

Technological intervention for improving functioning of Public Distribution System (PDS) in India: issues and concerns

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ABSTRACT

Public Distribution System (PDS) in India is presently the largest distribution network of its kind in the world, aims at providing the food and nutritional requirements at highly subsidized prices. The scheme was revamped and Targeted Public Distribution System (TPDS) was introduced to increase the access of food grains to the poor, improve nutritional standards and attain food security. The National Food Security Act, 2013, marks a shift by making the right to food a justiciable right i.e. the right to food as a legal right rather than a general entitlement. Indian economy has achieved remarkable economic growth along with a decline in poverty; however this has not matched with the improvement in food security, nutritional and hunger status. In the recent Global Hunger Index (GHI, 2017) India's ranking is of "Serious" category and is driven by high child malnutrition. Undernourishment and mortality among children remain alarmingly high. This has raised question mark on functioning of PDS. Since TPDS envisages target food grains entitlements to poor households, the identification of beneficiaries and their classification is crucial to fulfill the goals of the scheme. The National Food Security Act essentially relies on TPDS for identification and distribution of beneficiaries. The research indicates that due to the errors in identification, the entitled beneficiaries are not getting food grains while those who are ineligible are getting undue benefits. In order to plug the leakages the central government has been pushing for technological intervention in terms of Aadhar-based biometric authentication to improve the functioning and reduce leakages in the system. This paper aims to analyze the errors in identification of beneficiaries and how far the technological intervention can help in improving the functioning of system. Given the level of infrastructural and technological depth in rural areas, the paper highlights various issues and concerns that may arise out of the technological intervention.

Keywords: Entitlements, Food Security, Identification, Public Distribution System, Technology

I. INTRODUCTION

The Public Distribution System (PDS) in India was introduced around World War II as a war-time rationing measure and is presently the largest distribution network of its kind in the world. Initially in response to food shortages the PDS was heavily dependent on imports but subsequently government of India set up Agriculture Prices Commission and the Food Corporation of India to improve the procurement and storage of food grains domestically. The major commodities distributed through PDS are wheat, rice, sugar and kerosene. While as the central government bears the responsibility of procurement, storage, transportation and allocation of food grains, the state governments are responsible for distributing the commodities among consumers through an established network of Fair Price Shops. The system was envisaged as a means of providing the food and nutritional requirements at highly subsidized prices. Initially the scheme was universal in distribution of subsidized food but the scheme was criticized for its urban bias and revamped to improve access of food grains to the poor and to people in hilly and inaccessible areas. Subsequently, in 1997, the government launched the Targeted Public Distribution System (TPDS), aimed at improving the nutrition standards and attains food security of poor by providing access to foodgrains at highly subsidized rates. In September 2013, Parliament enacted the National Food Security Act, 2013. The Act marks a shift by making the right to food a justiciable right i.e. the right to food as a legal right rather than a general entitlement. The National Food Security Act essentially relies on TPDS for identification and distribution of beneficiaries. The Table 1 presents the timeline of development of Public Distribution System in India.

Table 1 Time Line of PDS in India

PDS	1940s	Launched as general entitlement scheme
TPDS	1997	PDS was revamped to target poor households
Antyodaya Anna Yojana	2000	Scheme launched to target the „poorest of the poor“

PDS Control Order	2001	Government notified this Order to administer TPDS
PUCL vs. Union of India	2001	Ongoing case in Supreme Court contending that “right to food” is a fundamental right
National Food Security Act	2013	Act to provide legal right to food to the poor

Though there is general agreement that the Indian economy has achieved remarkable economic growth along with a decline in poverty, however this has not matched with the improvement in food security, nutritional and hunger status [1][2]. In the recently released Global Hunger Index (GHI), which ranks countries based on four key indicators- undernourishment, child mortality, child wasting and child stunting, India is ranked 100th out of 119 countries. Among Asian countries only Pakistan (106th) and Afghanistan (107th) are ranked worse than India. In the previous year ranking India stood at 97th position. India’s ranking is of “Serious” category and is driven by high child malnutrition. Undernourishment and mortality among children remain alarmingly high. This report is quite disturbing because India is one of the largest producers of food in the world. Moreover there are a number of issues reflecting puzzling situation. With the rising income there has been decline in cereal consumption (NSSO, 2014).

Table 2: Per capita cereal consumption per month (in kg.)

