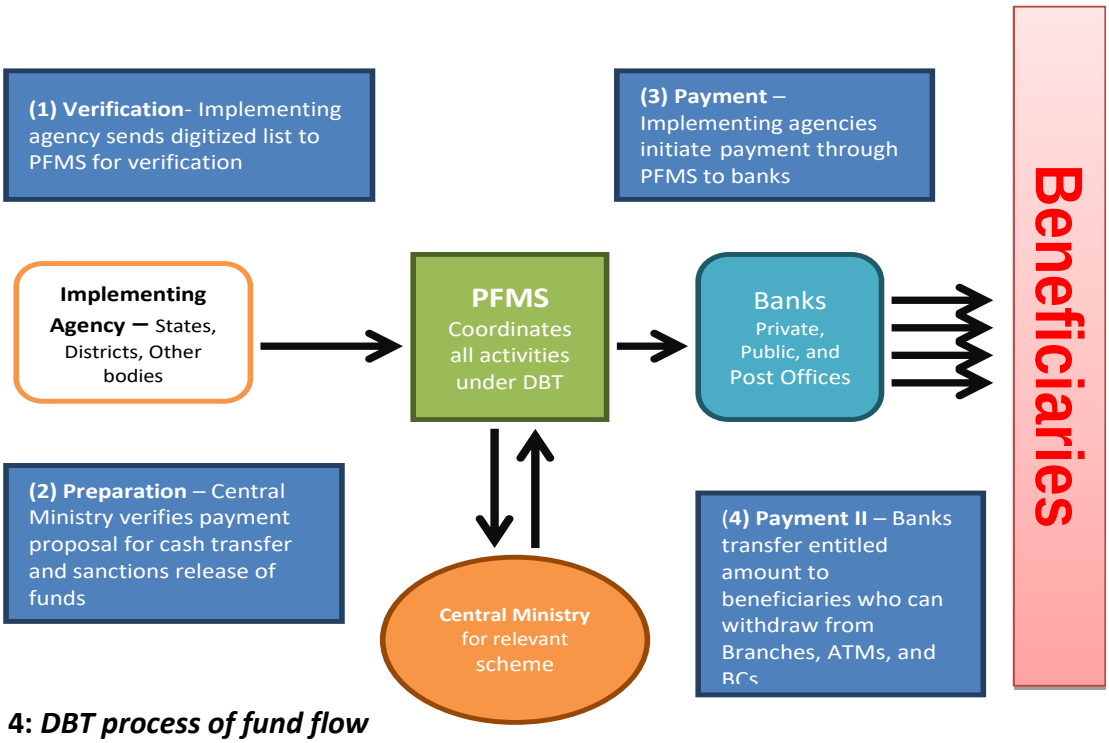

Figure 4: ***DBT process of fund flow***

Source: Author's Interpretation

[16] Set up specifically under the control of the Controller General of Accounts

The DBT was rolled out with 27 current, cash-based schemes. Currently, 84 schemes operated by 17 different ministries have been brought under the ambit of the DBT (Figure 5). All are cash-based (including three conditional schemes) and one subsidy scheme i.e. the Pradhan Mantri LPG Subsidy PAHAL Yojana (DBTL or direct benefits transfer for LPG)17.

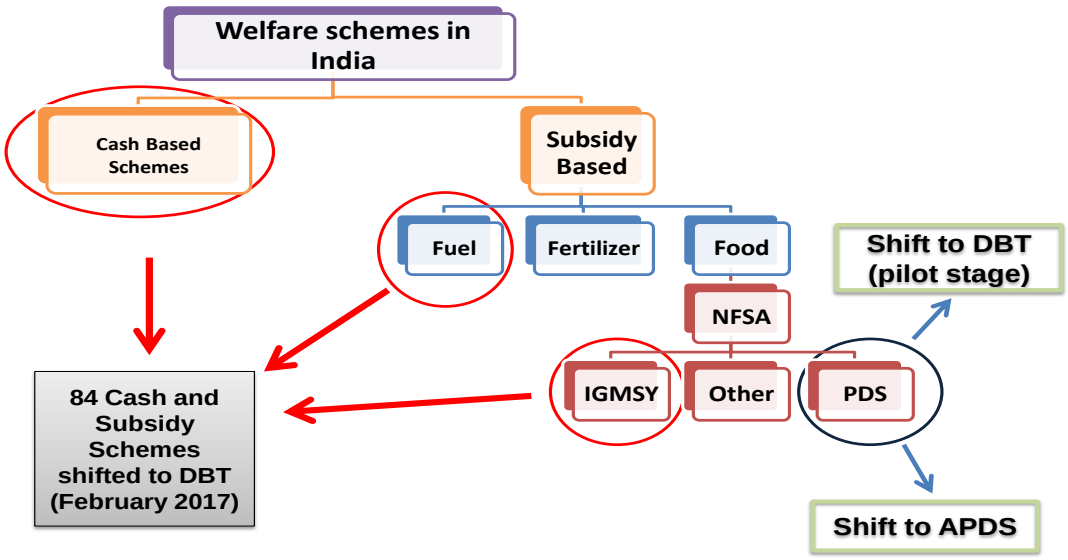

Figure 5: Progress under DBT

Source: Authors' Interpretation

With DBT, the delivery and operations of various Indian welfare schemes will simplify and thus are likely to yield large savings of scarce fiscal resources. In the three years since DBT rollout in 2013, the cumulative payout (since 2014) under DBT is estimated to be INR 1.6 lakh crore and the government's saving is about INR 49,650 crore (as on December 31, 2016). Close to 55 percent of this saving is due to the PAHAL scheme and about 29 percent or about INR 14,000 crores are from the reforms under PDS. There are savings also reported from MGNREGA (the Mahatma Gandhi National rural employment Guarantee Act that assures

[17] PAHAL stands for Pratyaksh Hanstantarit Scheme Started in 2013, PAHAL substituted an existing LPG cylinder subsidy scheme, with a cash transfer made directly into the beneficiary's bank account. The scheme made it compulsory for bank accounts to be seeded with Aadhaar allowing for subsidies to be transferred to only the true beneficiary. This arrested the diversion of LPG subsidy to duplicate LPG connections as well as use of LPG for commercial activities. The beneficiaries of PAHAL, however, are largely middle class households in urban areas with better literacy levels and higher access to banks.

minimum days of employment to manual unskilled labour) to the tune of about INR 7,633 crore [18 and19].

Most of these DBT savings, as is also evident above, emerge from shifting the old cash-based welfare schemes like PAHAL, MGNREGA and National Social Assistance Programme to the new DBT-PFMS platform. Under PDS, the savings are largely attributed to savings accruing from deletion of 2.33 crore bogus/ghost ration cards (since 2014) and better targeting under DBT. But as we will see eventually, there is no savings on account of the grain off take figures which in fact have increased despite fall in the total number of ration cards.

The PDS in India has traditionally been a safety net for the poor, if not in all, at least in some Indian states and UTs. There is a socio-economic, political and psychological need and comfort associated with it. Deciding to replace PDS—that has survived and grown since its pre-independence form—primarily on economic grounds may be the most unjust end to a welfare scheme. In the following sections, we thus examine the idea of DBT in food in India. We start by synthesising learning from experiences in cash transfer schemes, both nationally and internationally. We then qualitatively analyse and evaluate the case for DBT in food.

[18] http://economictimes.indiatimes.com/news/economy/finance/direct-benefit-transfer-leads-to-rs-50000-crore-savings-for-government-in-3-years/articleshow/57240387.cms

[19] The Government estimates for savings under PAHAL have recently been questioned by the CAG who attribute bulk of the reported savings due to the collapse of oil prices globally (see https://goo.gl/3Xy21N). In the above assertion we have referred the savings as given on the DBT portal setup by the Government.

Section II: Cash Transfers

International Experience

The origin of cash transfer schemes can be traced back to the ancient Roman period. In the 20th century, these schemes took the form of social pension schemes (for example, in South Africa) or food stamps (in the US and Sri Lanka in the 1960-70s) and in the 1990s, the Latin American Countries (LACs) popularized them as an instrument for poverty alleviation. When decades of expenditure on untargeted food subsidy schemes failed to arrest the level of food insecurity and the incidence of malnutrition among the poor in these LACs (Barraclough & Utting, 1987), alternate policies were debated and experimented-with in the 1980s. Both Mexico and Brazil were among the first to experiment with such alternative practices and which eventually led to the introduction of conditional cash transfer schemes aimed at tackling problems of food insecurity and poverty and for improving health and education levels.

In order to develop a DBT-food implementation strategy for India, we undertook a review of international cash transfer schemes and experiences and modalities of selected schemes are presented below:

Brazil

In 2003, there was high incidence of poverty, illiteracy and failing performances in health and nutrition in Brazil when the government decided to implement Bolsa Familia (BFP). The program identified beneficiaries through surveys and interviews conducted by municipal offices in each province. Based upon fulfilment of certain conditions, households received cash benefits into their bank accounts. These conditions centred on children and included-atleast 85 percent school attendance, monitoring of child growth at designated health centres and providing them the necessary vaccinations; and pre and post natal care for pregnant and lactating women. Failure to comply with any of these conditions led to either temporary suspension from the scheme, or in the case of repeat offenders, removal from the beneficiary list.

All identified beneficiaries have a unique social identification number used for making payments to them. The size of benefit received by each household per month varies from R$15 to R$95 depending on family size and economic well-being. The transfer is made electronically and each beneficiary household is given an electronic debit card. Withdrawals can be made at authorized centres such as banks, lottery offices, ATMs and post offices. There are close to 50 million participants (26% of the total population) in this program and municipal offices update the beneficiary database every 24 months (Aline, Gazola, & Hellmann, 2015).

Assessments of operations reveal that the BFP has been efficient in terms of delivering cash benefits to the very needy. Lindert et al. (2007) estimated that 80% of benefits under the BFP went to the poorest quartile of Brazil's population. Aside from this, its impact on health, education and food security is visible. Soares et al. (2006) showed that the GINI index for Brazil (which was high and sticky for many decades) dropped consistently after the program was launched. In terms of incidence of malnutrition, children of BFP households were also 26% more likely to achieve the normal height for their age than those in non-beneficiary households, as shown by Santos et al. (2011). Overall, Brazil witnessed a secular decline in the share of its total population that was food inadequate (FAO, 2015).

Mexico

In 1997, the Mexican government introduced, *Oportunidades* (now renamed *Prospera*), to tackle poverty, promote food security, and improve health and education. The Mexican federal government identifies beneficiaries and monitors them for compliance with laid-down conditions. Cash benefits are transferred in the name of a female member of the identified household and the amount transferred has two components: a food grant (fixed). and an education grant (subject to the the number of children in a household) (Roelen & Ulrichs, 2012). Receipt of the cash benefit is subject to fulfillment of conditions associated with health and educaton. In the case of the former, pregnant or lactating women and young children are required to have mandatory health checkups whereas for the latter, a minimum attendance of 85% is required for children going to school.

The amount is transferred bimonthly, and the average amount transferred is equivalent to 235 pesos. Benefits are transferred through an electronic payment system allowing beneficiaries to directly receive cash into their bank accounts and withdrawn at various designated points including non-banking financial institutions (Masino & Niño-Zarazúa, 2014).

In terms of scheme efficacy, Coady (2003) showed that 58% of the benefits from Progresa went to the poorest 20% of the population of Mexico and this increased to 80% when the poorest 40% of the population were studied. Oportunidades, thus, in terms of providing benefits to the real needy has been effective (Grosh, Coady, & Hoddinott, 2004). In terms of impact on health, nutrition and education, Skoufias's (2005) empirical findings on the impact of Oportunidades show a positive effect on the enrollment of children. The incidence of illness among children was obesrved to have reduced by 12% in households enrolled under the program. Hoddinott et al. (2000) estimated that the average level of consumption for households increased by 14.5% along with an increase in the diversity of dietary preferences and improvement in dietary quality.

Despite the improved human capital indicators, overall income poverty has not declined much in Mexico since the program started. Levy (2008) points out that the interaction of social policy, including *Oportunidades*, with labor markets does not create a sound incentive

structure for an efficient allocation of labor in the economy for sustained poverty reduction. A locally focused, decentralized cash transfer program sends a powerful disincentive for labor migration. Social protection, in combination with social security and *Oportunidades*, may have been leading to a larger informal sector with lower wages, lower productivity and lower economic growth. In view of these problems, Levy (2008) argues that social policy reform has to be carried out simultaneously with fiscal and labor market reforms.

Cash transfer schemes in other countries

Although popularized by LACs, cash transfers in the last two decades have also been adopted by many developing countries in Africa, Central Asia and South Asia. Currently, over 130 countries operate UCTs and 63 countries operate CCTs (World Bank, 2015). Outside of the LACs, Kenya, Pakistan, Bangladesh, Indonesia and Sri Lanka are some of the countries which have implemented cash transfer schemes with success.

In Pakistan, the Benazir Income Support Program (BISP) is an unconditional cash transfer scheme implemented across the country. The scheme provides additional liquidity for supporting food consumption and for raising the level of education and reducing the incidence of diseases among its impoverished households. The Pakistan government has made the BISP a co-responsibility cash transfer program. Unlike conditions that are required to be monitored and invite penalties for non-compliance, co-responsibilities are non-obligatory.

