Food Policy Reforms
A Rapid Tour of Possibilities

Reform of India’s food policies is on the front burner. This paper takes a rapid tour of the reform possibilities in the areas of storage and logistics, procurement, and distribution. The paper proposes a method for determining the needs for seasonal storage and discusses what ought to be targets for capacity creation. This is followed by an examination of the policies toward storage and reforms in procurement. The paper lays out the principal components of reforms in distribution. These are pursued in greater detail in the context of three states: Chhattisgarh, Gujarat, and Madhya Pradesh.

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Food Policy Reforms: A Rapid Tour of Possibilities

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<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>AAY</td>
<td>Antayodaya Anna Yojana</td>
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<tr>
<td>APL</td>
<td>above poverty line</td>
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<tr>
<td>BPL</td>
<td>below poverty line</td>
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<tr>
<td>CWC</td>
<td>Central Warehousing Corporation</td>
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<td>FCI</td>
<td>Food Corporation of India</td>
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<td>FPS</td>
<td>Fair Price Shops</td>
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<td>GoI</td>
<td>Government of India</td>
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<td>MSP</td>
<td>Minimum Support Price</td>
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<td>MT</td>
<td>Million Ton</td>
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<td>NFSB</td>
<td>National Food Security Bill</td>
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<td>NSS</td>
<td>National Sample Survey</td>
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<td>PDS</td>
<td>Public Distribution System</td>
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<td>POP</td>
<td>Poorest of the Poor</td>
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<td>PPP</td>
<td>Public–Private Partnership</td>
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<td>SWC</td>
<td>State Warehousing Corporation</td>
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I. INTRODUCTION

1. India’s food policy is in a state of flux. This is a rare moment. Food policies and their governance have enjoyed stability and continuity for many decades. Indeed, the framework for these policies was set by the war-time interventions of the colonial government in India. Those interventions consisting of direct procurement of grain and rationed distribution were made with the objective of securing food supplies for urban populations. Even though the objectives of food policy have mutated over the years, the interventions have not materially changed form except for changes in regards to scale. The Public Distribution System (PDS) owes its origins to the rationing systems of World War II. The Food Corporation of India (FCI), the principal central government apparatus responsible for foodgrain procurement and storage, was set up in the mid-1960s. The practice of offering support prices to rice and wheat also dates from that period. The series of reforms since 1991 that saw greater integration of India with world markets along with greater freedom for entrepreneurial activity left the food and agricultural sector largely untouched.¹

2. In recent years, however, India’s food policy and its institutions have been repeatedly challenged. The stunning growth of the economy in the 2000s has not been accompanied by commensurate improvement in indicators of poverty and nutrition. Politically, such dissatisfaction has taken the form of a ‘right to food’ by the United Progressive Alliance (UPA) that returned to power in India’s general election of 2009. This campaign promise has now seen the introduction of a National Food Security Bill in the Parliament. The run-up to this bill has been contentious as the government advisors, media and the independent experts debated alternatives that can effectively deliver the right to food.

3. While these debates have been about food policy of the central government, they have been informed, in part, by attempts to reform procurement and distribution systems by some state governments. It is widely agreed that PDS reforms are essential for the success of a food security act. Hence these reforms at the state government level are experiments that may chart the future course of food policy. The dynamics of policy and implementation are also influenced by a third factor – the judiciary. In 2001, the People’s Union of Civil Liberties filed a public interest petition in the Supreme Court of India demanding judicial oversight of the State’s food intervention. They argued that the right to food derives from the right to life that is guaranteed by the Constitution. The case is still ongoing. However, the court has been sympathetic to the petition and has passed a wide range of ‘interim’ orders. The court has also appointed commissioners to monitor the compliance of these orders. Most of the orders relate to legal enforcement of existing government programs. Some orders have expanded the scope of government programs while others have pressed for reforms such as the computerization of the subsidy network.

4. The goal of this paper is to take a rapid tour of the reform possibilities in the areas of storage and logistics, procurement and distribution. This paper attempts to present a snapshot of some of the possibilities. However, as these reforms are still evolving, our snapshot should not be seen as a final picture. In particular, while the direction of reforms seems durable, the particular models that are being tried out are not fully tested and therefore subject to change.

