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ICT and Zero Hunger:
A Comparative Study of Food Security Policies of Two Indian States

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ICT and Zero Hunger:

A Comparative Study of Food Security Policies of Two Indian States

The first goal of Millennium Development Goals (MDG) aimed at the reducing poverty and hunger by half between 1990 to 2015. After an evaluation, the United Nation's Millennium Development Goals (MDGs) are characterised as Sustainable Development Goals (SDGs). The second of the total seventeen SDGs is framed as "End hunger, achieve food security and improved nutrition and promote sustainable agriculture". The main objective of this goal is to eliminate the hunger and poverty. Though the goal seems to be a simple, there lie highly complex actions. About 800 million are reported to be poor in extreme poverty and hunger (FAO, 2015). According to UN report, 90% of the hungry (i.e., 795 million) are from developing countries - Sub-Saharan Africa and Asia. Nearly 200 million people are undernourished in India (FAO, 2015).

The role of India is crucial in achieving the goal of zero hunger. Towards this goal, India enacted the National Food Security Act (NFSA), 2013 for attaining the target of reducing poverty and hunger. The act stressed for leveraging the Information and Communication Technologies (ICT) for effective implementation of the policy intervention for ensuring the transparency, accountability, and effectiveness.

The paper attempts to understand the role of ICT tools in reducing the corruption and 'leakages' in food security policy of India, concerning Public Distribution System (PDS) programme for reducing the hunger. In the federal system of India, states play a crucial role in the implementation of the PDS programme and the states are advised to leverage the ICT tools in the NFSA. There are differences in the food policy implementation of various States by improving their Information Technology (IT) governance structure. Hence, a comparative study of two Indian states - Chhattisgarh and Telangana e-PDS projects will give valuable inputs for improving the policy and hence in reducing the hunger. The paper is based on the field level experiences of beneficiaries and interviews with the technocrats in both the states along with analysing the various policy documents of two states.

Key Words: Food Security, Public Distribution System, Corruption, Leakages, e-Governance, and Information and Communication Technologies (ICT).

Introduction

The first Millennium Development Goals aimed at reducing the poverty and hunger by half between 1990 to 2015. Though the goal seems to be a simple, there lie highly complex actions. The food difference between the rural and urban, availability of food grains, supply, and accessibility and nutritional value intake are cited as significant challenges. It is widely claimed that more than one billion poor have stated to have been lifted out of the extreme poverty across the globe. However, about 800 million are reported to be poor in extreme poverty and hunger (FAO, 2015). The first goal of MDG combined both extreme poverty and hunger as they have mutual cause and effect. Food security is a critical policy for the developing countries to reduce the extreme poverty and hunger. The developing countries particular the global south developed country-specific food security schemes, and they are successful in reducing the hunger and poverty by half. Though we still have serious issues. The global south is now aiming for achieving the zero hunger and reduced poverty. The primary challenge comes from the climate change and its impact on the food security.

After an evaluation, the United Nation's Millennium Development Goals (MDGs) are characterised as Sustainable Development Goals (SDGs). The second of the total seventeen SDGs is framed as "End hunger, achieve food security and improved nutrition and promote sustainable agriculture"¹. The main aim of this goal is to eliminate the hunger and poverty. Though the goal is wider and profound, it requires concerted efforts from various stakeholders. According to UN report, 90% of the hungry (i.e., 790 million) are from developing countries from Sub-Saharan Africa and Asia. Nearly 200 million people are undernourished in India. The role of India is crucial in achieving the goal of zero hunger. Towards this goal, India enacted the Food Security Act for attaining the target of reducing the poverty and hunger.

In order to achieve the goal, there arises a need to revitalize the sustainable agricultural practices and develop the leadership at various levels – political, executive and institutional, Commitment to effective leadership, policy, and institutional coordination. Asia, Africa, and South America are crucial in achieving the zero hunger by 2030. It is stressed that there is a scope for leveraging the Information and Communication Technologies for Effective

¹There is an addition of "improving nutrition and promote sustainable agriculture" to the MDG for a wider policy focus.

implementation of this policy intervention for ensuring the transparency, accountability, and effectiveness.

Food Security

The World Food Summit of 1996 defined food security as existing “when all people at all times have physical, (social) and economic access to sufficient, safe, nutritious food which meets their dietary needs and food preferences for an active and healthy life.” The term ‘social’ was added in 2002 FAO meeting to the 1996 definition. Food availability, food access, and food use are the three pillars on which food security is built. Ensuring the food security is a significant challenge for the developing countries. World Food Programme defines the food security as “a condition that exists when all people, at all times, are free from hunger”. There are four dimensions of the food security – availability, access, utilization dimension, and stability (Simon, 2012). FAO also defines food insecurity as a situation “where some people do not have access to sufficient quantities of safe and nutritious food and hence do not consume the food that they need to grow normally and conduct an active and healthy life”. Food insecurity may be due to lack of food, resources, access and improper utilisation”.

According to the State of Food Insecurity in the World report² jointly developed by the FAO, International Fund for Agricultural Development and World Food Programme state that the Economic growth is one of the key success factors for reducing the hunger but it should be inclusive and provide opportunities for improving the status of poor. There are inspiring global experiences especially from developing countries like

Brazil and South Africa. Brazil started the *Fome Zero*³ for poverty reduction, food security and to assist the small-scale farmers. There are nearly 50 interlinked initiatives as a part of *Fome Zero*. The *Bolsa Familia* a cash transfer scheme, the *Alimentação Escolar* a school

² The State of Food Insecurity in the World has been jointly prepared by the Food and Agriculture Organization of the United Nations (FAO), the International Fund for Agricultural Development (IFAD) and the World Food Programme (WFP).

³ In 2003, the Brazilian Government introduced the Fome Zero or Zero Hunger programme. Strengthening family agriculture, providing school meals and conditional cash transfers are some of the important schemes of the Fome Zero. Providing food security, reducing poverty and providing family security are the main aims of the of Fome Zero.

meal programme and Fortalecimento da Agricultura Familiar for strengthening family agriculture. High level of political commitment, economic growth, and labour reforms, external support, active civil society and social movement are considered as the main success factor of the Brazil programme. Civil Society and social movements played a significant role in ensuring food security by pressurizing the Government to keep the food security as an agenda in the public policy and Governance. The Integrated National Food Security Strategy (INFSS), which was designed based on the Constitutional principles of the Republic of South Africa, helped the country to reduce the halve the proportion of hunger people in their population by the end of 2015, using the 1990 level as benchmark (FAO, 2015).