In Bangladesh, a similar scheme is to be introduced called the Income Support Program for the Poorest, which incorporates the learning from its Shombhob CCT Pilot (implemented for a year) where instead of conditions (which were imposed in the pilot study), co-responsibilities are imposed.

Manley, Gitter, and Slavchevska (2012) in their comprehensive literature review found that on average cash transfer programs have positive but insignificant impact on child nutrition. Haushofer and Shapiro (2013), based on an Randomized Control Trial (RCT) in Kenya, conclude that unconditional cash transfers improve consumption, food security and psychological well-being of the recipients. Hoddinott et al. (2013), who evaluate vouchers and cash transfers in four countries (Ecuador, Uganda, Niger, and Yemen), found that effectiveness in improving food security of different programs heavily depend on local conditions, including severity of food insecurity or thickness of markets.

An interesting learning that emerges from our study of international cash transfer programs is the handling of the payment systems. Most of the countries that we studied invested heavily in improving their payment systems for the cash transfer schemes. Kenya is an interesting example of a country that incorporated technology-based solutions to resolve its problem of insufficient bank branches. Benefits under Kenya's Orphan and Vulnerable Children UCT scheme are delivered through mobile phones. Beneficiaries receive SMS alerts about the

credited amount which they can redeem from the closest telecom agent. This platform is operated by the private telecom enterprise, Safaricom (a subsidiary of Vodafone). Seeing the immense popularity of this platform in Kenya, other countries also followed suit. In Bangladesh, bKash, a mobile financial services provider operated by BRAC (a microfinance institution based in Bangladesh), was launched to increase access to financial services in the rural parts of the country (although this has not yet been linked to any cash transfer scheme). Similarly, Pakistan is also implementing pilot projects in five districts, testing to see if BISP cash benefits can be delivered using mobile phones.

Cash and food transfer programs, such as the well-established ones in Bangladesh (Ahmed et al., 2009) and the emerging ones in Africa (e.g. Ethiopia's Productive Safety Nets Program), have significant involvement by local government agencies. Large-scale CCT programs require a broader framework of assessment beyond direct and short-term household level impacts, including attention to the optimal division of responsibilities between local and Central Government structures, and incentives for transparency, as these are critical for poverty reduction in the long run. These experiences (see Annexure 1 for full list of schemes and their modalities and impact) help us appreciate the scope and likely impact of a cash transfer scheme. We next proceed to evaluate cash transfer experiences in India.

India's experience

Not just internationally, DBT experiments have successfully been undertaken in India too. Some of the bigger experiences are shared below.

Delhi's Dilli Annashree Yojana (DAY)

To complement the existing PDS/TPDS, the Government of Delhi introduced the Dilli Annashree Yojana (DAY) in 2012. Any household with an annual income of less than INR 1 lakh and who were not recipients of the TPDS (Niti Aayog, 2015) were included under DAY.

Under this scheme, an amount of INR 600 was transferred to the Aadhar seeded bank accounts of the female head of the household. The size of cash entitlement was calculated as the difference between the market prices of rice, wheat and sugar, and the issue prices at the FPS. For ensuring that beneficiaries could access their benefits, the state government relied on the success and outreach of business correspondents (BCs). These BCs carried micro-ATMs linked to the UIDAI's Aadhaar repository that could be used for withdrawal, balance enquiry and inter-Aadhaar transfers. It was the first cash transfer scheme for food security in the country.

Upon the launch of the NFSA 2013, all the DAY beneficiaries were absorbed under the Act and thus the scheme was withdrawn in early 2014.

Despite the short duration for which the scheme was in effect, the DAY had a positive impact on food security among beneficiaries. Transferring the amount in the name of a woman made the scheme gender-sensitive. The cash gave the household not just food security but also a social security against illness, especially in occupationally vulnerable families (NITI 2015). In particular, it was found that greater amounts of money were spent on healthier alternative food options such as milk, eggs, and vegetables (Chowdhary 2014, Srinivasan 2016). The major challenge in the scheme however, was coordinating the activities of the UIDAI, NPCI and banks by the state as there was no centralized system in place. Nevertheless, the scheme made a good case for assessing the efficacy of DBT in food and has found a place in NITI Aayog's "Social Sector Service Delivery: Good Practices Resource Book 2015".

Delhi and Madhya Pradesh: SEWA's UCT Pilot

SEWA in 2010 and 2011 conducted an unconditional cash transfer pilot study in selected districts of two states, Delhi and Madhya Pradesh (Davala, Jhabvala, Mehta, & Standing, 2015). While in one the idea was to transfer cash in lieu of subsidized physical grain entitlement under the TPDS (Delhi), in the other, cash transfers were supposed to complement the same system (MP). Under all the three pilots (one in Delhi and two in MP), amounts were transferred directly into the identified beneficiary households' bank accounts that were in the name of the woman of the household and if they did not have bank accounts, SEWA volunteers/workers facilitated the opening of one.

In Delhi, INR 1000 were transferred to each BPL household (randomly sampled). The amount was calculated as the difference between the market price of food commodities and issue price of the same commodities in the FPS. In MP, SEWA conducted two pilots—one in a sample of non-tribal villages and the other in a sample of tribal villages. In these pilots, beneficiaries were entitled to INR 300 per adult and INR 150 per child; this was computed as 20-30% of the monthly per household expenditure of vulnerable households at or below the poverty line (from the 2004-05 NSS survey).

While beneficiaries in the Delhi pilot were barred from receiving food grains under the PDS, this was not the case in the MP pilot where the transferred cash was in addition to the PDS entitlements that the beneficiaries received. Results (Davala, Jhabvala, Mehta, & Standing, 2015) from evaluations in both, Delhi and MP are summarized below:

- consumption of high value agricultural commodities such as eggs, meat, fish, fruits and vegetables apart from staples such as rice, wheat and sugar increased significantly;
- They opted for better medical treatment and because of this and increased consumption of nutritious food, the number of people with illnesses also fell.
- In both Delhi and MP there was no observed increase in consumption of alcohol and tobacco.

- In the tribal village pilot, beneficiaries who received cash used it to improve their living conditions by installing better lighting, shifting to safer sources of drinking water and repairing their dwellings. There was also an increase in the number of people using bank accounts to save money pay off outstanding debts, indicating that cash serves as an important income support for the debt-ravaged.

Based on the favourable experience with the DBT food pilot studies, the GoI in September 2015 ordered its implementation in three UTs, Puducherry, Chandigarh and Dadra and Nagar Haveli. While both Chandigarh and Puducherry rolled it out in September 2015, Dadra and Nagar Haveli was able to put it in place only partially in Silvassa (the capital) in March 2016, because of local elections and opposition. An overview of the DBT food experience in the two UTs, Chandigarh and Puducherry follows.

Puducherry

Profile of the UT

Of the total population of 1.25 million people, 68 per cent live in urban areas (Census 2011). On an average, they consume about 30 kilograms of rice and wheat (about 27 kilograms of rice and 3 kilograms of wheat) every month and close to 38 percent of this are obtained through PDS (NSSO). Puducherry is one of the two Union Territories, Chandigarh being the other, who have completely substituted their central grain entitlement under the PDS with cash transferred directly into the bank accounts of the identified beneficiaries.

Brief on TPDS that existed pre-DBT[20]

Between 1997 and 2015, Puducherry operated TPDS that provided common or Grade A variety of rice to its APL, BPL and AAY beneficiaries. The scale of issue as on 11 May 2015 was 35-38 kg/month/AAY household, 23-25 kg/month/BPL household and about 13-15 kg/month/APL household. The UT government distributed these grains free of cost, bearing the cost of the additional food subsidy from its own budget. Under the scheme, there were 0.67 million beneficiaries receiving food grains (mainly rice).

In 2013-14, the UT administration rolled out its own scheme of free-rice under which it distributed a locally preferred rice variety, i.e. single boiled (parboiled), in addition to the rice distributed under centrally funded TPDS. The monthly entitlement of a beneficiary household in their scheme was 10 kg that was later increased to 20 kg. The Puducherry government procured this rice from the open market and distributed it through the FPS network using

[20] See Annexure 2 for facts on TPDS and NFSA in Puducherry and Chandigarh

biometric authentication. This biometric system is separate from the e-pos system under the APDS[21].

DBT Food in Puducherry

In 2015, the Puducherry government implemented the NFSA and immediately rolled out the DBT for food scheme. About 0.63 million beneficiaries, including BPL and AAY beneficiaries, were eligible under the NFSA and thus under DBT. Under the new scheme, food subsidy is credited into the bank account of these beneficiaries.

The quantum of subsidy transferred to each household's bank account is calculated based on the formula given in the notification issued by the DFPD (See annexure 1). Subsidy amount is calculated, as mentioned before, based on the offtake ratio of wheat and rice in the UT under the TPDS. As people of Puducherry prefer rice, the cash-subsidy transfer amount is estimated based on rice prices alone. By multiplying the prevailing MSP of rice (derived from MSP of Grade A variety) with 1.25 and subtracting its CIP (i.e. INR 3), the food-subsidy cash equivalent is estimated. As of May 2017, the subsidy is equivalent to INR 25.17/kg, which means that a priority beneficiary of NFSA who is entitled to 5 kg/month is entitled to get a credit of INR 125.9 i.e. INR 25.17*5, and each AAY household with a monthly entitlement of 35 kg will receive INR 880.95 (i.e. INR 25.17*35). At the time of rollout, per kilogram cash subsidy amount was INR 23.13/kg. Since then, the subsidy amount was revised twice following changes in the MSP of paddy.

In order to address the problem of leakage and poor targeting of PDS prior to implementing DBT-food, the Central Government has required all states and UT governments to ensure that DBT transfer is made only to bank accounts that have been seeded with Aadhaar, and that the bank accounts should be in the name of the woman-head of the family, and should be integrated with a mobile number, so that timely notifications about the transfer can reach the beneficiaries. At the time of rollout in Puducherry, the level of Aadhaar seeding of bank accounts was low at 68 percent. The UT government issued circulars and carried out awareness drives through FPS to encourage beneficiaries to get their bank accounts seeded with Aadhaar. The UT however was not required to collect bank account details and mobile and ration card numbers since this information was collected during the rollout of the UT free-rice scheme in 2013-14. Precisely because of this reason, the UT has not delivered food subsidy

[21] The UT administration had created its own system of biometric offtake of food grains where ration card details and biometric markings were collected from all ration card holders. Eventually this was merged with the APDS where these details were linked with Aadhaar.

in the bank account of women alone and the same is being transferred in the accounts of men too[22].

As on May 2017, about 5.89 lakh beneficiaries received the food subsidy in Puducherry in their bank accounts (Source: Puducherry Government). The total number of persons to be covered under NFSA is actually 6.34 lakh, which means that about 7 percent of the UT's NFSA beneficiaries are still not getting their subsidy in their bank accounts. We gauged that one of the major reasons for this exclusion was delay in seeding of their bank accounts with Aadhaar[23].

Chandigarh

Profile of the UT

Similar to Puducherry, Chandigarh is a geographically small UT with a population of 1.06 million, of which close to 97 percent resides in urban areas. The consumption pattern of Chandigarh differs from that of Puducherry; unlike the latter where rice is a staple diet, consumers in Chandigarh prefer wheat. A household in Chandigarh consumes, on an average, 33 kg of rice and wheat (about 9 kg of rice and 24 kg of wheat) per month and about 12 percent of this consumption is met from PDS (NSSO). This difference in consumption pattern influences the proportion of rice and wheat distributed by the two UTs under PDS. The amount of food subsidy received through DBT in the two UTs is also affected by this..

TPDS and NFSA in Chandigarh

In Chandigarh, the TPDS was in effect between 1997 and 2014. Unlike in Puducherry, the UT administration sold grains at the central issue price (CIP) and did not operate a parallel state food scheme. Until June, 2013 the total number of ration card holders in the UT was 0.1 million of which close to 0.08 million were APL cards, 0.01 million BPL and only 291 were AAY.

In 2013, as part of its efforts to implement the scheme for end-to-end computerization, all ration cards in Chandigarh were digitized and were replaced with smart ration cards. Introduction of smart ration cards resulted in deletion of several bogus ration cards. Thus in January 2014, the total number of ration cards reduced to 0.08 million (representing 0.3 million individuals) of which 0.07 were APL, 0.01 million were BPL and 261 were AAY (the greatest reduction was seen in APL cards hence).

Chandigarh UT administration implemented the NFSA immediately after implementing reforms in its PDS, in February 2014. Under the new scheme, close to 0.06 million households were issued priority ration cards and 122 households were issued AAY cards. Both PHH and

[22] This is because Puducherry's free rice scheme (which was implemented before DBT) had no mandate on who was required to collect the rice from the FPS. In fact, details of up to two senior household members were collected and either of them could access rice under the scheme.

[23] Based on data from PFMS and the Puducherry Civil Supplies Department

AAY households received wheat and rice in a 3:2 ratio (determined based on the consumption pattern of the UT) at INR 2 and 3 respectively. APL households that were not included under the scheme (0.03 million such households) were given wheat under the centre's tide over allocation at the pre-existing CIP under the TPDS (INR 7/kg). The scheme was in effect till September 2015, after which the UT administration implemented DBT for food, under which beneficiaries received the food subsidy directly to their bank accounts.