5. An exercise of this sort has to be sensitive to the federal structure within which food policies are implemented. While the central government is largely responsible for funding, procurement and transport of grain to the states, the implementation and delivery of food

¹ For accounts of India’s early food policy, see Bhatia (1970) and Chopra (1981)
subsidies is in the hands of the states. The PDS is a shared responsibility of the Centre and the States and, therefore, PDS reforms have to be understood with reference to policy initiatives (and their associated political economy) at the center as well as the states. For this reason, this paper is informed by case studies of food policy structures in three states: Chhattisgarh, Gujarat and Madhya Pradesh.

6. This paper has significant omissions. It does not cover food policy issues concerning targeting and cash transfers. These two issues are important and have dominated the debate about the NFSB. However, apart from the fact that the authors wished to keep the study to manageable limits, these issues have already received much attention. In our review of PDS in Sections 2-4, we point to the formidable difficulties of targeting and how targeting in practice, leads to substantial exclusion of the poor. There is a fairly large consensus among economists that a food security bill dependent on targeting would be self-defeating. Whether a food subsidy system should move in the direction of cash transfers has also been examined in previous work. The focus of this paper is on reforms that are already on the ground and relevant to implementation. This is, of course, not to minimize the desirability of reforms that enlarge the access of poor whether through targeting reforms or through direct cash transfers.

7. Sections 2-4 are summary overviews of the food policy regime, its outcomes and the present policy context. One of the perceived failings of existing food policy is the insufficiency of storage capacity for foodgrains. Various schemes exist to promote the creation of more storage capacity especially for public grain stocks. To understand the need for such policies and to evaluate their likely success, Section 5 proposes a method for determining the needs for seasonal storage and discusses what ought to be targets for capacity creation. This is followed in Section 6 by an examination of the potential offered by existing policies. Sections 7 and 8 discuss reforms in procurement. Section 9 lays out the principal components of reforms in distribution. These are pursued in greater detail in Section 10 in the context of three states: Chhattisgarh, Gujarat and Madhya Pradesh, all of which have received attention for their attempts at reforms. The findings are brought together in summary fashion in Section 11.

II. BACKGROUND: A PDS PRIMER

8. In India, the central and state governments together run a marketing channel (called the Public Distribution System or PDS) solely devoted to the distribution of subsidized food. At the retail level, this involves a network of Fair Price Shops (FPS) which sells subsidized grain to consumers. Subsidized grain is not accessible elsewhere. The FPS is usually run by private agents who receive a fixed percentage as commission for their efforts. The FPS is often restricted to sell only subsidized grain. The central government is responsible for procurement, storage, transportation and bulk allocation of foodgrains to different states. The state government is also responsible for transporting and distributing the grain within its boundaries through the FPS network.

9. Grain sales occur at a fixed price called the 'issue' price that is typically lower than the market price. Two conditions govern the sale of subsidized grain. First, the buyer of grain must

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3 Chaudhuri and Somanathan (2011), Kotwal, Murugkar and Ramaswami (2011)
possess a `ration card'. Second, grain purchases are subject to a quota. The public distribution system is supported by a procurement operation that procures and funnels supplies to the PDS. Through the FCI, the government procures grain at the `procurement' price and then stores and transports it to the various consuming locations.

10. The food subsidy arises from government procurement and distribution of two commodities: wheat and rice. Significantly, coarse cereals (bajra and jowar)* do not receive subsidies even though, in some states, they are major components of food budgets of poor households. In the past, subsidies have been offered on other commodities such as edible oils and most notably, sugar. These are now unimportant particularly in relation to the subsidy expenditure on rice and wheat.