	1993-94	1999-00	2004-05	2009-10	2011-12
Rural	13.4	12.7	12.1	11.4	11.2
Urban	10.6	10.4	9.9	9.4	9.3

Source: National Sample Survey (2014).

The decline in poverty has not been matched by improvement in nutritional standards [3]. Table 2 presents the per capita cereal consumption per month. Contrary to decline in poverty with rising income levels resulting in purchase of better quality foodgrains from market, there has been an increase in use of PDS. Also with rapid decline in poverty and greater use of PDS it is expected that greater access to subsidized grains will improve the nutritional status of the poor, but most of the studies did not find any correlation between PDS use and decline in malnutrition. In fact there has been only a modest improvement in nutritional status [4]

In this context there is a question mark on functioning of TPDS and there need for improvement in its function and outreach. The National Food Security Act that gives right to food as a “legal right” classifies the population into three categories: excluded (i.e., no entitlement), priority (entitlement), and Antyodaya Anna Yojana (AAY; higher entitlement) is also backed on TPDS for identification and distribution. Therefore it is important to understand the management of food grains, classification and identification of beneficiaries and functioning of TPDS to fulfill its objectives. The research indicates that due to the errors in identification, the entitled beneficiaries are not getting food grains while those who are ineligible are getting undue benefits. In order to plug the leakages the central government has been pushing for technological intervention in terms of Aadhar-based biometric authentication to improve the functioning and reduce leakages in the system. This paper aims to analyze the errors in identification of beneficiaries and how far the technological intervention can help in improving the functioning of system. Given the level of infrastructural and technological depth in rural areas, the paper highlights various issues and concerns that may arise out of the technological intervention.

II.MANAGEMENT OF TARGETED PUBLIC DISTRIBUTION SYSTEM

The management of foodgrains for TPDS can be categorized in following steps: i. procurement, ii. Transportation and Storage iii. Allocation iv. Distribution

The central government procures the foodgrains at Minimum Support Price (MSP) from the farmers. The MSPs for various agricultural commodities are fixed by the central government, based on rates recommended by the Commission for Agricultural Costs and Prices (CACP), is typically is higher than the market price to provide incentive to the farmers for higher production and hedge against the market risk. The Food Corporation of India (FCI) is the nodal agency at the centre that is responsible for procuring grains at the MSP from farmers, maintaining operational and buffer stocks of grains to ensure food security and distributing and transporting grains to the state depots. The centre procures and stores food grains to meet the buffer stock norms for food security, release food grains under TPDS on a monthly basis, meet emergency situations arising out of unexpected crop failures, natural disasters, etc., and sale through the Open Market Sale Scheme (OMSS) to stabilize the prices and supply of grains in the market. While the centre procures food grains at the MSP, the central issue price at which food grains are sold under TPDS, is much lower. The food subsidy is the difference between the costs incurred by the centre on MSP (including additional costs) and the central issue price.

State governments are responsible for transporting food grains from the state godowns to the fair price shops where from the beneficiaries buy their monthly food grains entitlements at subsidized prices. Fair price shops or ration shops form the last mile delivery of the TPDS network. The owners of ration shops are licensed under the PDS (Control) Order, 2001 to sell essential commodities at central issue prices. Ration shops can be owned privately, by co-operative societies or the government. Ration shop owners are issued licenses by state governments and have certain

responsibilities under the scheme. These responsibilities include: (i) sale of commodities as per the entitlement of ration card holders at the retail issue prices fixed by state governments, (ii) maintenance of records and the display of information such as the list of BPL and AAY beneficiaries, entitlements of essential commodities, timings of shops, and (iii) maintenance of records of actual distribution of essential commodities and providing the details of the balance stock at the end of the month to government officials.

1.1. Identification of eligible households under existing TPDS

Since TPDS envisages target food grains entitlements to poor households, the identification and of beneficiaries and their classification is crucial to fulfill the goals of the scheme.

Under TPDS, beneficiaries were divided into two categories

- i. Households below the poverty line or BPL; and
- ii. Households above the poverty line or APL.

The identification and distribution of food grains to BPL consumers is the responsibility of state governments. The state governments identify the eligible BPL households on the basis of inclusion and exclusion criteria evolved by the Ministry of Rural Development and provide them a BPL ration card. The household above the poverty line were not identified and any household could typically apply for an APL ration card. The state governments identify the eligible households based on criteria given in Table 3.