Institutional Response: PDS

Since independence, India faced many structural challenges like droughts, low food production, continued conditions of poverty, unemployment and under-employment. This situation made the poorer class more prone to the food insecurity and malnutrition. It is not that there are no policy interventions for tackling this policy challenge. Programmes like anti-poverty programs, wage-employment, employment generation programs, nutrition and health based programs and Public Distribution System (PDS) are some well-intentioned policy intervention. Among all, Public Distribution System (PDS) is a significant policy intervention implemented through Fair Price Shops (FPS) (popularly known as ration shops). As an institutional response, creating Food Corporation of Indian (FCI) in 1965 is a crucial step for procurement food commodities like rice, wheat and sugar and non-food items (mainly oil and kerosene) from farmers and private players. Arranging a mechanism for ensuring access by needy through a network of FPS.

Initially, the Public Distribution System (PDS) was universal. All beneficiaries were entitled to get equal subsidized food grains and kerosene. Universal Public Distribution System (PDS) started receiving severe criticism from the policy experts and scholars regarding the fiscal health of the country. So in 1997, Government of India introduced Targeted Public Distribution System (TPDS). PDS subsidy, which was initially accessible to all citizens, became targeted to households identified as Below-Poverty-Line (BPL), by poverty estimates of Planning Commission. TPDS is also associated with two major problems: exclusion and inclusion errors and leakages (Masiero, 2014). Other problems include corruption, diversions

to the market, quality, identification of actual beneficiaries, Aadhar seeding, technological issues, distractions at the family level by the male head of the household.

Role of ICT in Effective Implementation

Many states address these problems with effective implementation of Information and Communication Technology (ICT) interventions. For example, Chhattisgarh is implementing the project – CORE-PDS covering most of the FPS in the state and use Point of Sale (PoS) devices and smart cards to give portability for the beneficiaries. e-Governance is the need of the hour for the country to minimize the diversions and challenges. In 2006, Government of India introduced National e-Governance Plan (NeGP) for “computerization of Government Departments to initiatives that encapsulate the finer points of Governance, such as citizen centricity, service orientation and transparency”⁴. The National e-Governance Plan (NeGP) was a comprehensive plan of e-Governance in the country with a collective vision and shared goals. Connecting rural areas to the internet through National Fiber Optics Networks (NFON), digitalisation of records and other IT infrastructure development are taking place across the country based on the NeGP.

Adoption of New Technology Solutions: Issues

There is a difference between the nature of information processes in the early days of information and technology and its present use. Initially, it was ‘data processing’ and ‘numerical crunching’ through data entry and various other output devices. Today, the application of information technology is aimed at creating, distributing, storing, accessing products of the mind and at communication rather than processing. The basic definition of digitalisation is converting the analogue signals to digital form, for example converting a book or objects into digital resources through scanning or photograph. Libraries, museums, Governments departments, etc., follow this basic process. Digitized information is for better storage, quicker accessibility and faster transmit and the digitization is used by some consumer electronic devices. Digitalisation helps us in easy transmission and communication of data between two individuals through an electronic medium. Digitalization allows the

⁴ Cyber Media Research (CMR), <http://cmrindia.com/government/> (accessed April 27, 2016).

virtual integration of physically separated information⁵. Information and Communication Technology (ICT) will play a significant role in digitalisation process. ICT acts as an enabler for sustainable socio-economic growth.

Over the last decades, a rich body of literature emerged in the area of correlation between the e-governance and development. ICTs are seen as tools for ensuring efficiency and accountability. The term e-governance now cited as “the digital route to good governance” (Heeks, 2001). The new technologies are supposed to indicate governing processes aimed at checking the discretionary power of street-level bureaucrats (Bovens & Zouridis, 2002), resulting in the higher transparency of administrative processes (Elbahnasawy, 2014): which are focused on being relevant for India's intractable administrative bottlenecks for effective implementation of PDS. The National E-Governance Plan thus is an outcome of initiatives to improve administrative capabilities. New technologies have been put to by the Indian government and different state governments in order improve the services to citizens as part of Systematic Adjustment Plan.

ICT helps the Government to become more efficient and effective in delivering the services and also become more transparent and accountable to the public. In India, many e-governance initiatives are launched to improve efficiency, transparency, accountability and effectiveness of the Government.

Towards Toning up Public Distribution System: The eGovernance Alternative

Since Center launched the digital initiative, several states showed interest in adopting it to overcome hurdles and optimise the outcomes. Various states implemented e-PDS projects. Chhattisgarh is considered to be one of the important states in effectively implementing the e-Governance project-related the Public Distribution System. The single objective of the state is to provide food security to 37 lakh Below Poverty Line families without diversion and leakage in a transparent way. With the help of National Informatics Centre, Chhattisgarh has digitalised the food grain supply chain from procurement from the farmer to distribution of the ration to beneficiaries. Technology has been effectively used in the system to address some of the prevalent problems in public distribution. The state drastically reduced the

⁵ Owen, J. Mackenzie & Navarrete, Trilce. (2011). *Museum Libraries: How Digitalisation will enhance the value of Museum*. Palabra Clave (La Plata. En línea): Amsterdam.

leakages at various levels. There is an 82% reduction in the leakages between 2004-05 and 2011-12 (Dereze & Khera, 2015). Compared to other states, Chhattisgarh reduced the leakages drastically between the mentioned period due to the COREPDS in the state. Whereas, other states are in initial stages of their implementation.

The newly formed Telangana state is implementing the ePDS project. 99.64% of ration card are seeded with the Aadhar. Though Point of Sale machines is used as a pilot project in Hyderabad state, issues related to Aadhar cards seeding, diversions of the ration to the market, exclusion errors apart from others show the need for a further focus on the intervention.