DBT Food in Chandigarh

In September 2015, Chandigarh rolled out DBT food. The food subsidy amount is calculated as explained in case of Puducherry but there is one difference: while in case of Puducherry, the food subsidy amount was calculated based on the MSP of only rice, in case of Chandigarh it is calculated based on MSP of both rice and wheat. The total subsidy transferred to each household uses the consumption ratio for wheat and rice (3:2) which was the actual ratio of distribution of wheat and rice for NFSA and TPDS. As on May 2017, amount of subsidy transferred to a PB (who is entitled to 5kg/month/person) is INR 105.7 and for AAY, with a household entitlement of 35 kg/month, it is INR 736.89.

DBT in Chandigarh follows a similar model to that of Puducherry for transfer of subsidy. The stakeholders involved are the Chandigarh UT civil supplies department, PFMS (NIC), NPCI and Banks. However, the Chandigarh UT department has setup a separate entity called the 'Chandigarh Society for Food Security and Consumer Awareness'[24] to specifically perform functions related to the implementation of the DBT. In Puducherry, the total subsidy was transferred to the bank account of the UT civil supplies department by the Central Government (after which it went to the beneficiaries); however, in Chandigarh subsidy was transferred to the bank account of this society which was subsequently responsible for making the payments to beneficiaries. In addition to creating a new entity, the Chandigarh UT administration also integrated the implementation of the DBT with the activities of Society for Promotion of Information Technology in Chandigarh (SPIC)[25].

In order to smooth the transition from PDS to DBT, the Chandigarh UT administration set-up special enrolment drives and camps. Through local representatives, they ensured that beneficiaries were made aware of the transition from food to cash and that their accounts were seeded with Aadhaar. These camps were conducted periodically. The number of households receiving subsidy at the start of the scheme was 0.04 million (equivalent to 0.18 million persons). Presently (March 2017), the total number of beneficiary households receiving subsidy under DBT is 0.06 million (or 0.27 million persons).

[24] Registered under the Societies Registration Act, 1860

[25] Setup under the Dept. of Information and Technology, to promote application of Information Technology in the UT's system of governance

Challenges faced by the two UTs

Based on continuous observation of the DBT as it unfolds in the two UTs and on our discussions with the various stakeholders, we have been able to filter some challenges that are affecting the ability of DBT-food to deliver on its set agenda in the two UTs. These are listed below:

- Inadequacy of transferred amount: It was unanimously felt by beneficiaries in both the UTs that the transferred amount was not sufficient to maintain the pre-DBT consumption levels. The transferred subsidy amount was not enough to buy rice or wheat in the open market as the amount is estimated based on the prevailing MSP levels and not the retail price levels. An analysis of this issue revealed three aspects of it:
    - Awareness of the beneficiaries: Most beneficiaries failed to understand that the amount transferred to them was net of CIP. Just like under TPDS, the CIP was an expense to be still borne by them. The right comparison of adequacy of the DBT amount and the market price thus had to be adjusted for CIP. We acknowledge that this is a subtle point, but awareness about it is crucial for creating social acceptance of the scheme;
    - In case of Puducherry, the situation is different. Under TPDS, the beneficiaries received free rice but now under DBT their subsidy amount is net of CIP. Not surprisingly, the UT's beneficiaries are finding the transferred cash subsidy amount inadequate for sustaining the pre-DBT consumption levels. But the fact that the UT scheme of free rice continues, also gives an additional support to these beneficiaries which is not available for beneficiaries in Chandigarh;
    - Hike in prices by the local kirana stores: In the absence of ration shops, there is a perceived likelihood that kirana stores might create artificial scarcity or hike prices leading the beneficiaries to feel the insufficiency of the transferred subsidy amount. Instances like this were not reported in Chandigarh or Puducherry. However, there are higher chances of such price rise in net food-deficit areas.
- Insufficient last-mile delivery mechanism: Compared to national averages, both the UTs are better banked, and despite that the following challenges were glaring:
    - Informing beneficiaries about food subsidy transfer: As Banks fail to inform all the beneficiaries about the fund transfer, the latter queue up in Banks to verify the transaction. This multiplies the number and frequency of footfalls in a bank branch apart from wasting working hours of a poor beneficiary who is possibly a daily wage earner. In Puducherry, DBT beneficiaries were automatically enrolled for the SMS facility; however some beneficiaries still did not receive SMS about the amount

subsidy credited to their account. In Chandigarh, different banks had different norms for sending SMS.

- There is another interesting dimension of the problem. With the telecom revolution in the country and the sharp price wars between the telecom players, some users have been frequently shifting mobile numbers. Because of this, the beneficiaries fail to update their bank accounts that remain integrated to their older mobile numbers. So, in many cases it was observed that because beneficiaries changes mobile numbers and failed to update the Bank about the same, the messages about the food transfer were not received by them. There is need to create awareness about this aspect among the beneficiaries.
- Multiplicity of bank accounts: In Chandigarh there were some beneficiaries complaining about not receiving their entitled food subsidy. Interestingly, most of these were ones who had multiple aadhaar-linked bank accounts or had recently opened a new aadhaar-linked bank account. We were informed by NIC that the database of beneficiaries automatically updates the bank accounts to the most recently opened aadhaar-linked bank account. Now, the government is crediting the food subsidy amount in the beneficiary's new account while the latter checks for it in the old account, thus causing discontent and inefficiencies.
- Entries in the Bank Passbooks: Passbooks for different banks used different descriptions for the credited food subsidy, while some called it "Cash transfer of food subsidy", others called it "PFMS credit" or "CPMSSB". This created confusion among beneficiaries, especially for those receiving benefits under multiple schemes such as old age pensioners, scholarship recipients etc.
- Withdrawal issues: Bank ATMs disburse currency notes only in certain denominations. This means that AAY or poorest of poor beneficiaries receiving food subsidy of INR 880. 95 or INR 736.89 cannot withdraw the entire amount at the same time. Perhaps they have to wait for the amounts to accumulate over months so that it can round off and can be withdrawn from the ATMs. This reduces the effective subsidy received by these beneficiaries. Interestingly, in Puducherry we found that beneficiaries did not withdraw the amounts every month and thus such a problem did not arise there. However, this is an important issue for consideration;

- Grievance redressal: Both UTs lacked a functional grievance redressal mechanism that allowed beneficiaries to register complaints if they did not receive money or if bank officials did not cooperate. However given the small geographical size of both UTs, some beneficiaries could directly seek grievance redressal at the offices of the UT Dept.

Of Civil supplies. But without dedicated and established mechanisms, it is likely to be a major problem in larger states.

Debate: PDS or DBT or Both?

After analysing international and national experiences, the question really is about the need for DBT in India. There are about 55 cash transfer schemes in existence (both conditional and unconditional) in India (DBT Mission, 2015). Shifting them to the more convenient and organized PFMS platform under DBT should be easy and more an operational issue as compared to PDS, where shifting away from existing subsidy-based or in-kind transfer schemes entails social, political, and economic challenges.

There are two main schools of thought on the topic of this sub-section. While one school wants the PDS to continue, strengthen, become universal and, if possible, be complemented by an unconditional cash transfers[26] and the other, favours replacing existing PDS with cash transfers while ensuring a proper transition management for the vulnerable poor[27]. The chapter, "*Universal Basic Income (UBI): A conversation with and within the Mahatma*" in the Economic Survey 2016-17 has propelled discussion on this topic. Today the question is not so much about the need of a cash transfer scheme (as that seems to be well established), as it is about letting it substitute, or run it complementarily to existing in-kind transfers. The problem of universalizing the system is also another aspect of this problem.

In this paper, we look at the possibility of DBT substituting the PDS wherever possible. The wider discussions on the concept of a universal basic income are beyond the purview of the current paper. We feel that if we can make a case for substituting the PDS with DBT, we can contribute to the ongoing debate.

We do this in three steps:

1. We evaluate the importance of grains from PDS in consumption basket of the country;
2. We evaluate the extent and level of grain pilferage or leakage from the PDS
3. Evaluate progress made by states on the PDS reforms and the impact;

Importance of PDS grains in average Indian consumption basket

The relevance of the PDS in an Indian food consumption basket, especially of the poor, is low but has been growing over the years. Since its inception in 1942, PDS has undergone several targeting reforms, entitlements have increased and CIPs reduced, *inter alia*, just so to ensure that the affordable food reaches all at all times. Impact of such reforms should reflect in the growing importance of grains from PDS in the consumption basket of individuals.

[26] See Shah (2013); Dreze (2011); Chakrabarti (2014)
[27] See Kapur et al. (2008); Economic Survey (GoI, 2016); Standing et al. (2015), Gulati and Saini(2015)

As per NSSO (2014), an average Indian consumes about 10 kg grains per month. Another NSSO report Public Distribution System and other sources of household consumer expenditure' (68th Round) tells about the sources of this consumption- whether the grains are from own source or if they are bought from the market or under the PDS. The share of total consumption that is met from purchases under PDS will give us an insight into the importance PDS for an average individual.

Findings: about 21 percent of the total quantity of rice and wheat consumed in India is derived from the PDS. For the poorest households, this dependence aptly increases to 33 percent. However despite the twelve percentage point increase in the quantity of rice and wheat sourced from the PDS, it is evident that poor households derive less than half of their consumption requirement for staples like rice and wheat from the PDS. The remaining quantities either are purchased from the open market (at market prices) or are grown by themselves.

An analysis for all states, shows that households in the seven states accounting for 70 percent of India's poor i.e. Bihar, Uttar Pradesh, Maharashtra, Odisha, Jharkhand, Madhya Pradesh and West Bengal depend on the PDS to meet, on an average, about 18 percent of their grain requirements. In states such as Tamil Nadu and Chhattisgarh, where State Governments distribute free grains, mainly rice, to all even there, the share of consumption met from the PDS is on average 50 and 36 percent respectively. Despite footing heavy expenditures on the state account, poor households in these states still have to rely on the open market purchases.

There is one limitation of this aspect: these numbers are for the year 2011-12. Due to continuous ongoing reforms, particularly in states like Bihar, West Bengal, Odisha these percentages would have improved since 2011-12 but since the latest data on the topic is only available for 2011-12 year we have to rely on them for evaluating all states of the country. More recently, the Economic Survey 2016-17 quoted a 3600-household survey across six states (Chhattisgarh, Odihsa, MP, Bihar, Jharkhand and WB) that showed that about 92 percent of the PDS grain entitlement was received by the beneficiaries in these states. This clearly reflects the improvements in the system which is the impact of the ongoing PDS reforms. But can these results represent the situation for the entire state? We are uncertain. Nevertheless, the fact remains that not all beneficiaries are receiving their dues and thus their dependence on PDS is low. Among other factors, such low reliance on PDS for meeting consumption needs is explained by the large rates of grain pilferage and leakage from the PDS where the grain does not reach its intended beneficiaries. We next estimate this level of grain leakage.

Challenge with the PDS-estimating grain leakages

Close to 40 percent of the bottom 40 percent of the country's population are not part of the PDS (Economic Survey, 2017) and between 40 to 50 percent of grain off-taken from

government granaries do not reach the intended consumers (Dreze and Khera 2015, Himanshu and Sen 2013 and Gulati and Saini 2015).

Despite the 70-year long history of PDS, India is home to world's largest number of poor and malnourished. Obstinately high levels of these problems have led the government to evaluate its PDS regularly. In terms of the economic and social implications, leakage of grains is one of the biggest problems plaguing the PDS. Despite the systemic changes implemented in the PDS in 1997 (changing coverage from general to targeted), 2002 (identifying the poorest of poor under AAY), and 2013 (introduction of NFSA) and reforms (that have been detailed in the last Section), there have been large-scale leakages or diversions of grain away from its intended recipients. Leakages are estimated as excess of grains off-taken from government granaries over what is actually consumed by the beneficiaries.

It is the responsibility of the Central Government to arrange and allocate food grains stored in its granaries to each of its 36 states and Union Territories. It is the responsibility of the state/UT agency to off-take[28] grains from these granaries. The grain is transported to the doorstep of fair price shops (FPS) by truck from where PDS beneficiaries collect their quotas showing a ration card (which acts as identification, based upon economic vulnerability, and also displays the beneficiary's entitlement) and purchase grains at CIPs. The grain has been observed to 'leak' at each of these stages. A summary of some of the estimates of this grain leakage is given below:

1. Estimates by Planning Commission for 2003-04: The Planning Commission of India evaluated these leakages (PEO, 2005) as excess of grains off-taken from government granaries over what was consumed by the BPL families. The report concluded that 58 per cent of the subsidized food grains issued from the Central Pool did not reach the intended beneficiaries (BPL families) in 2003-04. It found that to deliver one Rupee of an income transfer to a BPL family, the government had to spend 3.65 Rupees.
2. Estimates by NCAER: A primary survey by NCAER in 2014, covered six states: three that had implemented the NFSA provisions (Bihar, Chhattisgarh and Karnataka) and three non-NFSA states that still followed TPDS (Assam, Uttar Pradesh and West Bengal). The evaluation revealed that Chhattisgarh had the lowest leakage (6.96%) among the six states, and there was an impressive decline in Bihar's leakage (16.28%) over the past couple of years. The study also established that the magnitude of leakage from both,

[28] The state governments have to off-take the entire amount of grain that has been allocated to them in a stipulated time period. The amount of grain that is allocated to each state/UT each year is based on its actual off-take in the previous three years. Many states and UTs off-take less grain than allocated. During festivals, emergencies (floods, cyclones, etc.) a state/UT government can request the Central Government for additional grains and such grain is allocated to them in addition to the above allocation and is referred to as ad-hoc allocation or additional allocation.

the BPL and APL, categories was higher for non-NFSA states as compared to the NFSA-implemented states.