11. In the 1970s, the food subsidy averaged around 0.45% of GDP. It rose to 0.54% in the 1980s and was at around the same level (0.52%) in the 1990s. In the period from 2000/01 to 2007/08, the food subsidy has averaged 0.8% of GDP and around 7.5% of tax revenues. This indicates the pressure of the food subsidy on central government finances. In fact, the pressure might well be greater because it seems the budgetary provisions underestimate the magnitude of the subsidy. In the words of a report submitted to the Planning Commission of India, “The actual food subsidy is much higher as the release of the subsidy has been restricted up to the availability of the funds under the Budget.” 4 The same document goes on to record the FCI’s calculation that the gap between the food subsidy incurred by it and the subsidy allocation in the budget is expected to be Rs. 200,000 million in 2011/12. It should be noted that there are some states of the Indian Union that offer food subsidies beyond the parameters of the central government scheme. The additional expenditure is borne by those states and not included in the food subsidy numbers.

12. The food subsidy expenditure of the government consists of two components. The first component is the so-called `consumer subsidy' that comes about from the fact that the difference between the issue price (at which the government sells) and the procurement price is not enough to cover the costs of distribution. The second component is the cost of carrying buffer stocks called buffer subsidy. The buffer subsidy varies with the size of stocks. In the late 1990s and the early 2000s, the buffer subsidy rose sharply as stocks rose reaching a peak of 66% of total food subsidy in 2001/02 (Department of Food and Public Distribution, 2002). For later years, a consistent series of buffer subsidy is not available. The data does allow a direct calculation of the consumer subsidy. For 2009/10, the consumer subsidy was Rs. 530,000 million while the budgetary expenditure on the food subsidy was Rs. 580,000 million.5 However, the remainder cannot be deduced to be the buffer subsidy because of the under-estimation of the total subsidy alluded to earlier.

13. Prior to 1997, entitlement to the PDS was not contingent on household characteristics. The most significant policy initiative in reforming food policy was the introduction of the targeted PDS (TPDS) in 1997. Subsidies depend on whether the household is classified as above poverty line (APL), below poverty line (BPL) or poorest of the poor (POP) identified by the Antayodaya Anna Yojana* (AAY) program. Table 1 displays the issue prices for the various

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4 Working Group on Reforms in the Public Distribution System and Better Targeting of Food Subsidies during the 12th Plan Period (2011). The document is written as an input into the formulation of the 12th Plan. However, it does not represent an official view of the Plan panel.

* millet and sorghum, respectively.

5 In calculating this, we took the data on consumer subsidy per ton from the 2009/10 annual report of the FCI and the offtake figures from the Economic Survey (Government of India, 2012).

* Antayodaya Anna Yojana is a governmental food distribution program.
categories of beneficiaries as well as prices paid by households for grain from market sources for the years 2004/05 and 2009/10. The prices paid by households are computed from the consumption expenditure surveys of the National Sample Survey Organization. The table reports the median price paid by households for market grain. The table also reports the median price paid by the bottom four expenditure deciles of households. This is reported here because the grain supplied in the PDS is typically of low quality and therefore corresponds better to the market grain purchased by low income households.

Table 1: Issue Prices and Market Prices for Rice and Wheat, Rs/Kg

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<th>2004/05</th>
<th>2009/10</th>
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<tr>
<td></td>
<td>Rice</td>
<td>Wheat</td>
</tr>
<tr>
<td>POP Issue Price</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>BPL Issue Price</td>
<td>5.65</td>
<td>4.15</td>
</tr>
<tr>
<td>APL Issue Price</td>
<td>7.95</td>
<td>6.1</td>
</tr>
<tr>
<td>Median Market Price</td>
<td>10.75</td>
<td>9</td>
</tr>
<tr>
<td>Median Market Price of bottom 4 Deciles</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Issue Prices are from Economic Survey, Government of India; Market prices are computed from NSS expenditure survey data.

14. Presently, all households are entitled to a monthly quota of 35 kg of rice or wheat per month. In principle, the prices of subsidized grain are supposed to be fixed with reference to the government’s "economic cost", i.e., the cost incurred by government agencies in procuring, storing, transporting and distributing grain. BPL households are supposed to receive 50% subsidy (i.e., 50% of economic cost) while APL households are not supposed to be eligible for any subsidy at all. The prices for POP households are fixed below that of BPL households and not with reference to economic cost.