The paper attempts to analyse issues related to food security at global and local levels. A comparative study of Chhattisgarh and Telangana ePDS projects for insightful understanding on the food security programme is attempted with a focus on understanding the impact of new Communication architecture with an emphasis on transparency. The study also presents policy interventions in this domain in selected countries using comparative tools.

The main objective of the paper are

- To document the new initiatives for implementation of Food Security Policy using technology in Chhattisgarh Centralised Online Real-time Electronic PDS (COREPDS) and Telangana Electronic Public Distribution System (ePDS) for better designing of the Public Distribution Systems of other states
- To explore the possibilities for the adaptation of successful experiments in other states especially with reference to Chhattisgarh and Telangana

States like Madhya Pradesh, Rajasthan, Maharashtra are not performing effectively as the Chhattisgarh and Telangana models. The comparatively, smaller and young states are performing effectively by leveraging the Information and Communication Technologies and coordinated efforts by various stakeholders.

The study is based on the exploratory research. Exploratory Research tools provide valuable quality information that will stress the crucial issues that are to be addressed. The research methodology is as follows

The study refers mostly to secondary sources and includes the interviews.

Primary Sources: One or two persons from senior bureaucrats/technocrats, Fair Price Shop owners, and beneficiaries of two states will be constituting focus group for the research. Specific questions on the food security and e-Governance will be asked to the focused groups.

The areas of study are (a) Mana Camp, Barauda, Chhattisgarh(village near Raipur) and (b) GopanalliTanda, a village on the outskirts of Hyderabad. Open-Ended Questions are used for this exploratory study.

Secondary Sources: Published literature, accessible web resources on the Global Food Security, Millennium Development Goals, Sustainable Development Goals and Indian Food Security Policy by various International and National sources constitutes the main source for the study.

Comparative analysis is used to understand patterns of the Public Distribution Systems of Chhattisgarh and Telangana states. Various criteria used for the comparison of the policies, some beneficiaries, and their satisfaction levels, the bureaucratic and technocratic perspective, technological interventions and their impact, transparency and accountable levels.

Indian Food Security

India has implemented the integrated food security policy with the assistance to the producers to the subsidies to the beneficiaries. Programmes like Public Distribution System, Mid-day-Meals, Antyadoya Anna Yojana, Targeted PDS, AnapurnaYojana, Pension schemes, special assistance programmes were launched to reduce the poverty and hunger. All this culminated to result in reducing hunger and undernourishment among the vulnerable. According to Food and Agriculture Organisation, there is still 194.6 million undernutrition people in India that account for 15.2 percent of the Indian population. India missed both the MDG Goal 1C and World Food Summit Goal. India is home for one-quarter of the undernourished population in the world, one-third of the world's underweight children and one-third of the world food

insecure people. We will understand the Indian Food Security programmes before analysing challenges.

National Food Security Act 2013 provides subsidised food as a legal right to 75 percent of the rural population and 50 percent of the urban population. That implies about 80 crores of the 120 crores Indian population entitled to the food subsidies. There are certain policy issues that are mentioned by Dreze and Khera (2015), Mathew (2015), Choithani and Pritchard (2015), Masiero and Prakash (2015).

Deaton, Dreze, and Khera conducted research extensively on the Indian Food Security policy and leakages in Public Distribution System. Saini and Gulati (2015) also analysed reasons for the leakages and suggested various strategies to control them. Researchers like Aggarwal (2011), Chatterjee (2014), Choithani and Pritchard (2015), Dhorajiwali and Gupta (2011) Dreze and Khera (2011, 2012, 2013, 2014&2015) intensively conducted research in various states and suggested policy measures. Puri (2012) conducted research on the Chhattisgarh Public Distribution System and explored reasons for the successful model.

There are studies on the rural poverty and the PDS (Dreze and Khera, 2013), understanding the leakages in the PDS (Dreze and Khera 2015) and functioning of PDS in Bihar (Dreze et al., 2015). The main challenge for the states for not implementing the NFSA is the non-availability of the Social and Economic Caste Census (SECC) (Dreze and Khera, 2015). There is strong evidence of declining leakages in the states like Chhattisgarh and Odisha after the implementation of the reforms in the respective states and vice versa there are empirical evidence that those states which are not implementing the reforms they are paying the cost. States must transform their PDS system for ensuring the food security.

Mathew (2015) brings out the issues related to the implementation of the NFSA 2013. The cost of the implementation of the act is higher for the country like India. He also mentioned about the High-Level Committee on Food Security recommendations like reducing the beneficiaries to 40 percent from the present 67 percent, an end to end computerisation of the PDS, restructuring of Food Corporation of India (FCI). There is a duplication of the beneficiaries in the state.

Choithani and Pritchard (2015) have conducted an empirical study on the functioning of Coupon system in Bihar. The fieldwork of the researchers suggests that the coupon system probably has the positive impact in bringing the transparency at the FS beneficiary level. But there are certain structural problems like the maladministration practices that lead to many households receiving expired coupons and the problem at the FPS level. In Bihar, FPS ownership is not maintained by the Panchayat or self-help groups, they still influenced by the local political lobby.

Masiero and Prakash (2015) observed the computerisation of PDS in Karnataka reduced the leakages. They listed three mechanisms linking the IT systems to prevent the leakages in the PDS - the Point of Sale machines helps to prevent the users from the misappropriating PDS goods. Secondly, PoS avoid the ration dealers from diverting the food grains and thirdly the tracking of food grains through the software. They are mentioned about three types of concerns like the comparability of the PoS, non-performance of biometric machines and the concerns related to the Aadhaar project. The researchers conclude by saying that policy shift must be translated into practical implementation.

There is less research on comparative public policies of two or more states. The newly formed state, Telangana implementing both technical and nontechnical reforms in the country needs to be studied with a well-developed PDS model. The Chhattisgarh's PDS model is considered to be one of the best performing eGovernance models in the country. Chhattisgarh model was well studied and researched on various aspects. The primary objective of the study is to understand the similarities and differences of two young states i.e. Chhattisgarh and Telangana. This study will fill the gap in availability of literature related to the Telangana model and also helps in identifying major success factors for the successful implementation of the Food Security Policy in the country.