3. Estimates of leakages based on the consumption data from the National Sample Survey Organization (NSSO) and the FCI off take data: There are several researchers who have employed this secondary method for estimating leakages, some of these estimates are given below:

    a. Himanshu and Sen (2013) used this methodology and found the leakages to be to the tune of 54.8 percent in 2004-05, and 35 percent in 2011-12.

    b. HLC 2015 and Gulati and Saini 2015: Report of the High Level Committee (HLC) on Reorienting the Role and Restructuring of the Food Corporation of India (GOI 2015) cites 47% PDS leakage for 2011-12. The estimates were based on a working paper by Gulati and Saini (2015).

    c. Dreze and Khera (2015) found leakages to be around 42% in 2011-12. The Dreze and Khera (2015) report also derived leakage estimates using data on PDS purchases from the Institute for Human Development Studies (IHDS). With this data, the PDS leakage was estimated to be 32%.

In light of the differences in the estimates, we revisited the methodology originally used in estimating PDS leakages by Gulati and Saini (2015) and re-estimate grain leakages from the PDS for the year 2011-12 (July-June).

The methodology followed is as follows:

- *Total Annual PDS Consumption*: The TPDS household consumption numbers are obtained from the NSSO 2011-12, Public Distribution and Household Consumption Survey 2 (NSSO Report no. 565), and from the NSSO Report no. 558 that gives information about the state-wise monthly per capita (MPC) PDS consumption of wheat and rice in rural and urban areas. While the former series gives data for every household, the latter gives it on a per capita basis. Using data from the 2011 Census for the total number of people and number of households in India, we estimate annual PDS consumption (rice and wheat) as two price series: Series 1 estimates annual consumption from per capita numbers, and Series 2 estimates it from the household numbers. As per the two series, Indian consumed 29.98 MMT (Series 1) and 27.34 MMT (Series 2) of PDS rice and wheat in 2011-12.

- *Estimating Off-take by states/UTs from central agencies*: TPDS off-take figures are taken from DFPD's Food Grain Bulletin. The Bulletin gives annual off-take figures for the financial year April 2011 – March 2012. As the NSS data for TPDS consumption uses agricultural year as their reference period, the off-take of food grains has been converted and calculated for the agricultural year July 2011 – June 2012 wherever

possible. In our calculations, three types of off-takes have been included: normal off-take, off-take from two special ad hoc/addition allocations made for BPL households, in January and May, 2011, and, special ad hoc allocations made to 150 and 174 'poorest districts' of the country. For the year 2011-12, total grain off-taken was 52.9 MMT, of which 44.7 MMT was off-taken by the normal route and the remaining in the ad hoc, additional and special categories.

- *Estimating leakages*: In absolute terms, we estimate leakages by deducting the annual PDS consumption from the annual PDS off-take. It is also converted as a percentage of off-take. We find the PDS grain leakage to be about 22.9 MMT (Series 1) and 25.6 MMT (Series 2) in the agricultural year 2011-12. In percentage terms, 43.3 percent (Series 1) and 48.3 percent (Series 2) of the total off-take from the central pool is estimated to have pilfered from the system in the studied year.

We found that states and UTs such as Delhi, Chandigarh, and Nagaland have leakages above 70 percent. Gujarat was close to the threshold with a 69 percent leakage rate as per Series 1 and about 71 percent as per Series 2.

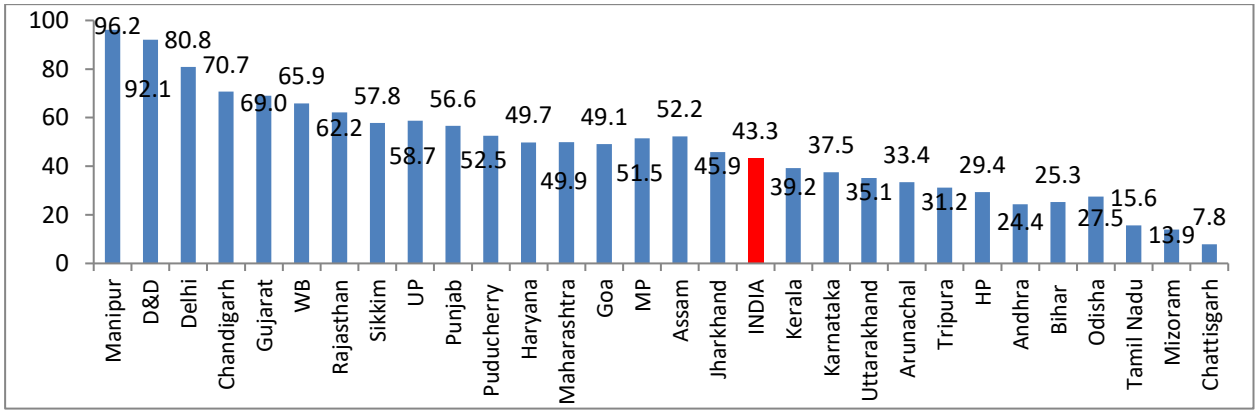

Figure 6: Estimates of grain leakages (%) from Series 1 for 2011-12 (AY)

Source: Authors' estimation from NSSO and Census data; Note/Acronyms: D&D: Daman and Diu, WB: West Bengal, UP: Uttar Pradesh, MP: Madhya Pradesh, HP: Himachal Pradesh

These numbers are for the year 2011-12 and more than five years have passed since. While we await NSSO data for a more recent year, we use these numbers for our analysis. For more recent years, we cite two sources. The first is the Indian Institute of Technology's (IITs) Public Evaluation of the Entitlement Programs (PEEP) 2013 report, and, the second, is an estimate presented in the recently released Economic Survey (2016-17). Both numbers are close, as can be seen from the last two columns in the table below. The PEEP survey results are estimated from a survey of 10 Indian states and the estimates in the Survey are extrapolated from

Himanshu and Sen's leakage estimate of 34.6 percent for year 2011-12 (2013). Here is a summary of the all-India leakage estimates by some Indian authors. Table 2

Table 3 Summary of PDS Leakage estimates by several authors

All India Leakage Estimates		
Himanshu and Sen (2013)	2004-05	54.8
Dreze and Khera (2015)	2011-12	41.7
Gulati and Saini (2015)		46.7
Himanshu and Sen (2013)		34.6
Current Study		**43.3 (48.3)**
PEEP Survey (10 States)	2013	20
Economic Survey	2016-17	20.8

Source: Compilation by Authors

This means that though the leakages are still high, they are falling and the continuous reforms in the PDS are yielding these results. We next evaluate how each of these states have performed on the set PDS reform agenda.

Evaluate progress made by states on the PDS reforms and the impact

As already discussed in our introduction of the PDS Section, states have attempted to implement reforms in their respective PDS systems. The progress on the nine-point action, plan has been rather slow but after NFSA the states have picked up pace on this plan. Efforts have been augmented for end-to-end computerization too. Financial assistance from the centre has enabled states to digitize ration cards of households, seed them with Aadhaar, commence APDS (in some states), computerize and enable tracking of food grains from FCI to state to FPS. As on date, the level of digitization of ration cards is 100 percent, and 77 percent of these are cards are seeded to Aadhaar. This has resulted in the fall of the number of ration cards (despite the transition from TPDS to NFSA). Has this fall in the ration cards resulted in savings of the government through their impact on the allocation and offtake? We briefly evaluate that below.

Between 2006 and 2016, the total bogus ration cards deleted by the Central Government were 63 million (GoI, 2016), as per our own calculations from the ration card data from DFPD, MoCAPD this number is only 2 million. Nevertheless, such a reduction should result in reduced allocation and offtake of grains as the latter should be a function ideally of the total number of beneficiaries. As per data from DFPD, between this period the allocation decreased by 19 million tonnes while on the other hand offtake of rice and wheat increased by 18 million tonnes[29] (Figure 7) .More recently, between 2014 and 2016, while the number of ration cards

[29] Based on figures reported by the DFPD in its monthly Food Grain Bulletins

declined by 7 percent, both allocation and offtake increased by 0.3 million tonnes and 5 million tonnes respectively.

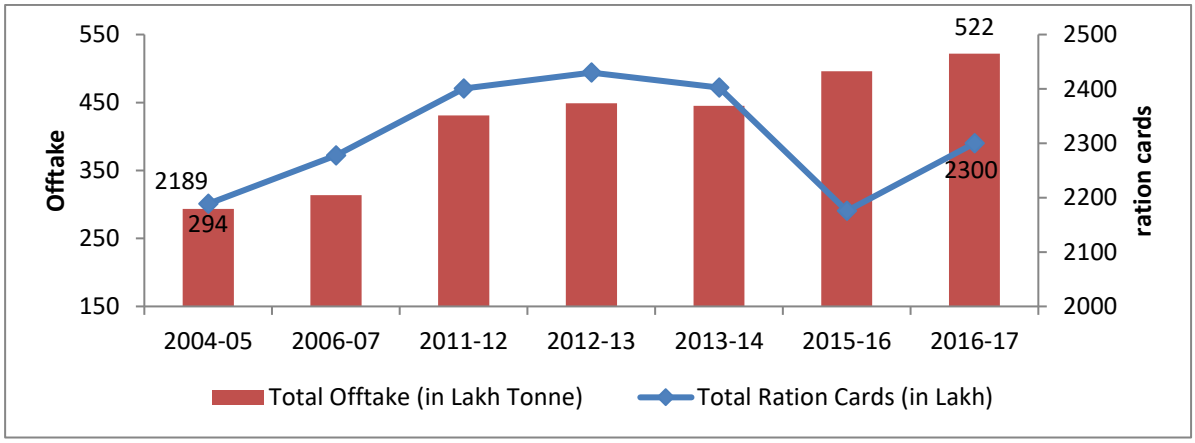

Figure 7: Reduction in ration cards and increase in offtake 2004-05 and 2016-17

Source: Food Grain Bulletin (DFPD)

There is some discrepancy either in the data provided by DFPD or in our understanding of the phenomenon that expects offtake and ration cards to be positively correlated. In Madhya Pradesh for example, in the last decade, about 2.5 million bogus ration cards were deleted. Even though its allocation reduced by close to 1 million tonnes, its offtake increased by 1.3 million metric tonnes.

Overall, there are clear indications of the system having improved over the years when seen from the perspective of leakages in the system. There is no dispute about the fact that the reforms in the PDS machinery, undertaken by both, the states and the Centre, have improved delivery and operations of the PDS, which has come under much criticism, and that large portions of country's malnourished people have benefitted from them

However, the question really is about the social, economic, and political efficiency and sustainability of the system. Is there a way to truly support India's vulnerable and also ensure economic efficiency? Is universalizing PDS the right solution or is there a need to evaluate an area's vulnerability and then devise a 'customised' solution? Each state within India is different and within these states, too, there are wide differences between districts, so can it be assumed that one standard PDS-type means of distributing highly subsidized (or even free) rice and wheat will resolve the often-unaccounted-for problem of malnutrition? Or is substituting the grain distribution system with a cash transfer under DBT across all states at one immediate time a viable solution? Can poor who have money but no access to affordable grains in the open market be better off and become food secure?

We propose below a plan in which the decision to adopt DBT food or implement APDS is based on a state's 'readiness' or 'vulnerability' status.

Section III: Analyzing State Readiness

Each state/UT in the country differs in its economic vulnerability, political motivation, and social framework. Even within a state, it is likely that the above differences are prevalent between districts. This means that the method to determine the future of PDS and DBT in food in a state/UT has to be less macro and more meso- and micro-based. Therefore, there is a need to develop a scientific method for analysing a state's readiness that should be used to decide the future course of action towards implementing DBT in food.

We propose below an indicative model that can be used to evaluate a state's/UT's readiness for implementing the ICT-based DBT food or APDS. Based on our analysis of national and international experiences, we evaluate this readiness based on three broad parameters - its demographic profile, effectiveness and relevance of existing PDS, and the extent of financial inclusion and/or situation of banking infrastructure. For each of these parameters, we next identify a list of quantifiable indicators.

A word of caution before we proceed: We acknowledge the fact that by undertaking a state-level analysis of a state's readiness for DBT we fail to acknowledge the diversity among its districts. Which means that even if a state appears to be ready for DBT, there most certainly will be areas where the extent of infrastructural deprivation or level of vulnerability is higher than the overall state and thus may not be fit for an immediate rollout of DBT? Likewise, by declaring a state as less-ready for immediate rollout of DBT, we fail to appreciate districts within that state which have superior financial infrastructure and have better levels of literacy and nutrition than the overall state and thus are more ready than the state itself to substitute its PDS grains with food subsidy (under DBT). However, due to paucity of resources and data at district level, we restrict our analysis to the state level.