1.2. Antyodaya Anna Yojana (AAY)

The AAY scheme was launched in December 2000 for the poorest among the BPL families. Individuals in the following priority groups are entitled to an AAY card, including: (i) marginal farmers, (ii) slum dwellers (iii) rural artisans/craftsmen such as potters and tanners, (iv) landless agricultural labourers, (v) persons earning their livelihood on a daily basis in the informal sector such as porters, rickshaw pullers, cobblers, (vi) destitute, and (viii) all primitive tribal households.

Eligible beneficiaries are entitled to subsidized food grains

Category	Entitlement of foodgrains (kg/family)
AAY	35 kg
BPL	35 kg
APL	15 - 35 kg

Source: Ministry of Consumer Affairs, Food and Public Distribution; Department of Food and Public Distribution;

Table 3: Identification of the eligible households

	Role	Details
Ministry of Rural Development	Comes out with criteria for inclusion and exclusion from BPL list as part of its BPL Census	Criteria for classification of BPL families, as per BPL Census 2002, include parameters like size of land holding, clothing owned, food security, means of livelihood etc.
Planning Commission	Estimates state-wise poverty, i.e., the number of people below the poverty line	Uses NSSO household expenditure data
Central government	Allocates food grains to each state based on state-wise poverty estimates of Planning Commission and population projections of the Registrar General of India as of March 2000	The number of BPL families has been calculated using 1993-94 poverty estimates by Planning Commission. This number has not been revised despite the release of new poverty estimates by the Planning Commission in 2004-05 and 2011-12
National Sample Survey Organisation	Conducts sample survey of consumer expenditure every five years	Consumer expenditure is the expenditure of a household on some basic goods and services. The expenditure on this basket of goods is the basis for the poverty line

There are several issues in implementation of TPDS but the most important crucial issues that determine the success of the scheme in attaining its objectives are as i. identification of eligible households, ii. The leakage

The targeted PDS (TPDS) was introduced as a measure to increase its efficiency and improve nutritional status of the poor. The new system classified the population as above Poverty Line (APL) and Below Poverty Line (BPL). The BPL is entitled to receive food grains at lower prices through the fair price shops. Studies have shown that targeting mechanisms such as TPDS are errors. Two types of errors originate from the process of identification of beneficiaries:

Error I: Wrong Exclusion- This type of error resulted when households are excluded from the subsidized food grains that otherwise is poor and should have been included as beneficiaries.

Error II: Wrong Inclusion- This type of error occur when households who are not poor and not entitled to receive benefits are included as beneficiaries

Due to the errors in identification the entitled beneficiaries are not getting food grains while those who are ineligible are getting undue benefits. An expert group was set up in 2009 to advise the Ministry of Rural Development on the

methodology for conducting the BPL census. It estimated that about 61% of the eligible population was excluded from the BPL list while 25% of non-poor households were included in the BPL list [6].

As per the IHDS 2004-05 and 2011-12 surveys, using the Tendulkar Committee poverty line based on consumption data, the percentage of the poor came down from 38.4 per cent in 2004-05 to 21.3 per cent in 2011-12, but ironically the proportion of households with AAY or BPL cards had actually increased slightly Fig. 1. Also the proportion of households having AAY/Annapurna/BPL cards is very high as compared to the poverty rates Fig. 2.S

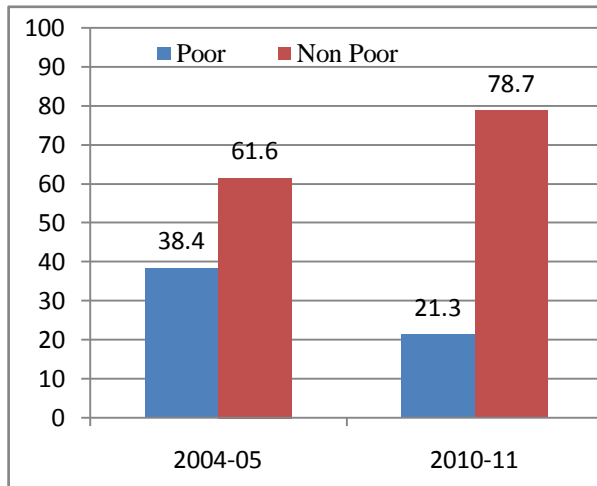


Figure 1 Poverty ratios (in percent)