Food Security Act & Political and Policy Implications

According to Jean Dreze, the right to food can be seen in three perspectives. One is the point of view of Indian Constitution. Secondly, from the point of view of International conventions and declarations, for example, the Universal Declaration of Human Rights. Thirdly, considering the right to food as the moral and social right. In his article in EPW, he

concentrated more on the first perspective, particularly on the right to food as one of the “economic and social rights” affirmed in the Directive Principles. The architect of the Indian Constitution, Dr. B. R. Ambedkar emphasised on the Directive Principles for his visionary conception of democracy. Ambedkar stressed on building the ‘good society’ based on the ‘liberty, equality and fraternity. Democracy according to him was both the end and means. Indeed in the Ambedkar’s perspective democracy was intrinsically geared to social transformation and human progress (Dreze, 2004). Ambedkar emphasised on linking political democracy with the social and economic democracy. Dreze opines that “Sixty-five years down the road, economic democracy has been quietly buried as a principle of public policy, and even political democracy is not exactly in the pink of health” (Dreze, 2004). Including the right to food in the Indian Constitution is an urgent requirement for achieving the social and economic rights enshrined in the Directive Principles. After the intensive struggle for the legal right to right to food, in 2011, The National Food Security bill was introduced in the Parliament.

In 2013, the National Food Security Act was passed to provide “food and nutritional security in human life cycle approach, by ensuring access to adequate quantity of quality food at affordable prices to people to live a life with dignity and matters connected in addition to that or incidental to it”⁶. The National Food Security Act, 2013, states that 75 percent rural population and 50 per cent urban population, i.e., 67 percent of the total population will come under the food security nets under the Targeted Public Distribution System (TPDS). The Act classifies the population into three categories: excluded (i.e., no entitlement), priority (entitlement), and Antyodaya Anna Yojana (AAY; higher entitlement). With Act, the right to food is not a general entitlement but a legal entitlement. This step is a milestone in the history of the food security in India. Further, the NFSA 2013 recognizes maternity entitlement. It determined the responsibilities for the centre and states. The crucial point in the act is the compulsory creation of the grievance redressal mechanism for any grievances that are faced by the beneficiary for his/her entitlement.

Problems of Public Distribution System in India

⁶ National Food Security Act 2013 states it.

After analysing various literature available and practical experience, there are issues related to PDS in India. There are certain problems associated with the PDS that needs to be addressed carefully for the effective and efficient implementation of the act.

- (i) Problems of identifying the real beneficiary: Studies have shown that targeting mechanisms such as TPDS are prone to large inclusion and exclusion errors. According to an expert group, there are about 61percent of the eligible poor was excluded and 25 percent of the ineligible or non-poor households were included in the list.
- (ii) The existence of Ghost Cards: Ghost cards are the cards of the no existence people. Such cards will lead to the leakages and the ration which should reach a poor, and the Ghost cards will unlawfully entitle eligible beneficiary.
- (iii) Leakage of food grain: During the transportation from the producers to the beneficiary, there are issues related to diversions and deviation to the market.
- (iv) Instances of rampant corruption within the supply chain, manual system of maintaining records, inadequate and non-transparent monitoring mechanisms, weak grievance redressal mechanisms.

Based on various studies in all India level there are leakages of up to 41.7 percent and some states like Gujarat, Rajasthan and West Bengal have leakages more than 60 percent. Whereas, states that have taken the PDS reforms both technical and non-technical have been successful in controlling the leakages. For instance, Chhattisgarh reduced the leakages by about 82 percent (Dreze&Khera, 2015) by implementing effective Public Distribution System with the help of technological tools and by coordinating various stakeholders in the state.

Table No I: Leakage of food grains: State wise

Low leakage (less than 20%)	Chhattisgarh, Jammu and Kashmir and Tamil Nadu
High leakage (20% to 40%)	Andhra Pradesh*, Bihar, Himachal Pradesh, Karnataka, Kerala, Odisha, Uttarakhand

Very High leakage (40% to 60%)	Assam, Haryana, Jharkhand, Madhya Pradesh, Maharashtra, Punjab, Uttar Pradesh
Abnormal leakage (more than 60%)	Gujarat, Rajasthan and West Bengal

*Includes both Andhra Pradesh and Telangana. Calculation based on the data of 2011-12.

Source: - Dreze and Khera (2015)

To reduce the leakages, the Department of Food and Public Distribution launched the e-PDS portal in October 2012. The National Informatics Centre (NIC) designed the portal. The portal gives the real time information related to the central and state schemes, ration offtake, FPS details, beneficiaries details, Aadhar seeding status, respective state governments Food Security Portals, prices of the commodities and other valid information. The main objective of the portal is to promote transparency and accountability and to enhance the effectiveness and efficiency of the PDS process.

This section of the article emphasised on the Indian food security, evolution, strategies and ends by bringing out challenges that are associated with the Public Distribution System.

Comparative Analysis of Chhattisgarh and Telangana PDS

This part of the article reflects the issues related to Chhattisgarh and Telangana Public Distribution System based on inputs from the bureaucrats, technocrats, Fair Price Shop owners, and beneficiaries. This is expected to give us an understanding of processes of PDS. The comparative method is employed for exploring the differences and similarities in the models of Chhattisgarh and Telangana states.

The Supreme Court, IN 2010, identified serious gaps in Public Distribution System (PDS). Some of these include (i) diversion of the food grain to the market, (ii) duplicate, ghost, and illegal food cards, (iii) corruption and pilferage of PDS commodities, (iv) wastage of grains. Given this problems and challenges, the Supreme Court called for revamping the Public Distribution System by using the technology. Many states started implementing the changes. Before the Food Security Act in 2013, Chhattisgarh has started computerizing the PDS

process and implementing the non-computer based reforms. Other states followed the reforms at different levels and in different ways.

Some of the reforms like (i) FPS automation for effective analysing of day-to-day reports and real-time information about the status of the movement of goods, (ii) digitalisation of ration cards for removing the unauthorised and ghosts cards, (iii) automation of entire supply chain of PDS to reduce the leakages and corruption, (iv) an interactive web portal of the PDS as a transparent model for giving information to the general public, (v) effective grievance redressal mechanism for solving any kind of grievances of the beneficiaries, (vi) a dedicated call centre and toll-free number to handle the grievances. These reforms are followed by different states in a different manner. Some of them are implementing most of the reforms, and some are in nascent stages. Major reforms are presented in the following table.