15. In practice, the subsidized prices fixed in 2002 have not been revised despite increases in economic cost. Figure 1 plots the BPL and APL issue prices of rice as a percentage of the procurement price of rice and also its economic cost. The procurement price of rice is representative of the wholesale price of rice at harvest while the economic cost is a close approximation of the retail price.\(^6\) The graphs for wheat are almost identical and therefore not reported. It can be seen from Figure 1 that even the APL households receive a subsidy in excess of 50% of economic cost.

\(^6\) In fact, as pointed out later in this report, the economic cost could be higher than the retail price.
16. The qualification to this is that the central government does not guarantee full grain supply to the state governments for its APL requirements. The actual allocation depends on past purchases and ad-hoc considerations. As a result, the grain quota for APL households ranges between 10-35 kg per month across different states. The total number of households within a state that are eligible to be classified as BPL is made through an expenditure sample survey administered by the central government (the consumer expenditure survey of the National Sample Survey Organization).

17. The list of BPL beneficiaries is prepared through a separate BPL census. In the latest census of 2002, households received scores based on 13 criteria. The BPL households were identified as those who fell below a cut-off score (which was decided by the respective state governments). If the total of BPL identified households exceeds that which is estimated by the central government, the subsidy on the excess households has to be borne by the State government.

18. In recent years, some state governments have departed from the norms of the central government with respect to entitlements of BPL and APL groups with regards to price and quantity. However, the centrally-decided parameters of entitlements and issue price remain the basis for allocation of grain to the states and the price that is charged to them.

III. REACHING THE POOR

19. The National Sample Survey (NSS of consumption expenditures of households in 2004/05 shows that only 40% of rural poor households and 27% of urban poor households (i.e., households with expenditures less than the official poverty line) possessed either a BPL or a

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Notes: BPL1: The BPL issue price of rice as a proportion of procurement price of rice, BPL2: The BPL issue price of rice as a proportion of the economic cost of rice, APL1: The APL issue price of rice as a proportion of procurement price of rice, APL2: The APL issue price of rice as a proportion of the economic cost of rice.

Sources: Data is obtained from various issues of the Economic Survey. The paddy procurement price has been converted to a rice procurement price assuming a conversion ratio of 0.67.
POP entitlement (Jha and Ramaswami, 2010). This is the exclusion error of targeting. The remainder of poor households either had no entitlement or an APL entitlement.

20. The inclusion error of targeting is the proportion of BPL and POP beneficiaries that are non-poor. This is 68% in rural areas and 51% in urban areas. High inclusion errors are to be expected. First, since there are benefits from being categorized as BPL or POP, the process of identification of poor is vulnerable to manipulation and capture by non-poor groups. Second, it is hard in practice to distinguish households who are just above the poverty line from those just below it. India’s official poverty line measures bare subsistence and so households above this threshold may also exhibit signs of income stress. Indeed, 70% of BPL and POP beneficiaries in rural areas and 78% in urban areas are households with expenditures less than 1.5 times below the poverty line (Jha and Ramaswami, 2010).

21. Among the poor that have BPL or POP entitlement, only 61% use the PDS. This suggests that many poor households do not find the PDS convenient. Case studies have thrown up a variety of reasons for this such as the limited liquidity of poor households, (as ration entitlements can be accessed only once every two weeks rather than continuously) uncertain ration supplies, inferior quality of PDS grain, irregular hours of PDS shops and their often inconvenient locations. Ramaswami and Balakrishnan (2002) show that consumers perceive PDS grain to be of lower quality even though the government does not set out to procure such grain. This is a deadweight loss that occurs due to inefficiencies in the government marketing chain.

22. The PDS has also been criticized for illegal diversions and for excess costs of state agencies. Illegal diversions happen as agents in the government marketing chain sell the subsidized grain in the open market and profit from the difference between the market price and the subsidy price. Excess costs occur when the cost of procuring and distributing grain is higher for the state agencies than for the private sector. Jha and Ramaswami (2010) show that, in 2004/05, 55% of the subsidized grain was illegally diverted. They also show that only 29% of the total food subsidy expenditures by the government reached the households. The remainder of 71% was absorbed by excess costs (28%) and illegal diversions (43%).