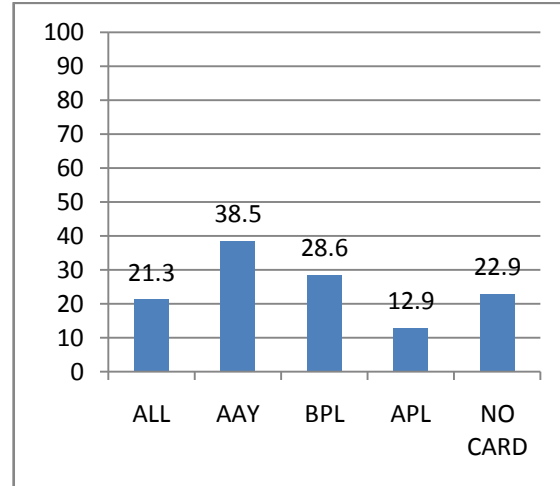


Figure 2 Proportion of poor by card type

The IHDS data (2011), suggests that over two-thirds of the population under the AAY/Annapurna scheme comprised the non-poor while over three-quarters having BPL cards were non-poor. On the other hand, only 13 per cent of the households having APL cardholders were found to be poor. In 2011, On income-based categories of card holders around 54 per cent of the households in the bottom 20 per cent income held AAY/Annapurna and BPL cards, and around 50 percent in next 20 per cent income (second quintile). It is Interesting to note that close to 21 per cent of AAY/Annapurna or BPL cards holders were among the top 20 per cent of the households as per income category. Hence, inclusion errors seem more significant than exclusion errors in the TPDS. The IHDS surveys [5] suggest that the inclusion errors increased from 28.8 per cent in 2004-05 to 37 per cent in 2011-12 whereas the exclusion errors declined from 54.9 percent to 41.4 percent in the given period. . This trend is both due to more households being issued PDS cards and expansion of the AAY category, also the over-identification of the poor under the TPDS in 2011-12. So despite a decline in poverty rates over this period, the non-poor are still identified as beneficiaries Fig. 3.

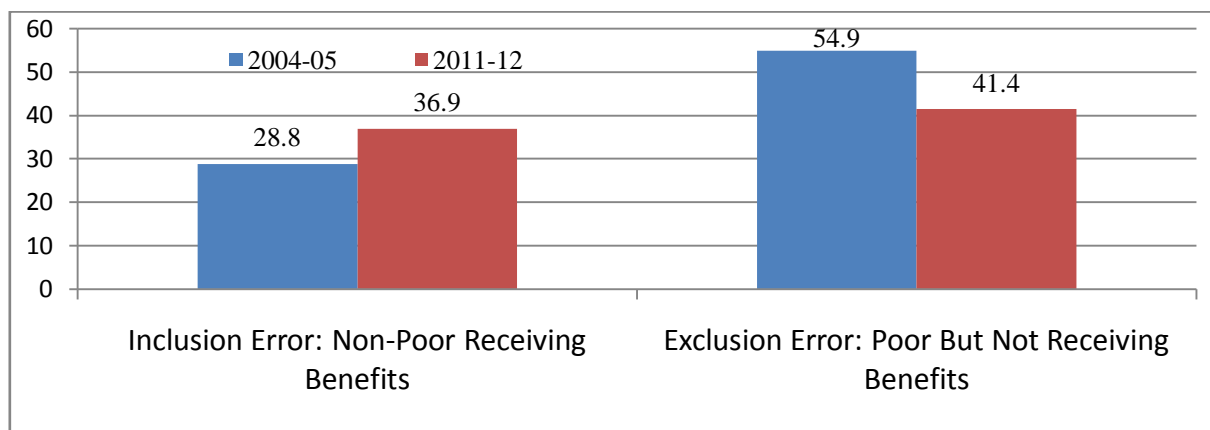


Figure 3: Inclusion and exclusion errors: 2004-05 and 2011-12 (in per cent)

Source: India Human Development Survey (IHDS)

At state level there are varying levels of exclusion (of BPL families). The state-wise variation in inclusion and exclusion errors using three indicators is presented in Table 4. Table 5 presents the categorization of States according to level of exclusion.