Table No II: - Reforms to TPDS: An Overview

Type of Reform	States implementing reforms
Fair Price Shop (FPS) automation	Andhra Pradesh, Chandigarh, Chhattisgarh, Gujarat, Haryana, Karnataka, Odisha, Puducherry, and Telangana
Digitisation of ration cards	Andaman & Nicobar Islands, Andhra Pradesh, Chandigarh, Chhattisgarh, Daman & Diu, Delhi, Gujarat, Karnataka, Kerala, Lakshadweep, Punjab, Puducherry, Tamil Nadu, Uttar Pradesh and Telangana
Automation of Supply-Chain	Completed in Chhattisgarh, Delhi, Gujarat and Puducherry and in progress state in Andhra Pradesh, Chandigarh, Daman & Diu, Haryana, Jammu & Kashmir, Jharkhand, Karnataka, Lakshadweep, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh
Transparency Portal with PDS	Andaman & Nicobar Islands, Andhra Pradesh, Chandigarh, Chhattisgarh, Delhi, Gujarat, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Odisha, Puducherry, Tamil Nadu and Uttar Pradesh
Dissemination of information through SMS alerts	Chhattisgarh, Delhi, Puducherry and Uttar Pradesh

Call Centre/ Toll free helpline number	Assam, Chandigarh, Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu& Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Odisha, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal
Online grievance redressal mechanism	Chhattisgarh, Delhi, Gujarat, Haryana, Himachal Pradesh, Maharashtra, Mizoram, Odisha, Puducherry, Rajasthan, Tamil Nadu and Uttar Pradesh

*Includes both Andhra Pradesh and Telangana

Source:“Press release by Ministry of Consumer Affairs, Food & Public Distribution (2013)” and “Justice Wadhwa Committee Report on Computerisation of PDS operations (2013).”

Based on the Supreme Court judgment, many states went in for a technology based reforms in the Public Distribution System. Significant changes are presented in Figure 3. Some of the steps are given below. e-PDS helps in computerisation and digitalisation of the existing PDS machinery from producers to the beneficiary. The ICT tools can be implemented by computers entire supply chain. ePoS machines and Android-based Tabs will be used for the authentication of the beneficiary. The flow chart of the e-PDS process is represented in the above figure.

The Chhattisgarh COREPDS Model

Chhattisgarh is regarded as an example of transforming a non-functional PDS into a functioning with the help of technology along with community involvement. The initiatives and reforms include both technical and non-technical aspects with a single clear objective of creating food security to 37 lakh Below Poverty Line families without any diversion and leakage in a transparent way. Chhattisgarh has implemented Centralised Online Real-time Electronic PDS (COREPDS). As a part of COREPDS, Chhattisgarh has computerized the whole process of the supply chain from the procurement to distribution for curbing leakages and to track diversions. This bold step has promoted transparency and improved internal management. By creating a centralized database and removed unauthorized and ghost cards. It was estimated that 22.5 lakh unauthorized or ghost ration cards were eliminated. Bar-coded ration cards are distributed in the public gathering; this step helped Chhattisgarh to ensure transparency and accountability. Special meetings are held in villages and wards in

towns for the distribution of ration cards to real beneficiaries. Through the Hindi webportal, ration card information was published. A real-time information regarding the disbursement of the ration is also available on the webportal. This step further promoted transparency and accountability in the PDS process. Further, the Chhattisgarh Government concentrated on the computerization of the movement of ration from the godowns to the Fair Price Shops (FPS). The doorstep delivery system was put in place based on demand and the trucks transported the goods to fair price shops. The actual allocations were fed into the computer system, and delivery order was issued. The delivery truck drivers were advised to carry mobile phones with cameras. They were instructed to take pictures of the truck number and the manager whenever the commodity was unloaded. This crucial step reduced the diversion of ration to unscrupulous people and reduced diversion to open market. An effective grievance management system was initiated, and a call center with a toll-free number was started to address the grievances of the general beneficiaries.

For registering the complaints from the beneficiaries Jan bhagidari, a citizen service website, was initiated. The government also filed FIR on the fraudulent element based on the information gathered through the website. Another initiative by the Government is registering of mobile numbers at the FPS shops or through the website to provide information through SMS related the status of the ration truck and availability of ration the FPS. This initiative was launched with the help of National Informatics Centre. Anyone even not a beneficiary can register through this process. Hence, there is an enhanced accountability and public scrutiny of the fraudulent activities in the PDS.

The initiatives based on the Information and Communication Technologies are Automated Allotment Calculation for PDS Schemes, monthly submission of FPS sales details by declaration through computer entry, web-based software module for distribution centers, truck dispatch information through SMS to registered users, unified ration card database, call center and complain monitoring system, truck photograph to replace gate pass, keeping the reports in the public domain, inter-warehouse truck transport information through SMS are considered as few technological interventions.

Some of the non-Information Communication Technologies initiatives are conducting rice festivals, de-privatization of FPS, the economic viability of FPS, and coloring of the truck carrying PDS commodities in yellow.

Fair Price Shops and Automation

The above table represents the FPS in Chhattisgarh. Android based tablets are used instead of PoS machines in 9949 FPS. There are two major problems with the PoS machines, one the connectivity problem and the second the maintenance issues. Though the mobile penetration and the internet penetration rates in the Chhattisgarh is moderate and there are problems in connectivity in the interior rural areas. Another problem is the maintenance issue with the vendor provider. Hence, the Government introduced Android-based tablet which will store the data of the transactions in offline mode also. Later the shop owner can upload the data while the internet is available. There is no maintenance issue as the Android tablets are owned by the shop owners. Special software was designed to install in the Tablets that is in local language – Hindi.

Table No III: - Fair Price Shops in Chhattisgarh

	FPS
Android based Tablet	9946
Point of Sale Machines	525
Manual	1829
Total	11670

Source: - Web portal of ePDS of Chhattisgarh

There still 525 FPS using the PoS machines in Raipur district and these shops are phased out shortly. Manually they are 1829 shops which are interior of the state, and the state machinery is keeping the efforts to automate the shops. There are nearly 60 lakhs beneficiaries.