We next proceed with a sequential explanation of the three parameters/variables detailing our methodology:

1. <u>Demographic profile:</u> We study the demography of a state/UT under four sub-heads:
    a. *Urban or rural*: We identify if a state/UT is rural or urban by looking at proportion of its population living in urban and rural areas. We used the data from Census 2011 for this purpose. If greater than half of the population resided in rural areas, then the state/UT is addressed as rural, else as urban. By this measure, 27 states/UTs out of the 36 are rural. The two states of Tamil Nadu and Kerala have about similar number of people living in urban and rural areas and thus are categorised as urban/rural. This leaves about seven states/UTs (Delhi, Goa, Mizoram, Puducherry, Lakshwadeep, Daman and Diu, and Chandigarh) which are

categorized as urban. We associate, contingent also upon performance on other indicators, greater readiness of a state for DBT if it is an urban area.

b. *Poor populations*: We study the status of poor in each state both as a percentage of the state's total population (poverty ratio), and as a percentage of nation's total poor. In our analysis, a state with higher share of poor is taken as less ready for DBT immediately and we feel that before it shifts to DBT in the medium to longer run, the state system of PDS/APDS needs to be strengthened. States such as Chhattisgarh, Bihar, Odisha, MP, Jharkhand, and UP are among those where the poverty ratio was much higher than the national average of 21.9 percent. States/UTs like Delhi, Punjab, Kerala, Andhra, Goa are among the ones with a poverty ratio of less than 10 percent. In terms of share of India's poor, six states namely, UP, MP, Odisha, Bihar, Maharashtra and West Bengal accounted for about two-thirds of India's poor and so these were not ranked very highly on this parameter and thus were not advised for immediate DBT rollout;

c. *Literacy rates*: A state's level of literacy, especially among its females, is central for the success of any food security mission where higher levels of education (mainly female) are associated with improved levels of food security. This may not be a sufficient condition for alleviating food insecurity, but surely is a vital determinant of success of schemes like DBT food where the vices associated with an unconditional cash transfer can be offset by an educated woman of the house. We study total literacy rate and female literacy rate (both as percent of population) for all 36 states/UTs. We associate a higher literacy rate (also contingent upon performance in other indicators) with a greater readiness of a state for DBT;

d. *Proportion of malnourished children in the state/UT*: We study the level of malnutrition in a state/UT by measuring the level of stunting and underweight among its children less than 5 years of age. We used the NFHS data for the analysis. We score the states/UTs with higher rates of malnutrition relatively lower and mark them as being less ready for DBT food and more in need of a reformed and more robust PDS/APDS in the short to medium run.

By evaluating states based on these four criteria, we determine if a state should look at initiating DBT or strengthening APDS on an immediate basis. If a state has a high proportion of poor, where more than half its population live in rural areas, has literacy rates much lower than the national average and has high numbers of malnourished children, then, as per our analysis, that state should work towards strengthening its PDS by shifting to the ICT-based APDS in the medium to short run. However, if the state has a relatively lower share of its population living below poverty line, and the levels of education are higher and relatively

fewer children are malnourished, then that state can be looked upon favourably for introducing the ICT-based DBT food.

Based on the assessment of performances of states on the first parameter, Uttar Pradesh, Bihar, Madhya Pradesh and Odisha emerge as inappropriate grounds for immediate rollout of DBT food. Given their relatively better standing with regard to malnourished children, poor population, and literacy levels, Delhi, Punjab and Goa emerge as fit grounds for a DBT food rollout.

In our next step, we proceed with analysis of the states on the second parameter that evaluates the existing PDS of that state.

2. PDS Performance: Taking the analysis from the previous section, we study the states on all the three aspects: i.e. importance of PDS grains in average consumption basket of that state, level of grain leakage and progress by the state on the PDS reforms. We associate greater level of leakage, lesser dependence on PDS for meeting consumption and good progress on the PDS reforms as conducive for shifting away from APDS to DBT.

   In terms of leakages, we found that states such as Punjab, Delhi, Uttar Pradesh, Gujarat, and West Bengal have high PDS grain leakages much over 55 percent (Refer to section on Leakages). In terms of dependence on PDS grains, Bihar, Uttar Pradesh, Maharashtra, Odisha, Jharkhand, Madhya Pradesh and West Bengal emerged as lesser dependent on the PDS (less than 18 percent of their monthly grain consumption is met through PDS) . States where the bulk of household consumption (NSSO) is already sourced from non-PDS sources or open market are better suited for DBT food as beneficiaries are already accustomed to purchasing from the open market.

   Lastly, the degree of PDS reforms matter in determining a states' readiness. For states where the FPS is automated and have achieved other aspects of the nine-point action plan and there is greater reliance on PDS for consumption, implementation and strengthening of APDS would be more desired in the short run.

   For many states with high grain leakages and lesser dependence on PDS we did not recommend immediate DBT rollout because these states scored low in Parameter one, i.e. they have high rates of poverty and malnutrition (as you will see in the following paragraphs).

Apart from the PDS performance, the readiness of a state's banking infrastructure is critical for success of DBT in food.

3. Banking Infrastructure and Financial Inclusion:

- *Bank Infrastructure*: Availability of a sufficient number of bank branches, ATMs and business correspondents (BCs) is critical to the success of implementing DBT in food. Experiences of Puducherry and Chandigarh and of other reviewed schemes underscore its importance. In order to evaluate and compare this aspect, we estimate a ratio between the total number of bank branches, ATMs, Post offices and BCs in a state with its population[30]. This gives us an estimate of the number of banking access points a state has per hundred thousand people (Figure 8). The banking density of the country is about 48 branches per hundred thousand people. While Goa is at the top with a banking density of 140 for Goa, Bihar is at the end of the spectrum with a banking density ratio of 30, meaning that there are about 30 banking access points for every lakh people in Bihar.

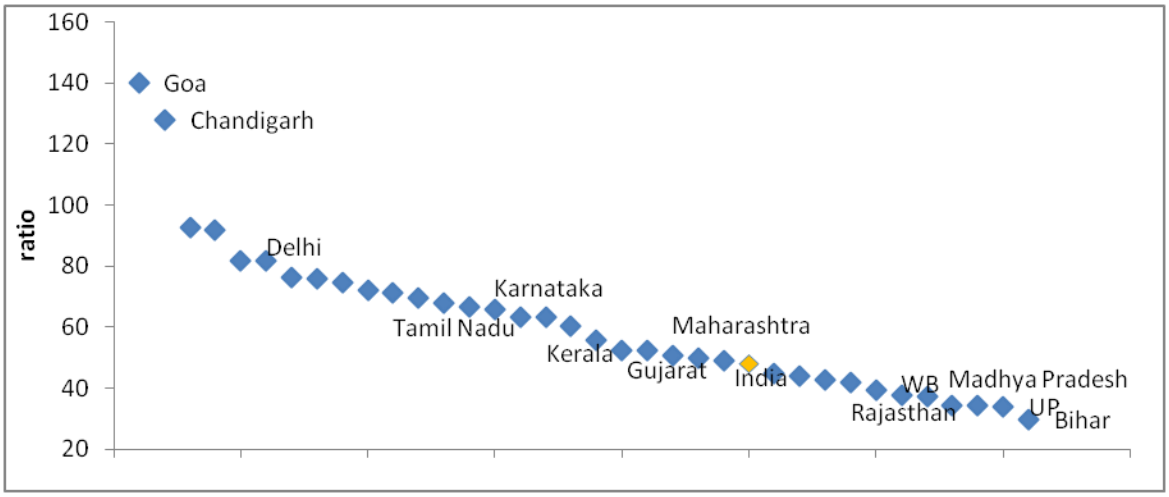

Figure 8: State-wise Banking Density per 100,000 people (as on March, 2017)

Source: RBI; India Post; Census 2011
Note: The densities in the above figure have been estimated relative to state population totals for Census 2011.

This is however an overestimation, since data on Bank Branches, ATMs, BCs and Post Offices is for the current period (2017) and the population total used to estimate the bank densities if from 2011 (Census). In order to get a more recent picture, we have also calculated the same densities using population totals for each state projected for 2016 (using decadal growth rate for populations between 2001 and 2011). As and when we discuss this aspect for different states subsequently in this analysis, we will refer to both.

It must also be noted here that our estimates may differ with banking density computed in the Economic Survey 2016-17. For example, estimates of banking density

[30] The data is taken from RBI, India Post, and Census 2011.

for Himachal Pradesh in this paper show a far more optimistic picture than that seen in the Economic Survey. The disparity is likely due to differences in methodology, definitions and the kind of banking institutions included.

- *Financial Inclusion:* Having active bank[31] accounts is a good indication of *access to banking services*. In addition, the level of seeding of these bank accounts with Aadhaar is an important indicator for success of DBT. Therefore, we look at the number of active bank accounts as a share of the total population in the state/UT, the average number of active accounts per household and the level of seeding of these bank accounts with Aadhaar.

Apart from these parameters, we also looked at the extent of mobile penetration in a state.

Strategy for implementing DBT – results of state-readiness criteria

Based on the performance of each state on the above three criterions, we have developed a 4-phase strategy for implementing DBT food in the country. By 2022, i.e. within the next four and half years, we are recommending completion of the DBT-food transition process. Each phase is in succession and it specifies the time by which the states listed in it have to implement DBT food. States within each Phase are identified based on their performance on the three parameters. Sates/UTs in the first phase are recommended for an immediate rollout of DBT food and for ones in the last phase, we recommend a time gap so that they get time to strengthen their banking and financial infrastructure and improve on elements they lack, before they transition onto DBT.

For the first three phases, we have segregated states based on their performances on the proposed readiness criteria. However, the last phase comprises of 13 states (Arunachal Pradesh, Assam, HP, J&K, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, A&N Islands and Lakshwadeep) that have been given a special category status by Union Government and the Planning Commission[32]. These 13 states either have low population density, or are geographically located in remote areas, and/or are socio-politically and economically sensitivity areas. A brief review of the performances of states in each phase is given below (See Annexure 5 for information on state performances).

[31] As per RBI (2016) active bank accounts are defined as those which have had at least one customer induced transaction undertaken in the last 12 months. These transactions exclude self generated interests on certain kinds of accounts.

[32] To target the fund flow for balanced growth, the Central Government and Planning commission has identified 13 states/UTs as being in the 'special category'. These states/UTs have common characteristics such as strategic location along national boundaries, hilly terrains, low population density, sizable share of tribal population, economic and infrastructural backwardness that necessitate awarding a special category status. These 13 states are: Arunachal Pradesh, Assam, HP, J&K, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, A&N Islands and Lakshwadeep.

The details are given below[33]:

Phase 1: DBT Food Implementation by 2018

We start the transition to DBT food with five urban states/UTs of India- Delhi, Daman and Diu, Goa, Puducherry, Chandigarh, Lakshwadeep and Mizoram and 1 rural state i.e. Punjab. It may be noted that DBT food has already been rolled-out in Chandigarh and Puducherry nevertheless we present it here, as results from our analysis reconfirm that the two UTs are infact ready for this transition and so are the rest three.

The six states have better banking infrastructure, higher literacy levels, and higher mobile penetration rates compared to the country as a whole.

All the five urban states have low levels of poverty (<10 percent) with Chandigarh being the only exception (22 percent). They together account for only over 5 percent of India's poor population. Literacy levels in these states are relatively high with the total literacy rate being over 80% for all states, and female literacy rate over 75 percent. The prevalence of malnutrition (measured in terms of underweight and stunted children) is also below 30 percent for all states (except in the case of Delhi where the share of stunted children is little above 30 percent).

While analyzing the efficiency of existing PDS in these five states, it is observed that all have high leakages (>50 percent). Consumers' dependence on PDS for meeting their total consumption needs of rice and wheat is also low, with four of the five states (except Puducherry) relying on the PDS for less than 30 percent of their total rice and wheat consumption needs. Puducherry's higher dependence on the PDS for consumption is largely explained by its local rice scheme (PDS extension) distributing locally-preferred rice. Other states also offer extensions by way of lower issue prices; however, this hasn't really affected their consumption reliance on PDS.

These five states/UTs also perform the best, compared to all other states, in terms of banking infrastructure in the country. On an average, the total number of bank branches, ATMs, BCs, or Post Offices available per hundred thousand people is 101 (92) [34]. Of these Chandigarh (where DBT for food is currently) in operation and Goa the banking infrastructure is over 100 branches per hundred thousand (for both 2011 and 2016 populations). In terms of financial inclusion, the number of active bank accounts in all five states/UTs exceeds the total state population, implying multiple bank accounts in each household. Both Chandigarh and Goa are again the best performers with the number of active bank accounts being 1.5 times of their respective populations. However, the share of these bank accounts seeded to Aadhaar is low.

[33] See annexure 3 for complete data

[34] Figures in brackets refer to banking densities using projected population for 2016. We present banking densities in similar fashion in other phases also

The average level of seeding is 73 percent in these five states/UTs. In addition, these states/UTs have a strong presence of mobile phones with nearly the entire population of these states having access to one.

In case of Punjab, despite being mostly rural, its poverty ratio is very low (below 10%) and its share in India's total poor population is negligible and being the food bowl of India, not surprisingly has a low incidence of malnutrition too. The level of PDS leakage is high and they average consumer depends on PDS for meeting only about 9 percent of his monthly rice and wheat consumption needs. Its banking infrastructure is comparable to that in the urban states identified for this phase, and it has a high level of Aadhaar seeding of both bank accounts and ration cards (80 and 97 percent respectively). We thus recommend Punjab, along with Delhi, Daman and Diu, Goa, Puducherry and Chandigarh for immediate implementation of DBT for food.