IV. THE CHANGING POLICY CONTEXT AND FUTURE DIRECTIONS

23. Until the late 1960s, the principal policy question was how food could be procured cheaply. Toward this end, the government imposed mandatory levies on rice mills, instituted zoning regulations on movement of grain from surplus to deficit areas (so that prices are lower in the surplus zones), prohibited external trade except on government account and severely curtailed large trading operations through “anti-hoarding” controls on stocks.

24. The food policy context changed in the 1970s with the technological breakthroughs of the Green Revolution. Earlier concerns about movements in inter-sectoral terms of trade adverse to industry faded away. With large food surpluses, declining real prices of foodgrains, and greater political clout of farmers, the emphasis of food distribution shifted to support of farm gate prices, stabilization and subsidy for lower income groups. Food subsidy as a major item of government expenditures made its appearance around this time. Over time, the principal policy issue became to find acceptable ways to cap the food subsidy. In this background, the idea that subsidies ought to be targeted to the poor gained support in the late 1990s.

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8 The diversion estimates from the recently released survey data for 2009/10 are of the order of 41%.
25. With rapid economic growth, the policy environment shifted in the late 2000s. There is concern that the income gains from growth have not been shared evenly. To ensure that the poorest groups benefit from growth will require many things; one of them is to use the expanding resources of the State to directly help the poor with basic goods and services such as food, education and health. The campaign of the United Progressive Alliance that came to power in 2009 promised a National Food Security Act that would create legal entitlements to subsidized food for the poor. The scope and form of such an Act is the subject of current debate.

26. Two issues have been prominent in the debates about this bill. The first issue is about the scale of the food subsidy program. Should it continue as a targeted program or should it have universal access? The second issue is about the form of the subsidy program. Should the subsidy program be modeled on the public distribution system or are there alternative and more efficient forms of delivery?

27. The massive exclusion errors of PDS targeting, noted in the previous section, question the continuance of targeted programs. Until a reliable way of identifying the poor is found, might near-universal coverage be necessary to avoid exclusion errors? The staggering inefficiency of the PDS suggests to some observers that alternative models (especially direct cash transfers) ought to be considered. Others believe that the existing structure should be reformed and continued.

28. The draft of the NFSB that is publicly available commits the government to reach food subsidies to 75% of the rural population and 50% of urban population. Thus, the coverage has been extended from existing levels to what has been called “near-universal” coverage. This would mean a PDS that operates on a larger scale. However, the near-universal coverage has not put an end to the debate about targeting. Firstly, the government still has the task of excluding 25% of the rural population and 50% of the urban population. Secondly, the draft bill proposes differential subsidy entitlements to what they call ‘priority’ and ‘general’ households. Priority households are entitled to 7 kg per person per month while general households can claim 3 kg per person per month. The subsidy rate is also higher for priority households. As a result, it is estimated that at current costs, the subsidy to a priority household is Rs. 1344 per person per year while that to a general household is Rs. 417 per person per year. Thus, while near-universal coverage would help in ensuring that most of the poor receive some subsidy, the new proposals do not do away with targeting. The government still needs a way to distinguish priority from general households.

29. The PDS is seen as the principal instrument of subsidy delivery in the main text of the draft bill. However, Chapter VII of the bill commits the central and state governments to undertake necessary reforms of the PDS. Some of the reforms mentioned in the bill include: (i) doorstep delivery of foodgrains to PDS retail outlets, (ii) application of information technology tools for computerization and transparency, (iii) use of the “aadhaar”* or unique biometric ID platform for transaction authentication, and (iv) introduction of schemes such as food coupons and cash transfers.

* Aadhaar is a 12 digit individual identification number issued by the Unique Identification Authority of India on behalf of the Government of India.
V. STORAGE AND LOGISTICS: HOW MUCH CAPACITY IS NEEDED?