Table 4: Distribution of cardholders among Poor and Non-Poor in some states State

State	% of poor with no ration card	% poor with BPL/AAY cards	% non-poor with BPL/AAY cards
Andhra Pradesh	24.1	66.8	50.3
Assam	25.7	23.3	7.6
Bihar	25.5	21.2	12.6

Chhattisgarh	24.1	47.9	29.4
Gujarat	10.9	48.1	24.2
Haryana	4.4	32.6	15.2
Himachal Pradesh	3.3	45.1	13.7
Jammu & Kashmir	7.9	55.1	17.2
Jharkhand	22.1	31.9	17.0
Karnataka	20.7	59.6	36.5
Kerala	10.0	48.4	25.0
Madhya Pradesh	30.0	41.9	22.2
Maharashtra	19.2	39.9	18.4
Odisha	29.3	54.8	29.4
Punjab	15.8	19.5	8.5
Rajasthan	5.0	23.6	12.1
Tamil Nadu	9.0	29.7	15.0
Uttar Pradesh	16.4	22.9	10.6
Uttarakhand	6.1	35.2	12.0
West Bengal	11.2	40.5	20.6
All India	19.1	36.0	20.7

Source: Planning Commission, Eleventh Five Year Plan, Volume II, 2008 (AAY refers to the Antyodaya Anna Yojana, the poorest 10 percent of the BPL category)

Table 5: Categorization of States according to high and low exclusion of BPL families

Low exclusion (less than 20%)	Himachal Pradesh, Madhya Pradesh, Andhra Pradesh, Punjab, Rajasthan, Tamil Nadu
High exclusion (more than 20%)	Uttar Pradesh, West Bengal, Assam, Bihar, Maharashtra, Gujarat, Haryana, Karnataka, Odisha

Another source of leakage is 'Ghost Cards' i.e. cards made in the name of non-existent people. Through Ghost Cards the foodgrains meant for distribution through PDS are diverted for sale in open market. The Table 6 below presents the leakages through Ghost Cards

Table 6: Leakage through ghost cards

Moderate Leakage (less than 10%)	Tamil Nadu, Andhra Pradesh, Haryana, Punjab, Rajasthan, Kerala
High Leakage (10% - 30%)	Odisha, Uttar Pradesh, Bihar, Gujarat, Karnataka, Maharashtra, West Bengal
Very High Leakage (more than 30%)	Himachal Pradesh, Madhya Pradesh, Assam

Source: Planning Commission, 2005 [6].

III. INCLUSION AND EXCLUSION ERRORS AMONG SOCIAL GROUPS

The poverty status of social groups and the level of inclusion and exclusion errors are presented in Table 7. The data indicates that inclusion errors for various social groups have increased between the two survey periods of 2004-05 and 2011-12. In 2011-12, the inclusion errors were 49 per cent for the Dalits, 40 per cent for the OBCs, 34.1 per cent for the Muslims, 51.1 per cent for the Adivasis. The reason may be partly due to increasing movement out of poverty for the marginalized groups [7] and partly due to greater distribution of PDS cards among marginalized groups. However, as seen in table the Exclusion errors steadily came down but were still high among all the social groups. Declining exclusion errors and increasing inclusion errors are due to the expansion of the AAY programme as a result of which many poor are under its ambit, thereby reducing the proportion of poor who do not have access to BPL/AAY/Annapurna cards and the income growth occurred over time

Table 7: Poverty status, inclusion and exclusion errors among social groups (in per cent)

Social group	Poor Population		Inclusion Error		Exclusion Error	
	2004-05	2011-12	2004-05	2011-12	2004-05	2011-12
High Caste	21.0	10.7	16.4	21.5	68.4	54.4
OBC	36.8	19.3	32.3	39.8	56.8	42.6
Dalit	47.1	27.0	39.4	48.7	48.8	36.0
Adavasi	65.4	41.6	42.0	50.9	36.4	33.2
Muslim	44.0	23.1	27.2	33.7	67.7	49.1
Christian, Sikh, Jain	17.3	6.8	13.9	18.3	54.7	46.2

Source: India Human Development Survey (IHDS, 2014)

IV. TECHNOLOGICAL INTERVENTION TO INCREASE EFFICIENCY OF PDS

One of the key problems in the implementation of TPDS is the inclusion and exclusion errors in the identification of beneficiaries. Though the Exclusion errors in PDS targeting have declined the inclusion errors have increased and both types of errors remain high. High inclusion errors lead to subsidies being wastefully spent. The research suggests that only one-third of the total subsidy went to the poor [8]. The Cash transfers also do not address the issue of inclusion of ineligible beneficiaries and the exclusion of eligible ones. Also the poor access to banks and post offices in some areas may reduce their effectiveness. It may expose recipients to price fluctuation, if they are not frequently adjusted for inflation. The central government has been pushing hard for compulsory biometric authentication of all cardholders in the public distribution system (PDS). The logic provided is that using Aadhaar with TPDS would help eliminate duplicate and ghost (fake) beneficiaries, and make identification of beneficiaries more accurate. The integrate the Unique Identification or Aadhaar number with TPDS can used to accurately identify and authenticate beneficiaries entitled to receive subsidies under TPDS.