Phase 2: DBT Food Implementation by 2019

Phase 2 states are Haryana, Tamil Nadu, Andhra Pradesh, Telangana, Karnataka and Kerala. They have the necessary infrastructure at comparable or slightly lower levels than states in the first phase. They have low poverty ratios (<20 percent) and account for about 13 percent of India's poor. Compared to the Phase 1 states, literacy levels in these states are lower (except for Tamil Nadu, which has similar levels of literacy as Punjab) and incidence of malnutrition is higher, with the share of underweight and stunted children lying between 30 and 45 percent. Kerala however is an exception. Overall literacy rate and among females are both the highest level in the country and incidence of malnutrition is below 20 percent.

In terms of grain leakages, the performance of these states is much better than the states in the Phase 1. The average leakage rate in these states was about 38 percent (lower than Phase 1 states where leakage was about 67 percent on average). In terms of dependence on the PDS to meet consumption needs, on an average, about one-third of rice and wheat monthly consumption needs in these states were met by the PDS with the remaining being met through the open market. In the case of Tamil Nadu despite implementing large scale extensions to the central PDS and with low grain leakage levels (15.6 percent), surprisingly only half the monthly consumption needs were met through the PDS..

In terms of banking infrastructure, the banking density of these six states is between 60 and 70 (55 and 65), with Tamil Nadu having the highest density at 71 (67) branches per hundred thousand people. The number of active bank accounts in these states is close to 90 percent of their respective population. Of these accounts, 72 percent on an average are seeded to Aadhaar with Andhra Pradesh and Telangana leading with about 82 percent seeding and Karnataka, Kerala and Tamil Nadu are amongst the worst performers with seeding levels of 72, 68 and 63 percent respectively. States in Phase 2 perform relatively well in terms of mobile phone subscription. All states exhibit near or greater than 100 percent share in population

with subscriptions to a mobile service provider. Implementation of DBT after phase 1 is thus most feasible in these states.

Phase 3 – DBT Food Implementation by 2021

We place the remaining eleven states (when 13 vulnerable states are already clustered in Phase 4) Madhya Pradesh, Chhattisgarh, Rajasthan, Jharkhand, Bihar, Odisha, Uttar Pradesh, West Bengal, Maharashtra, Gujarat, and Dadra and Nagar Haveli, in Phase 3. By 2021, if the necessary improvements are undertaken in their financial infrastructures and enough open market grain is made available to all at all times, these states can successfully transition away from PDS to DBT-food.

All states in this phase are characterized by high vulnerabilities as evidenced by their poverty ratios, malnutrition and literacy rates. These states account for 80% of India's poor population with Uttar Pradesh, Bihar and Madhya Pradesh alone accounting for half of that. The level of female literacy, in particular, is extremely poor in states such as Rajasthan, Bihar and Uttar Pradesh with the share of literate females being just over 50%.

Leakages in the PDS of these states is high (>40%) but Chhattisgarh is an exception (only 7.8% leakage) since like Tamil Nadu, this state also has a significantly large PDS extension program. This is also evident from the higher dependence of consumption on PDS (36%), compared to the rest of the states whose reliance on the PDS ranges between 20 and 30%. Most of the states have also initiated PDS reforms by fulfilling objectives under the 9-point action plan and the scheme for computerization, and many have even completed these two schemes.

In terms of banking facilities, there is a high infrastructural deficit. Bihar is clearly the worst performer in terms of bank branches followed closely by Jharkhand, Uttar Pradesh, and West Bengal. In terms of financial inclusion, the distribution of bank accounts to total state population is less than 60 percent with Dadra and Nagar Haveli being the outlier (98 percent). Despite the level of seeding to Aadhaar for states like Rajasthan and Jharkhand is high (>80 percent), the low prevalence of active bank accounts is likely to create severe challenges when implementing DBT. We thus categorize these states in Phase 3 so that they get enough time to create and expand their financial infrastructures

Phase 4: DBT Food Implementation by 2022

In the last Phase, DBT will be rolled-out in the remaining 13 states (Arunachal Pradesh, Assam, HP, J&K, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, A&N Islands and Lakshwadeep). Up until 2022, however, the governments should strengthen and streamline PDS/APDS and simultaneously encourage focused investments for expanding financial infrastructure and ensuring complete Aadhaar seeding of bank accounts and ration cards.

The biggest foreseeable problem that these states will encounter will be while ensuring open market grain availability. The geographically tough terrains, remote districts of hilly areas are generally food-deficit areas and ensuring enough grain in the open market at all times, will require a nuanced planning by the government. State Governments have to empower private trade and the Central Governments should be ready to undertake sale of grains under its OMSS scheme to ensure that enough grain is available in the open market.

Table 4: Summary of the implementation schedule

Phase	States and UTs
Phase 1: DBT Implementation by 2018	Six: Punjab, Delhi, Chandigarh, D&D, Goa, Puducherry
Phase 2: DBT Implementation by 2019	Six: Haryana, Tamil Nadu, Andhra Pradesh, Telangana, Kerala and Karnataka
Phase 3: DBT Implementation by 2021	Eleven: Madhya Pradesh, Chhattisgarh, Rajasthan, Jharkhand, Bihar, Odisha, Uttar Pradesh, West Bengal, Maharashtra, Gujarat, and Dadra and Nagar Haveli
Phase 4: DBT Implementation by 2022	Thirteen: Arunachal Pradesh, Assam, HP, J&K, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand, A&N Islands and Lakshwadeep

It may be noted that certain cities like Lucknow in UP, Chennai in Tamil Nadu, Bangalore in Karnataka, Mumbai in Maharashtra, among others, are more prosperous than their average states or even the states in Phase 1. Thus, even though the complete state is recommended for a later date of DBT food implementation, these cities can be taken up for its immediate implementation.

Two cautionary points are to be raised here -

First, as we have stated before, this analysis of states may not represent the situation in individual districts of a state. For example, even though we have put the state of Punjab in Phase 1, there could be backward districts in Punjab that have bigger clusters of poor people, have scattered or inadequate banking facilities as compared to the more prosperous regions of the states and/or have less grain available in the open market for consumption. While this may discount the analysis and its conclusions, it does not, by any measure, impact the line of thinking that there is a need to acknowledge the socio-economic diversity among Indian states/UTs.

Second, the evaluation of a state using the four criteria above should be looked upon as the first step and not as a final leap that will guarantee successful implementation of DBT.

Successful implementation and the ability to sustain an efficient and effective DBT food in the longer term will be the result of a process rather than a onetime evaluation.

We highlight below some points that we observe to be necessary for ensuring success of DBT food in the longer run:

1. *Ensuring open market grain availability*: When money is given to people to buy grains from the open market, then it becomes the responsibility of concerned authorities (like FCI and other state agencies) to ensure that enough grain is available in the open market. Kozicka, Kalkuhl, and Brockhaus (2017) find that implementation of cash transfer in lieu of the PDS is likely to higher prices of rice and wheat. But more money in system should not push up food prices, in which case the very needy will be the most hurt. Markets vulnerable to fluctuating supplies of goods will leave beneficiaries worse off since the DBT will bring them into the ambit of market forces.

2. *Gearing up the ecosystem in its entirety*: When people get money they demand more of everything, including education and health care (as has been described in previous sections). Unless the government ensures enough medical supplies, vaccination centres, good schools, giving money by itself will not improve the well-being of its recipients. In fact, unless the whole system of public services evolves, diversion of transferred cash into vices is quite possible. .

3. *Redundancies of the PDS paraphernalia*: With DBT food in place, most of the expansive infrastructure around the physical grain procurement, storage, distribution and trade may have to be reorganized and scaled-down. This is certain to have socio-economic and political repercussions. Winding up the existing infrastructure and/or thinking of alternate ways to utilize this strategically located infrastructure will be an important step in this transition from PDS to DBT.

4. *Address missing food-absorption element in the current welfare schemes*: Despite the NFSA explicitly stating the role of the state and Central Government in providing nutritional security, the DBT does not yet attend to this aspect[35]. It has been shown that linkages with health and nutrition schemes/initiatives are significant in improving child nutrition and women's health[36]. Thus, the current perverse levels of malnutrition will need more than rice and wheat to address and a cash amount transferred to support rice and wheat open market purchases may not be enough to address the issue. The government should think of ways to improve the cash transfer amount so that the recipients are able to afford a diversified consumption basket.

[35] Section 31, Chapter 12, National Food Security Act (2013) http://indiacode.nic.in/acts-in-pdf/202013.pdf

[36] https://blogs.unicef.org/evidence-for-action/cash-transfers-and-improved-child-nutrition-where-did-all-the-impacts-go/

Interestingly, some of our above observations find support in Khera (2014) who highlights them as reasons[37] why DBT food in India would not work and thus there was a need to strengthen PDS. For us, these pointers are first steps that are necessary interventions for successful implementation of DBT-food.

Another point in favour of DBT food is the existing caveat of *force majeure* under the NFSA. According to this caveat, in situations of force majeure (like war, fire, drought, flood, cyclone, and earthquake), where regular supply of food grains/meals is adversely affected, the NFSA legal entitlement does not apply. This means that continuity of grain entitlements in the periods it is needed the most is not assured. The DBT cash system can bypass that issue and the government can even decide to increase that transfer amount during vulnerable times thereby addressing one of the biggest criticism of the NFSA.

We next progress to the way forward that we suggest based on the analysis of the paper and also to the policy recommendations.

[37] As per Khera (2014), five reasons why cash transfers would not work were: (i) expenditure (diversion) of cash on non-food items, (ii) inconsistent or irregular supply of food grains,(iii) costs involved in accessing far away banks, (iv) delays in payments and, (iv) resultant rise in food prices.

Section IV: Way Forward

The wheels have been set in motion to find an alternative to the PDS, a system that has existed for longer than India has been independent, and replace its grain entitlement with a cash transfer under the system of DBT. Despite the evident problems of the PDS and its inefficiencies, which are common knowledge, this move from food to cash will be by far the boldest and most radical move by the government. Given the substantial value that food holds especially in policy discourse on poverty alleviation, this policy will come under heavy public scrutiny. Fear of rocking the sensitive socio-political balance compels states/UTs to retain and strengthen the PDS instead of replacing it with an ICT based DBT system. However, there are compelling arguments, as presented in this paper, on economic and social grounds in favour of substituting the PDS with DBT in food.

Admittedly, not all states currently have the capacity to introduce such a system immediately. With the number of people living below the poverty line still at high levels, the need for providing food is understandable in some areas where its incidence is the highest. For the other states however, replacing PDS rations with a food subsidy could be a socially, economically and fiscally wise decision.

Shifting all in-kind welfare schemes to cash in the long term will enable the convergence of all benefits under different schemes into one consolidated amount for the beneficiary. The advantage being that while each component of the 'consolidated grant' is intended for a specific purpose, beneficiaries, in reality, are free to use it as per their needs. The administrative synergies of running multiple transfers through the same agency and using the same beneficiary database would create a positive externality with immense benefits from consolidating and analyzing data on transfers. Eventually this cash transfer system can become a consolidated income support program for the poor and eliminate multiple sources of subsidy. Such a cash transfer system can become an important part of the country's social safety net system.

Apart from this, a cash transfer also removes the unwanted 'paternalism' by the state and encourages beneficiaries to be determinants of their own consumption needs. Many commentators point towards the vices like increased consumption of alcohol that such 'unconditional' cash could trigger, particularly in the hands of men. However, from the review of both national and international experiences, we found little evidence of such behaviour.

From the perspective of the government, transferring benefits in the form of cash directly into the accounts of beneficiaries identified through Aadhaar has unique advantages. Firstly, the State Government can track the flow of benefits to each beneficiary on a real-time basis. Secondly, the process of identifying the ineligible beneficiaries is easier through this system.

However, even the DBT is fraught with challenges and it remains to be seen if the government's pro-active engagement with digitisation continues for next couple of years. The sustainability of the DBT is dependent on how deep technology based products and solutions are integrated into the system and how inclusive these solutions are of the poorest and the most illiterate citizens of the country. Services such as mobile wallets and payment banks attempt to bypass the problems associated with the costly brick and mortar-banking infrastructure. However, the demonetization drive in 2016 revealed the limited outreach that these products have. Ensuring last mile delivery of benefits under DBT requires further initiatives to be taken by the government in confluence with private players to improve ease of use and access to financial technology.

Another related aspect is use of Aadhaar for identifying and disbursing benefits under welfare schemes. Despite controversy surrounding it, Aadhaar is best placed for the true and unique verification of beneficiaries. The rapid pace at which the Government has enrolled people (especially those living in the rural parts) into this program has made it credible Having a database with just the Aadhaar card information is sufficient to identify every recipient of scheme separately (subsuming the multitude of cards and documents that exist today for identification under various schemes). However, despite the success of Aadhaar together with its legal backing, India is still in the initial stages of creating a 'master database' with information on all its citizens. To create such a master database, different databases such as Aadhaar, the National Population Registry, and the Socio-Economic Caste Census (SECC) must be merged. In addition, the SECC also needs to be updated more frequently (say every 5 years instead of the current 10 years) to truly assess the socio-economic progress being made by the poor. The PFMS is a step in the right direction. All this also requires measures to ensure security and safety of information contained in this database. DBT in the future thus requires investment and monitoring not just in the merger and consolidation of data but also for retaining privacy and protection of an individual's personal information.