Inputs from Bureaucrats, Technocrats, FPS Owners and Beneficiaries

The administrators at the Secretary and Director (Technical) of National Informatics Centre (NIC) expressed that the political will is crucial in the implementation of effective PDS in the state. Before the Supreme Court's order and the passage of the National Food Security Act, 2013, Chhattisgarh Government has implemented the reforms related to the PDS in 2004.

The committed Bureaucrats with technical help from the NIC they started reforming PDS by removing the barriers. In Chhattisgarh, FPS are privatized, and the ownership was given to the Self-Help Groups and village panchayats. Various inputs from the interviewers from Bureaucrats and Technocrats are

There may be inclusion errors but not the exclusion errors

The primary objective of the Chhattisgarh Government is no eligible poor person should be excluded based on any reason from the beneficiary list. There may be inclusion errors like duplication, ghost cards and unauthorized cards, but in the process to remove them they must remove the eligible beneficiary name from the PDS list. Hence, there are many parallel mechanisms arranged to manage the issues. For example, if the Aadhar authentication is not working, there are other options like One Time Password (OTP) to the beneficiary or authentication through a photograph of the beneficiary.

Portability and Flexibility of Availing Ration

The beneficiary has given the option of taking the ration from any of the FPS in the state. This portability and the flexible option will provide the beneficiary to change the FPS if he/she is not satisfied with the ration or the service of the shop owner. This step will also enhance the competition among the FPS owners. This option is not available for the Aadhar non-linked ration cards.

Introduction of Android Based Tablet and Chhattisgarh PDS App

The Chhattisgarh PDS provided the ration through Point of Sale machines, but there are certain issues with the PoS machines like connectivity and maintenance issues. To tackle the problem, state machinery advised the FPS owners to purchase the Android-based Tabs and

installed the Chhattisgarh COREPDS App in the tabs. This is an interactive and user-friendly mobile application. It was designed in the local language. This Android-based Tab helps in making the transaction without an internet connection. The FPS owner must update it within the stipulated period that is up to five days. Though there are issues like loss of data and mishandling of tabs, they are considered not as a major problem. For the first time in India, Chhattisgarh has introduced the Android based tab for the PDS, which is considered to be a paradigm shift from PoS to Tab.

Real Time Information to the Public

To make the every transaction transparent and accountable, the state Government has decided to keep the every transaction in the public domain with real-time information to the beneficiary or any other users. All report regarding FPS offtake, ration allocated to the beneficiary, status of beneficiary cards, district wise allocation of ration and other reports that make the process transparent and accountable.

A toll free number 1800-233-3663 or 1967 is dedicated to any concerns or complaints can be registered. A reference number will be given to the caller for the future reference. The Chhattisgarh Government introduced the Grievance Redressal number before the National Food Security Act 2013 was enacted. They made it under the Chattisgarh Lok Sewa Guarantee Act, 2011 (Annexure I).

De-privatization of Fair Price Shops (FPS)

De-privatization of FPS was a major step taken to make the PDS accountable and inclusive. In the allocation of the FPS, ownership preference will be given to Panchayats, Self Help Groups, Co-operatives, and women. Private traders are restricted. The de-privatization a crucial non-technical step taken by the Chhattisgarh for effective implementation of the Food Security Act.

Conducting the Social Audit by the Local Bodies

The Periodic social audit is needed to be conducted by the local bodies or authorities authorized by the state government. Independent researchers are also encouraged for doing research on the functioning of the PDS.

Input from Beneficiaries

Most of the beneficiary in Mana Camp, Barauda, Chhattisgarh are satisfied with the quantity and quality of the ration they are receiving from the FPS. They are empowered to know where to give the complaint. They are unaware of the Grievance Redressal Mechanisms and toll-free number. Any grievance is lodged in the Panchayat office rather than the calling the complaint. There needs to be publicity for the regarding the Grievance mechanism in the state. Six out 15 interviewed are unaware of the phone registration for the status of ration available at the shop. An SMS is sent to the registered phone users about the dispatch of the ration from the godowns.

Telangana PDS and its Implementation

There are some serious issues related to the duplication of cards, ghost cards, corruption and leakages in the Public Distribution System. These issues are common to all the states in the country. The newly formed Telangana state is not an exceptional. This part of the paper concentrates on understating the role of e-Governance initiatives of Telangana Government. This e-PDS project of Telangana focuses on the removal of duplication cards and ghost cards.

Inputs from Bureaucrats, Technocrats, FPS Owners and Beneficiaries

The inputs through the intensive interview with Secretary-level officials, Project Managers, Technocrats from National Informatics Centers, FPS owner (Gopanpalli Thanda), and beneficiaries in both the states gives inputs at the ground level. Snowball technique is used for getting the information from the respondents.

e-PDS in Govt. of Telangana

There are about 467 Manuals and 17163 Fair Price Shops (FPS) in Telangana state. 16.80 Lakh MT of rice is distributed to the beneficiaries in the state. There are problems like duplication of ration cards, the inclusion of non-eligible cards, corruption, and leakages with Telangana Public Distribution System. The entire ration cards are digitized by the help of the software developed by the National Informatics Center (NIC), and it is an effectively functioning for allocating ration to the beneficiaries through the Fair Price Shops. The Telangana state also achieved 99.95% Aadhar seeding for the elimination of bogus cards and duplicate cards. Aadhar seeding though has certain challenges it is effective means for elimination of the deviations. After the Supreme Court order, the State of Telangana implemented the end to end computerization.

There are two stages in the computerization process. They are: Component I and Component II

Table IV:- e-PDS in Telangana

	Component I	Component II	Data Digitization
Hon'ble Supreme Court Order – description	Computerization of complete supply chain up to FPS Availability of information on a Transparency Portal	Electronic authentication of delivery and payments by beneficiary at the fair price shop level	Digitalised database for the public domain
Requirements for Computerization	A. Utilization reporting & Allocation B. Lifting of commodity from FCI to FPS C. Lifting of commodity from State Godown to FPS	A. Sale of commodity at FPS • Beneficiary authentication • Transaction recording	A. One time beneficiary Data digitization B. Online management of beneficiary database

Source: - NIC, Telangana

Component I of the Telangana e-PDS concentrates on the computerization and online tracking of the movement of commodities from the FCI godowns and State godowns to Fair Price Shops. Supply Chain Tracking system is implemented in Hyderabad district on a pilot basis. Automation of this component is required for proper tracking of the movement of commodities, as diversions and leakages are common in this part. Component II of the project aims at the computerization and online tracking of the ration from Fair Price Shops to the real beneficiary. ePoint of Sale(e-POS) machines are used for authentication of the beneficiary through biometric data. An SMS will also be delivered to the beneficiary about their entitlements of the ration.