It is to be noted that despite high errors of inclusion and exclusion the PDS has come a long way in providing the access to food to masses and reducing the malnutrition and increasing the food security. In 2013 survey of PDS, It has emerged that the system was working reasonably well for "below poverty line" (BPL) households and on average they were receiving 84 per cent of their foodgrain entitlements from the PDS. The high leakages are in the "above poverty line" (APL) quota. The high leakages in APL category are partially due to Central government policy of dumping of excess food stocks. The National Food Security Act (NFSA), enacted three years ago, is a step in direction of reducing the leakages. Under the NFSA, the APL category is abolished and eligible households come under two well-defined categories: Priority households and Antyodaya. The priority households are entitled to 5 kg of foodgrains per person per month at nominal prices, and Antyodaya households (the poorest), entitled to 35 kg per household per month.

The Central government's push for Aadhaar-based biometric authentication (ABBA) in the PDS may prove counterproductive. The system involves verifying the identity of card holders by matching their fingerprints against the Aadhaar database over the internet every time they buy their food rations and installing point of sale (PoS) machines. This system requires multiple fragile technologies simultaneously to work properly: the internet connection, the biometrics, remote servers, the PoS machine and household members to have an Aadhaar number, correctly seeded in the PDS database. Biometric authentication often fails old age, excessive manual labour and even dry skin. Given the depth of technology in for rural areas, especially in the poorest states the poor connectivity and network failures can disable this sort of technology and create chaos. Note that internet connectivity is a must for biometric authentication. Also the ABBA may reduce identity fraud it cannot prevent quantity fraud. There are better ways of plugging last-mile leakages by introducing simpler especially the ones that are not dependent on the internet. In its 2009 report, the Wadhwa Committee [9] found that states had implemented computerization and other technology-based reforms to TPDS have been able to plug the leakages to a great extent and curb large-scale diversion. The Chhattisgarh-model of PDS reforms based on de-privatization of PDS shops, computerization, fixed distribution schedules, tight monitoring, broad coverage, clear entitlements, separation of transport agencies from distribution agencies, active grievance redressal can reduce the errors become more inclusive, transparent and methodical. Imposing a technology that does not work is detrimental for people who depend on it for their survival. It would not be justifiable to deprive people of their food entitlements due to technology failures.

CONCLUSION

The Public Distribution system in India, envisaged as a means of providing the food and nutritional requirements at highly subsidized prices, has moved from being universal in distribution to Targeted Public Distribution System (TPDS), aimed at improving the nutrition standards and attains food security of poor. The National Food Security Act, 2013 made the right to food as a legal right rather than a general entitlement. Though there has been remarkable economic growth along with a decline in poverty but this has not matched with the improvement in food security, nutritional and hunger status. India's ranking in Global Hunger Index is of "Serious" category and is driven by high child malnutrition. Undernourishment and mortality among children remain alarmingly high. There are issues with identification of the beneficiaries and various errors have crept in the system. Consequently some of the genuine beneficiaries are left out whereas some are getting the undue benefit. This has resulted in leakages and poor efficiency of system in achieving its goals. In order to eliminate duplicate and fake beneficiaries, and making the identification of beneficiaries more accurate, the central government has been pushing hard for technological intervention through compulsory biometric authentication of all cardholders in the public distribution system. This system requires multiple fragile technologies like internet connection, remote servers etc. simultaneously to work properly. But given the depth of technology in for rural areas, especially in the poorest states the poor connectivity and network failures can disable this sort of technology and create chaos. Biometric authentication often fails old age, excessive manual labour and even dry skin. It would not be justifiable to deprive people of their food entitlements due to technology failures. Rather the system should be improved through better administration and introduction of simpler technologies in phased

manner that would go along with the gradual improvement in technology in rural areas and does not deprive the poor of their food entitlements.

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