There is an undisputed need for the political and economic thinking behind DBT-food to evolve to consider creation of a wider system of welfare that creates a social-safety net for the vulnerable, DBT food is just the first step. It will provide a compelling platform to the government for creation of a wider social safety system.

Based on our analysis, we present below a summary of main policy recommendations for implementing ICT-based solutions for streamlining India's food subsidy bills.

Policy Recommendations

<u>For the DBT-Food</u>

I. Revamp infrastructure

- *Ensure open market grain availability*: Centre and the states need to ensure adequate availability of food grains in the open market. While states that are net producers will find this easier, the states that do not produce enough surpluses and are in net deficit will need to initiate efforts to maintain a consistent supply of food grains. For this, the private supplies have to be made more reliable and widely distributed. FCI and State Governments have created storage capacity to hold stock equivalent to three months' PDS requirement in most districts. It will be prudent to transport food grains to the food deficit districts and undertake OMSS operations in selected vulnerable areas to maintain sufficient supply of wheat and rice in the open market. There are some districts in eastern states, especially in NE region, where storage capacity is still shorter than three months requirement. The State Governments of these states should urgently create storage capacity in these districts so that supply is maintained and OMSS can be continuously undertaken.
- *Transform (winding-up or revamping) fair price shops*: This will be a major challenge, and efforts will be needed to accommodate the existing FPS network of over 5 lakh ration shops, possibly in other vocations. Business models that allow FPS to be converted into general stores can be looked into and the role of the private retail sector can be explored. In both Rajasthan and Madhya Pradesh, such models have been adopted. In the case of Rajasthan, FPSs have tied up with a retail enterprise, the *Future Group*, to sell products apart from rice, wheat and other commodities sold under the PDS. The agreement has been structured to benefit both the FPS dealer and the consumer (who can be non-beneficiaries also). Evaluation of the scheme so far has shows that 20 percent of all FPS in Rajasthan have been integrated into the scheme[38]. FPS dealers under the scheme have received additional income between INR 5,000-10,000 due to the expansion of the number of commodities sold (Agarwal 2017).
- *Promote inclusive financial integration*: Simultaneous efforts are required to increase the number of bank branches, ATMs and BCs. There is also a need to include cooperative banks and even large PACS (which currently are not part of the core banking system). These smaller cooperatives/banks have a better outreach in certain areas where accessing payments will become easier if they also become part of DBT. Integration of India Post into the DBT payment channel is a step in the right direction. Given its wide access and outreach across the country, the postal network can give a thrust to the system. The cause of expanding the banking network is further supported by the RBI's decision to allow India Post and private enterprises (e.g. Airtel and Paytm) to set up payments banks that can further improve the delivery channel of food

[38] FPS have been selected based on fulfilling certain basic conditions regarding ownership of FPS, minimum area of the shop, and location.

subsidy through DBT. In addition, the RBI has also shifted to on-tap licensing creating the scope for smaller institutions to open banks in future (RBI, 2016); Digital initiatives such as BHIM, UPI are steps in the right direction but it is only over time that they will be able to gain the stakeholder's trust enough to ease the common man's reliance on banks;

- *Continuous drive to promote financial literacy*: The challenge of last-mile connectivity is not just related to the supply side but also to the demand side. Even with sufficient bank branches, ATMs, and BCs, there is still a lack of demand from the consumers (i.e. beneficiaries) for using these services. This is partly due to the low level of financial literacy and lack of awareness and knowledge about the benefits of formally engaging with the banking system and thus there is a need to aggressively promote financial literacy/awareness among all;
- *Encourage innovations in payment channels:* Apart from vertical expansion of the banking network, we also recommend horizontal expansion of payment channels. More agencies that are not necessarily financial institutions should be granted the opportunity to become point of withdrawal for beneficiaries. One channel that can be realistically explored is mobile money, given the large penetration of mobile phones in India. Adopting a model similar to Kenya's m-PESA, can benefit a large number of beneficiaries who for various reasons may not necessarily have access to institutional banking services;
- *Stable IT connectivity:* Existing levels of IT connectivity, though improving each day, has a long way to go. Reliable IT connectivity at all times is an essential criteria for a State or parts of it to switch to DBT or even to draw full benefits of the PDS reforms. Unless there is a deeper penetration of telecom (especially cellular) services across the country, especially in rural, remote and hilly/ desert/forested areas where the poorest and marginalised live, PDS reforms or DBT can never be complete. Thus, reliable connectivity is the linchpin of these reforms in PDS;
- *Create a grievance redressal mechanism:* An effective and responsive grievance redressal mechanism should be established for beneficiaries to register their complaints and queries. States should ensure that toll-free numbers exist and that they are well-advertised.

II. Scaling down of existing grain procurement operations:

With DBT food, the existing system of procurement of food grains by the government will need to be sequentially modified. Excessive focus on rice and wheat and on selected states for its procurement, PDS had overtime adversely affected the ecological balance, for example in several rice producing areas in north-west India. Diversification to other crops

will have to be undertaken on a sustained and planned basis. In order to prevent any setback to farmers, the Centre and states should together work towards:

- *Hedging farmers' market risks*: The Centre and states should together work towards creating and facilitating deep and wide alternative markets for farmers to sell their surplus. The Central Government has already taken a step in the right direction with the launch of National Agricultural Markets (e-NAM), an electronic portal that has the potential to connect farmers to distant agricultural markets across the country. With uniform taxation across country with Goods and Services' Tax (GST), eNAM should get a thrust going forward;
    - *Provision of an unconditional cash transfer to the farmer:* With DBT in food, the government may also consider, in the longer run, substituting the existing input subsidy support (including fertiliser subsidy) and output price support to farmers with a cash transfer made directly into the farmers' bank accounts. China provides budgetary support to its farmers on both the input and output side. On the input side, in particular, the budgetary support is given in the form of one payment under the head "agriculture support and payment protection". This payment includes direct payment to grain producers, compensation for any increase in price of agricultural inputs, particularly fertilizer and fuel, and subsidies for improved seeds and for purchases of agricultural machinery (OECD 2017). India too can introduce such a cash transfer that can be delinked from actual production levels. Such transfer can also be in the form of deficiency payments where farmers are compensated for the market price-risks. But integrity of price discovery in the markets is essential for any such system of deficiency payments and it can only be explored after ensuring accurate and timely capture of prevailing market prices in Mandis through online data entry in e-NAM portal which will have to be linked to Agmark price portal;.
- *Encourage agriculture financial commodity markets*: In order to make agriculture markets efficient, there is an almost simultaneous need to encourage deep and wide agri-financial markets. Integrating e-NAM with financial markets can help give former the right pivot making the system deeper and thus more efficient;

III. Investments and incentives

- *Correct Price Incentives*: By creating and facilitating deep and wide markets and ensuring right price incentives, the government can encourage production of high value goods such as fruits, vegetables, milk, fish, eggs and meat. These are likely to be demanded increasingly by a growing set of income secure consumers. Substantial investment along the entire value-chains for perishables is pivotal to shield both

farmers and consumers from existing price volatility that is exacerbated by the long chain of intermediaries ;

- *Financial Sector Reforms*:
  - Financial Inclusion: To give thrust to the financial inclusion drive under the PMJDY, additional efforts by state and UT governments and agencies should be made. For example, they can include assistance from civil society groups involved in an area to ensure that all BPL and AAY households in their respective states have bank accounts. In addition, information sessions should be set up to educate consumers about the basic features of banking such interest rates, how to operate ATMs, benefits of saving in a bank, etc.
  - The state and UT government's should ensure that all bank accounts be integrated with the Core Banking System (CBS), as failing to do that will delete the beneficiary account details from the list of beneficiaries;
- *Investment in awareness campaigns and camps*:
  - Awareness about the DBT scheme and benefits: As the success of cash transfer schemes is dependent on public consensus, it is essential that states implementing the DBT ensure that aggressive efforts are made to spread awareness about the scheme and its benefits. Information campaigns, registration camps, etc., should be set up to inform people about their entitlements, the usage of these benefits, and the pre-requisites. Learning from Swachh Bharat Mission may be used to plan and execute the campaign for information dissemination on DBT of food subsidy. To ensure inclusion of all the eligible households, these camps must facilitate the completion of the pre-requisites (such opening of bank accounts and its seeding).
  - In order to avoid diversion of the transferred cash towards vices, government has to ensure that the entire economic system grows up to meet the increasing demand that will result from greater disposable incomes in the hands of a household. In particular, there is a need to ensure commensurate increased and stable supply of food, education and healthcare services.
  - Awareness about nutrition and health: Given the NFSA's focus on nutrition, both the states and Central Governments must educate beneficiaries about nutritional intake, and foods and habits that are healthy and are needed especially for infants, children and mothers;
  - Awareness about the aadhaar-seeding of bank accounts, integration of the mobile numbers with the banking system has to be regularly shared with the beneficiaries;

IV. Leadership and political will: Political motivation in the States to implement the DBT or reforms in the PDS is a vital factor determining the future of any reform process. While Rajasthan in the recent past has rapidly improved its PDS, others like Telengana who despite being at par with Andhra Pradesh (and way ahead of many others) at the time of bifurcation of the State of Andhra Pradesh, is today slow in even introducing many of the necessary progressive steps. Therefore, leadership and strong political will at the very top of the State government is most vital for undertaking PDS and DBT reforms. While most state governments are determined, the speed and close monitoring is a feature, which can vary with their resolve.

V. Adequacy of benefit

This is among the most crucial aspects of DBT food and unless the "adequacy' is ensured and delivered the whole ambition of DBT will collapse.

From our analysis in the preceding sections we found that the government's current formula i.e. 1.25*MSP – CIP has not helped beneficiaries in Chandigarh and Puducherry to fully sustain their pre-DBT consumption levels. This is attributable to the market price differential between the retail prices of rice and wheat and food subsidy paid to the beneficiaries.

In view of this, the following alternative formulas for calculating the food subsidy amount are available to Government:

1. Substitute MSP with Economic Cost: Calculate the food subsidy at full economic cost of the commodity (which is round 40-50% over the MSP) i.e. let Subsidy = 1.4 (or 1.5)*MSP – CIP
2. Instead of using MSP, the subsidy can be calculated at retail prices of the commodity i.e. Subsidy = Retail Price – CIP. This retail price could be a quarterly average prevailing price in selected markets nationally. Despite this being a favoured method, we foresee two problems immediately in its implementation:
    - Prices in south Indian states are generally, on an average, higher, than the prices in north India. By averaging prices throughout India, we may be supporting consumers in one region more than in other region;
    - There is a possibility of rigging of prices by traders and/or mandis in APMCs and thus efficiencies of markets and accuracy and timeliness of price data will have to be ensured by the state and Central Governments;
3. An alternative to the 'retail formula' is to index the food subsidy with the Consumer Food Price Index (CFPI) or to Consumer Price Index-Agricultural Labourers;

4. Finally, following SEWA's (2015) computation of benefits, the size of the cash benefit transferred under the DBT can instead be treated as a 'basic income' and instead of relying on prices of select commodities; it can be computed at the official poverty line.

   According to us, the most practical and feasible solution is given in Alternative 1. If the MSP is substituted with Economic cost, the problems of "inadequacy" of the food subsidy transfer amount may be resolved. The government can expect to save the difference between economic cost (i.e. cost incurred under PDS) and food subsidy transferred under DBT. Due to this suggestion, part of saving that was likely to result from DBT-food is likely to reduce and/or vanish. However, we should remember two things:

   - Primary objective of any welfare policy is betterment and welfare of the beneficiaries: through DBT we are just trying to find a better way to deliver to the beneficiaries and even if it costs the same (as under PDS) to the system but the delivery is better and targeted, the resources can still be counted as spent better;
   - Even if Option 1 reduces savings, the government will still save on the distribution cost incurred by State Governments e.g. states will save on their handling, internal freight costs, costs resulting from storage and transport losses , leakages and pilferages.

   One point of caution: it is not one-shot in arm solution that by increasing the food subsidy amount the government can alleviate the problem of malnutrition and poverty. In fact, an increase in the food subsidy amount will need to be accompanied by aggressive measures to improve the banking infrastructure, financial literacy, create awareness among the beneficiaries and address problems of exclusion and inclusion errors. In fact an entire ecosystem encouraging better economic and physical access and absorption of food by all, needs to be come up almost simultaneously.

Besides implementing these reforms, the government also has to undertake simultaneous fiscal and labour market reforms to address the longer run problems associated with an unconditional cash transfer. As stated before, in the longer run, such an unconditional cash transfer may lead to perpetuation of informality in labour markets, slowdown of re-allocation of labour across sectors, and hampered economic transformation (Birner and von Braun 2015, Woolard and Leibbrandt 2010 and Levy 2008). Therefore, it becomes crucial that the list of beneficiaries under the scheme should be periodically reviewed so that only the real needy got the benefits in the longer run. There is also a need to ensure a continuous assessment of impacts of this transfer on social and economic interaction of the beneficiaries. Besides this, the government has to encourage formalization of labour and create more employment as that is the best way to deliver inclusive and sustainable development in a country.