By implementing the software, the department was able to deactivate 9.93 lakh bogus ration cards from June to Sept 2014. The department was able to save 15,779 metric tons of rice. The National Informatics Center (NIC), Telangana provided the data. Presently around 79,68,314 duplicate or nonbeneficiary cards were removed from the beneficiary list.

Aadhar Seeding:-

Aadhar Seeding is the process of one-to-one “mapping of the beneficiary Aadhaar number with his/her record in the scheme database and approval of the same by an appropriate authority”⁷. Aadhar Seeding helps in removing duplication and unauthorized beneficiary list. In Telangana, the process of Aadhar seeding is intensively taking up. The following table will provide information related to district wise Aadhar seeding with Ration Cards.

Table V: - Status of Aadhar Seeding in Telangana: April 2016

District	Percentage of Aadhar Seeding with Ration Cards
Adilabad	99.96
Hyderabad	99.96
Karimnagar	99.95
Khammam	100
Mahaboobnagar	99.8
Medak	100
Nalgonda	99.99

⁷Aadhar Enabled Direct Benefits Transfer - MicroSave, http://www.microsave.net/files/pdf/130216_MicroSave_Case_Study_DBT_Aurangabad.pdf (accessed May 02, 2016).

Nizamabad	99.82
Ranga Reddy	100
Warangal	100
Total	99.95

Source:- Telangana PDS Portal

All govt employees, four wheel owners, all pan card holders/credit card holders/debit card holders, two wheelers with more than 100 cc, people having landed property more than an extent which may differ from Mandal to Mandal,

Point of Sale Project in Hyderabad and Ranga Reddy Districts

e-POS pilot project was introduced in 45 shops from Oct 2012. From April 2016 onwards this project was extended to 1545 FPS shops in Hyderabad and Ranga Reddy Districts. The primary purpose of this project is issuing ration after Aadhar authentication in Point of Sale machine by the ration card holder. Food Inspector will authenticate for old and physically challenged. Through this project approx. up to Rs. 45,000 per month per shop will be saved. The primary purpose of this project is to deliver the ration to authorized persons only, online verifications of the beneficiary will be facilitated, and real-time information can be gathered at the State National Informatics Centre. This project aims at eliminating corruption and facilitates effective decision-making at the state level.

In the month of April 2016, the Hyderabad district has saved around 35.51 percent of the Rice that is saving around 14 crores for the state's exchequer (Annexure IV). This implies if the state implements the PoS in all districts, then the state will save around 1500 Cr per year. The savings reflects that the return on investing in technologies is high.

Input from Beneficiaries

Beneficiaries of Gopanpalli Tanda, a village on the outskirts of Hyderabad, expressed their concern related to the functioning of the Aadhar authentication. Old aged beneficiaries and workers of construction are having the problem of Aadhar authentication. Even the best of

any finger is used for the authentication the problem persists. Beneficiaries have expressed that they are receiving the ration regularly, and there are no deviations.

Comparative Study between Chhattisgarh CORE-PDS and Telangana e-PDS

Centralized Online Real-time Electronic PDS(CORE-PDS) is an e-Governance project of Chhattisgarh was designed and implement all over the state. The main objectives are to capture transactions between Ration Card holder and the FPS, to make the FPS accountable to people (beneficiaries) by offering “Portability” and to eliminate diversion of PDS stocks – by authentication of the beneficiary at the FPS before transaction and Regular physical verification of transactions. CORE-PDS project introduced “Annapoorna ATM” Application Software (A3S) on a pilot based project and Android based tabs instead of ePoS machines, which works in online or offline mode and interacts with the PDS server. Many states replicated the CORE-PDS model their respective states and Telangana also implemented certain practices. But Telangana e-PDS is concentrating on the digitalisation of data. Authentication through e-PoS and tracking of movement of ration are implanted on a pilot basis in Hyderabad district.

Chhattisgarh has migrated to Android based tabs from the ePoS machines due to connectivity and maintenance problems. Whereas, Telangana has implemented the ePoS machines in Hyderabad and Ranga Reddy districts by strengthening the servers at the state level and outsourcing the maintenance to the third party vendor provider. We can access the impact of the ePoS and the Android based tabs only after certain time period. Both the initiatives are not implemented all the over the states in their respective states. We can look at this initiative from the point of view of changing trends in the technology and governance for better transparency and accountability. One cannot transform the processes frequently, and it will impact the cost and performance of the system.

Chhattisgarh Government is not completely insisting on the Aadhar Authentication for the beneficiary. They can authenticity based on the One Time Password or the picture authentication. In Telangana, there is much emphasis on the Aadhar base authentication of the beneficiaries. A comparative table is given in next table.

Table VI: -Chhattisgarh's CORE-PDS and Telangana's e-PDS: A Comparison

Particulars	Chhattisgarh	Telangana
Population	2, 55, 40, 196	3, 51, 93, 978
AAY Families and persons (NFSA)	7.19 lakhs families And 20.42 lakhs persons	5.67 lakhs families and 15.29 lakhs persons
Priority Persons (NFSA)	180. 35 lakhs	176. 33 lakhs
Actual Beneficiaries	180.35 lakhs	279.84 lakhs
New Smart Ration Cards	Smart Ration Cards are issued to all beneficiaries	No Smart Cards
Portability	Allowed. Beneficiary can take ration in any of the FPS	Not allowed.
AADHAR Seeding	91% data Digitalisation	99.95% of Aadhar seeding has to be done
Online Tracking of Ration	Implemented in state with RFID technology	Implemented on pilot basis in Hyderabad circle with GPS system
e-POS	e-POS is introduced	e-POS project is implemented in 1500 FPS in Hyderabad district in a phased manner and targeting to expand to entire state by the end of 2016
Android Tabs	Implemented in the state	ePOS are used instead of Android based tabs
Grievance Redressal	Toll-Free Number and Web-based complaint registry	Toll-Free Number and Web-based complaint registry
SMS regarding the movement of ration	Implemented	Implemented

Source:- Author's compilation

Key Success Factors for Strengthening the PDS

Commitment of Political, Bureaucrats and Technocrats

Political will is crucial in implementing various reforms in the Public Distribution System. There are many hurdles in implementing the reforms like resistance from the FPS owners, dealers, and executive machinery. Pushing reforms need a kind of commitment from the head of the state. In both Chhattisgarh and Telangana, the Chief Ministers of the states are committed to implementing the reforms. Bureaucrats and Technocrats also play a major role in designing the effective policies and implementing the policies to reduce the leakages and diversions of the food grains. It is a herculean task for the bureaucrats and technocrats in implementing the new policies as it requires change management and proper training to the existing machinery.

Digitalisation of the PDS

Digitalisation of all aspects of PDS is crucial in checking the deviations and leakages of grains. We need to digitalise the entire process instead of certain part of the supply chain. Digitalisation is essential in understanding the status of the PDS functioning, and it promotes the transparency and accountability. The process of digitalisation must accompany with proper alternative mechanisms in place for the certain period. For example, Chhattisgarh has implemented the Aadhar based authentication, but if the beneficiary is not enrolled or not authenticated due to a technical error, the Food Officer is provided with the power to authenticate till the problem is solved.

Partnering and networking various stakeholders in Change Management

Involving various stakeholders in the process of the change management is another success factor for the strengthening of the PDS. A proper communication channel should be evolved in involving the stakeholders. Both states have taken various inputs from the stakeholders and involved them in the process of reforms. Chhattisgarh is trying to incentivize the FPS owners for implementing the changes. There are training programmes conducted for

implementing the ePOS in Hyderabad and Rangareddy districts of Telangana. A dedicated team is a setup for rectifying any technical problems in both states which are responsive and active.

Grievance Redressal Cell

Grievance Redressal Cell is crucial in addressing the concerns and problems of the beneficiaries and it is also useful in reducing the corruption and deviations. These cells are crucial in promoting the transparency and solving the problems of the beneficiaries. It also improves the processes by identifying the critical areas. Though the Food Security Act specifies the implementation of the Grievance Redressal Cell, a well-defined and structured cells are need of the hour.

De-privatisation of FPS

Fair Price Shops should be de-privatised and allocated to the Self Help Groups, Panchayats, and women. This initiative in Chhattisgarh has brought a change in the functioning of the PDS and made the processes more effective. These step will enhance the responsibility and beneficial for the empowerment of the society. 43.5.6. Portability

In Chhattisgarh, a beneficiary can take the ration from any of the FPS in the state. The option of portability will promote the competitive spirit among the shop owners and enhance the service output.

For the PDS, there should be multi-disciplinary teams to undertake the impact analysis of the scheme. Comparative analysis of PDS models of different states could be studied intensively for making the PDS effective in respective states. The outcomes of study could be shared with the states by the Centre. It is also a way forward for the Cooperative Federalism.

Digitalisation is not a solution for all the challenges, but it can be used as a tool for enabling the processes to deliver proper results and make the system effective. We need to leverage the

technology and at the same place, we need to have parallel mechanisms if it is unable to deliver or break down.

Conclusion

Globally the poverty showing a downward slide and the countries are reaching the targets of Millennium Development Goals (MDG). An interesting debate is a subtle distinction between poverty and hunger. While absolute poverty shows a decline, hunger remains a challenge. There are concerns about the malnutrition and underweight of marginalized and poor. Hence, we cannot conclude that reduction in the poverty levels will reduce the hunger and malnutrition automatically. We need to target the poverty and hunger differently with different approaches though they are interlinked.

India is also in the process of reducing the poverty and hunger. It tried out many strategies since independence. Public Distribution System (PDS) is considered as an effective measure to reduce the hunger. But the PDS has faced many challenges like targeting the hunger, leakages, corruption, nepotism in allocating the FPS dealers, diversions of food grains to the market, rotting of food grains in the godowns and others. The policy makers have continuously involved in redesigning the scheme for effective and efficient outcomes. Certain states like Chhattisgarh had owing to strong leadership facilitated the transformation of PDS and reduced the leakages. They are regarded as success models for reducing the leakages in the country.

There is a transition from manual Public Distribution System to e-Public Distribution System for effective and efficient delivery of ration to the genuine beneficiary. The focus of ePDS is to plug out loopholes and problems. By leveraging the Information and Communication Technologies (ICTs), beneficiaries are identified and targeted properly. e-PDS system can be used effectively to realize the objective of food security by reducing corruption and enhance transparency, accountability, and efficiency. However, there are some challenges which have to be addressed. Technology as an enabler has to combat market diversion, corruption and it should ensure reaching of benefits to the original beneficiary. Chhattisgarh's PDS model is considered as the best model to reduce the leakages and ensure the accountability.

The e-PDS of states like Chhattisgarh reflect the emerging trend of computerization of social safety nets. Information and Communication Technologies are to be used to improve the quality of implementation, and should address the root causes of the problems. The e-PDS is an apt example of it.

Telangana's e-PDS has a high potential for improvement. The issue is how effectively and efficiently this project is implemented with a time-frame. Implementing Aadhar is crucial in addressing crucial challenges like ghost cards and leakages. But we need parallel mechanisms for a temporary period if there are any problems with Aadhar like authorisation by Food Inspector, other beneficiary identification mechanism for a short period of time. This paper could not concentrate on the impact analysis of Android based tabs in Chhattisgarh and e-POS of Telangana Government. As both projects are implemented in the same year, the impact will be visible only after one or two years. This is one of the limitations of the project. This project might be developed further by emphasizing on the impact analysis of various technologies on the social and economic profile of the beneficiaries.

To conclude, states may adopt the strategy that there might be inclusion errors but not the exclusion errors in implementing the food security programmes in achieving the goal of Zero Hunger and various Information and Communication Technologies (ICT) will help in effective implementation of the food security policy for a developing country like India.

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