Policy Recommendations for APDS

In the short to medium run, for states in Phase 2, 3 and 4, we recommend that they continuously reform their PDS machinery and simultaneously work towards strengthening the infrastructure for implementing DBT (on lines as mentioned in the prior section). For reforming PDS, the following recommendations are made below. These recommendations are clearly viewed as creating the groundwork for eventually introducing DBT-food:

1. *Review of AAY and BPL lists*: Regular review will help address the existing inclusion (including the ineligible) and exclusion (excluding the real needy) errors. PDS or DBT, this element is a crucial aspect of the scheme. The nine-point action plan though has been completed by nearly all states, progress on them needs to be regularly monitored;
2. *Ensure continuous electricity supply and internet connectivity*: As the APDS's main advantage is real-time verification of beneficiaries, reliable internet connectivity and fewer power outages would be desirable;
3. *Biometric authentication* should not just be restricted to finger prints: States may follow successful examples like that of Andhra Pradesh who has adopted iris scans and one-time passwords sent as SMS to the registered mobile phone number as alternatives if authentication through fingerprinting fails.
    a. For beneficiaries without Aadhaar, or for those whose details have not been registered in the cloud-based system, provision for on-the-spot registration at the closest Fair Price shop is recommended. This would enable beneficiaries to self-select for the scheme.

We believe that modernization of the TPDS machinery through the APDS should be mandatory. However, some states can use the improved system to shift to DBT in food immediately. While others especially the 'special category' states (ones located along international boundaries, with a hilly terrain, with low population density, a sizable share of tribal population, or which are economically and infrastructural backward) should continue to maintain and strengthen their APDS operations and delivery in the short to medium run. In the longer run, however, they should shift to DBT food.

Overall, DBT has the potential to make way for a system of social security or universal basic income, a special income support provided to each and every citizen whose size can be adjusted to their needs and vulnerability. Although the concept of basic income is still at its infancy even in the most developed countries, the path to creating such a system has to be through the DBT. Notwithstanding initial problems in implementation and the problems of labour markets that DBT may trigger, a cash transfer systems has become a potent tool in the government's armoury of social welfare. As the country transitions from its low income

position to becoming the world's fastest growing economy in a few years, a cash transfer system delivering a social security transfer to all can promote a growth process that is inclusive, efficient and sustainable.

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Annexure 1: International and National Cash Transfer Schemes

International Cash Transfer Schemes

Country	Year	Modalities	Impact
Brazil: Bolsa Familia	2003	• Covers 25% of total population • Eligible beneficiaries below income level of $60 and further identified through Household surveys • Size of transfer – R$15-95 • Access payments through banks, lottery offices, retail stores using debit card • Conditions – Minimum 85% attendance and compulsory attending of health checkups for women and children • Cost of scheme – 0.5% of GDP	• 80% of benefits went to identified beneficiaries • Decline in households that are food inadequate • Decrease in Brazil's GINI coefficient • Decrease in number of children malnourished • Increase in food consumption • Over 60% transactions made through non-bank agencies
Mexico: Oportunidades	1997	• Focus on geographically poor regions. Households identified in these regions using marginal index • Covers 20% of total Population • Cost of scheme – 0.4% of GDP • Size of transfer – 235 pesos (average) • Payments made bimonthly • Benefits can be withdrawn from bank branches and authorized non-financial agencies • Conditions – Minimum attendance requirement and mandatory health check ups	• 60% of benefits went to poorest 20% of the population • 12% decrease in incidence of illnesses • Increase in enrollment of children into schools and reduction in dropout rates • 15% increase in consumption (especially for food) • Increase in likelihood of women deciding on how benefits to be spent
Bangladesh: Shombhob (Pilot)	2012	• Households identified using PMT score • Size of transfer – BDT 400 for households with infants or primary school going children, BDT 800 households with both • Payment through electronic payment system devised by Bangladesh Post • Conditions – Growth monitoring of children, nutrition sessions to be attended by mothers, and 80% attendance in schools	• Increase in consumption especially for food • Dietary diversity • Increased expenditure on protein
Indonesia: Program Keluarga Harapan (PKH)	2007	• Beneficiaries identified as those 80% below poverty line • Unified database containing information on beneficiaries created for scheme • Size of transfer – USD 187 paid monthly	• Reduction in nutritional deficiency • Increase in school attendance • Increase in monthly per capita expenditure on health and education • Stronger impact among beneficiaries in urban areas • 10% increase in average monthly consumption

		• Benefits transferred through Post office	• Benefits used to pay off debts by some beneficiaries
Kenya: GiveDirectly UCT (Pilot)	2011	• Focus on poor households in the most vulnerable geographical areas • Size of Transfer - $32 • Benefits paid monthly or lump sum (for nine months) • Benefits equivalent to 33% of household expenditure • Payment made through MPESA (Mobile platform) • Recipient of benefits either male or female •	• Benefit used on building household assets, food, healthcare, education and social expenses • Increase in total consumption by 20% • 32% decrease in hunger • 42% decrease in the number of days children go hungry
Pakistan: Benazir Income Support Program	2008	• Beneficiaries identified using PMT score • Beneficiary information collected and stored in single registry called National Database Registration Authority • Each beneficiary given unique identification number • Coverage – 3% of population • Cost of scheme – PKR 70 Billion • Size of transfer – PKR 3000 paid quarterly • Payment made directly to bank accounts, Post offices and in some cases by cheque • Government now piloting biometric ATMs and mobile money transfer	• 95% of benefits spent on daily consumption requirements (such as food) • Linked with education and health through introduction of co-responsibilities

Domestic cash transfer schemes

State	Year	Modalities	Impact
Delhi: Annashree Yojana	2012	• Beneficiaries identified through household survey and those excluded from TPDS • Eventually eligibility criteria changed to households with income less than INR 1 lakh (per annum) • Size of transfer – INR 600 • Payment made directly to bank account in the name of female head	• Increase in food consumption • Dietary diversity • Women empowered to make decisions on consumption expenditure

		• Reliance on BCs for withdrawal • Bank accounts have to necessarily be aadhaar seeded • Large information campaigns about the scheme and its benefits conducted prior to enacting scheme	
SEWA Delhi (Pilot)	2011	• BPL households randomly selected • Size of transfer – INR 1000 • Payment made directly to bank account in the name of female head • SEWA facilitated opening of accounts for women without accounts • Beneficiaries barred from purchasing food grain at FPS	• Significant increase in consumption of non-cereal foods such as milk, eggs, fruits and vegetables • No significant increase in consumption of alcohol and tobacco
SEWA Madhya Pradesh Rural and Tribal (Pilot)	2010	• Two pilots conducted in sample of non-tribal and tribal villages • Size of transfer – INR 300 per adult and INR 150 per child • Payment made directly into bank accounts • Information campaigns conducted prior to pilot study to spread awareness on study • Beneficiaries allowed to purchase food grains from FPS	• Increase consumption of eggs, fruits and vegetables • Many beneficiaries paid off debt • Cash spent on repairing household dwellings, improving drinking water sources etc. • Some part of benefits saved in bank accounts

Annexure 2: Tables for NFSA/TPDS in Puducherry and Chandigarh

Table 1: Highlights of TPDS and NFSA in Chandigarh and Puducherry*

TPDS and NFSA	**TPDS**		**NFSA***
	Puducherry	**Chandigarh**	**Chandigarh (2014-15)**
Entitlement (Kg/HH/Month)			
AAY	35	35	35
BPL	25	35	5 (per member)
APL	15	35	-
Issue Price at FPS (INR/Kg)			
APL Rice	Free	8.5	-
BPL Rice	Free	6.15	3
AAY Rice	Free	3	3
APL Wheat	Free	7	
BPL Wheat	Free	4.65	2
AAY Wheat	-	-	2
Total Beneficiaries (Million)	0.67	0.35	0.24**
Total Population (Million)**	1.25	1.1	1.1
Coverage (%)	**54**	**32**	**23**

Source: Puducherry and Chandigarh Dept. Of Civil Supplies, Census 2001, Food Bulletin
*after implementing NFSA, Puducherry directly shifted to DBT in 2015
**Excludes APL card holders receiving tide over allocation

Annexure 3: Evaluation of States for readiness

Table 2A: Demographic and PDS Indicators

State	Poverty Ratio (%)	Share in India's Poor (%)	Literacy Rate (%)	Literacy Rate - Female (%)	Underweight (%)	Stunting (%)	PDS Extension? (Y/N)	PDS Leakages (%)	PDS Consumption (%)
Phase 1									
Chandigarh	21.81	0.09	86	82	24.5	28.7	No	73.49	11.24
Daman & Diu	9.86	0.01	80	79	26.7	23.4	Yes	92.83	2.00
Delhi	9.91	0.63	84	81	27	32.3	No	83.62	7.78
Goa	5.09	0.03	81	77	23.8	20.1	Yes	56.13	25.53
Puducherry	9.69	0.05	83	76	22.6	23.7	Yes	59.74	37.52
Punjab	8.26	0.86	74	69	21.6	25.7	Yes	61.33	8.58
Phase 2									
Andhra Pradesh*	9.2	2.92	63	55	31.9	31.4	Yes	31.35	33.44
Haryana	11.16	1.07	70	63	29.4	34	Yes	55.25	11.61
Karnataka	20.91	4.81	71	65	35.2	36.2	Yes	40.76	37.29
Kerala	7.05	0.89	88	88	16.1	19.7	Yes	41.84	34.39
Tamil Nadu	11.28	3.06	75	69	23.8	27.1	Yes	21.33	49.76
Phase 3									
Bihar	33.74	13.28	60	52	43.9	48.3	No	32.96	18.60
UP	29.43	22.17	63	54	39.5	46.3	Yes	62.93	12.34
Jharkhand	36.96	4.61	64	55	47.8	45.3	Yes	52.32	14.64
Chhattisgarh	39.93	3.86	68	59	37.7	37.6	Yes	8.84	36.34
Madhya Pradesh	31.65	8.68	65	56	42.8	42	Yes	55.56	17.22
WB	19.98	6.86	73	69	31.5	32.5	Yes	69.43	12.23
Rajasthan	14.71	3.81	62	50	36.7	39.1	Yes	66.43	10.60
Maharashtra	17.35	7.34	77	71	36	34.4	Yes	53.80	21.01
Orissa	32.59	5.13	70	63	34.4	34.1	Yes	27.64	27.50
Gujarat	16.63	3.79	73	66	39.3	38.5	Yes	71.43	11.55
D&N Haveli	39.31	0.05	66	59	38.9	41.7	No	55.01	18.13

Source: Planning Commission, NSSO, NFHS – 4, Census 2011, DFPD,

*Refers to erstwhile unified Andhra Pradesh since data for Telangana is not available separately

Table 2B: Bank infrastructure and other aspects

State	Banking Infrastructure (per hundred thousand)[1]	Active Bank accounts (% of Population	% of accounts seeded to Aadhaar	Mobile Phones (as % of Population) [2]	Aadhaar Enrollment (% of Population)[3]	Aadhaar Seeding of Ration Card (%)[4]
Phase 1						
Chandigarh	128 (119)	152.42	73.90	121.86	101	100
Daman & Diu	82 (68)	123.65	79.22	97.10	81	100
Delhi	82 (75)	119.10	68.09	291.87	119	100
Goa	140 (134)	157.31	65.52	109.54	101	89
Puducherry	72 (65)	115.86	77.87	108.41	98	100
Punjab	69 (65)	87.35	80.12	123.26	102	97
Phase 2						
Andhra Pradesh*	66 (55)	92.15	81.57	93.59	97	100
Haryana	63 (58)	86.94	77.48	89.94	104	91
Karnataka	67 (62)	82.20	72.49	105.72	94	100
Kerala	63 (61)	95.97	67.73	112.58	100	98
Tamil Nadu	71 (67)	89.96	62.59	112.95	92	100
Phase 3						
Bihar	30 (27)	48.14	67.31	55.09	82	50
UP	34 (31)	61.22	64.33	74.62	85	75
Jharkhand	34 (31)	60.49	79.80	55.63	98	96
Chhattisgarh	38 (34)	70.60	75.00	64.16	98	97
Madhya Pradesh	37 (34)	66.05	66.82	64.64	95	89
WB	39 (37)	64.18	67.40	88.43	92	62
Rajasthan	43 (39)	60.30	82.14	89.34	89	95
Maharashtra	49 (46)	68.41	70.03	106.54	95	87
Orissa	51 (47.6)	72.11	53.03	75.76	89	86
Gujarat	52 (48.1)	68.77	63.03	107.47	94	100
D&N Haveli	74 (62)	98.12	77.15	96.56	99	94

Source: RBI, TRAI, UIDAI, India Post

[1]Estimated using 2017 estimates for Bank Branches, ATMs, BCs, POs by RBI and India Post and 2011 Census population totals. Figures in brackets are the same figures estimated using instead projected population totals for 2016 (computed using decadal growth rate of population between 2001 and 2011) [2]As on May, 2017; [3]As on May, 2017; [4]As on March, 2017

*Estimates for Andhra Pradesh and Telangana have been combined

Note: Banking Infrastructure, Active Bank accounts and Mobile Phones have been estimated based on population projected for 2016 using final state-wise population totals given by Census 2011