30. Since 2010, the problem of insufficient storage capacity has attracted both political and media attention. In print and television, commentators have highlighted that the country lets grains rot while there are people that go to bed hungry.9 Similar comments have echoed in the country’s Parliament.10 In September 2010, the Supreme Court hearing the Right to Food public interest petition asked the government to distribute to the poor, the foodgrains that would otherwise rot. The mismatch between stocks and capacity has, if anything, worsened. An internal note of FCI accessed by a newspaper predicts stocks of 75 million metric tons (MT) by June 2012. The note warns that "FCI and state agencies will neither have the storage capacity nor the manpower to manage such a substantial increase in stock in central pool" (Times of India, April 23, 2012).11

31. It is useful to split the issue into two questions: how much storage capacity is required for public stocks and second, what policies will get us there. The first question is tackled in this section while the second question is discussed in the following section.

32. An analysis of the first question is non-trivial because stocks fluctuate over time depending on harvest, price support and market prices. Clearly, then capacity that is sufficient at any one point in time can be too little or too much at other times. In this section, we offer a simple method for determining the needs for seasonal storage.

33. As India’s volume of marketed surplus grows, so will needs of storage and transport. This is independent of whether there is a PDS or not. In the late 1990s, the marketed surplus of rice was estimated to be 52% of output and that of wheat to be 54% of output (Directorate of Marketing and Inspection, 2002). With a total output of around 180 MT (of rice and wheat), the marketed surplus is then in the range of 90-95 MT. Crop harvests occur at finite discrete points (rabi (spring) in the case of wheat and predominantly kharif (autumn) in the case of rice) with consumption occurring through the year. Hence the crop needs to be carried from the harvest months to the other months when there is no harvest. This constitutes the demand for seasonal storage.

34. Table 2 displays the per capita consumption of foodgrains, wheat and rice across quarters. The consumption data show that there is no seasonal pattern in the consumption of cereals. Therefore, if $x$ is the total annual consumption of grain, the consumption in any quarter is roughly ($x/4$). For a crop like wheat which is harvested at only one time in a year (April-May), this means that grain must be carried to other periods in the year. Hence there is high demand for seasonal storage. Rice is principally a kharif crop with harvests in October-November. There are harvests at other times in the southern and eastern parts of the country. However, these are much smaller and therefore the pre-dominant seasonal demand for rice storage comes from the need to carry the kharif harvest to the rest of the year.

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The seasonal demand for storage can be worked out from the principle that grain must be allocated equally over time. The first step is to compute the marketed surplus. From information given earlier in this report, it is assumed a marketed surplus of 50 MT for rice and 40 MT for wheat. Second, it is assumed that the portion of output that is consumed on-farm does not require commercial storage in the form of godowns and silos. Third, because this is a model of seasonal storage, it is assumed that there are no carry-overs of grain from one marketing year to another. Fourth, it is assumed that in the periods of production, the consumption demand is instantaneously met without any need of storage (in the form of godowns and silos). Of course, some very short-term storage would be required – whether in shops or in transit.

Thus for instance, at the beginning of October – which is the kharif marketing season, there are no carry-overs of rice from the previous marketing year. At the beginning of the next quarter, starting in January, the carry overs are 3/4ths of the marketed surplus of 50 million MT which is then progressively reduced to 1/2 and 1/4 th of the marketed surplus in the succeeding quarters. A similar scheme can be worked out for wheat. Storage requirements taper off at the end of the marketing years for rice (September) and for wheat (March) respectively. The results are displayed in Table 3 below.

The peak demand for storage occurs on January 1 and this constitutes the storage capacity that must be planned for. This means that storage capacity of approximately 50 million MT is the current requirement and that such requirement would proportionally increase with marketed surplus. For instance, the projected output for 2013/14 is 86 million MT of wheat and 106 million MT of rice (Economic Advisory Council, 2011). This would result in a marketed surplus of around 43 million MT of wheat and 53 million MT of rice. The logic of table 2 means that the maximum demand for storage would occur in January and would be 3/4 ths of the marketed surplus of rice and 1/4 th of the marketed surplus of wheat. Even with these expected projections, the demand for seasonal storage for rice and wheat is unlikely to exceed 60 million MT in the immediate future. It should be emphasized that if estimates of marketed surplus are different from what we assumed, our method can still be used to determine seasonal storage requirements.

What about the storage needed for public stocks? Table 4 displays the official norms for minimum buffer stocks held by the government. If the government stocks were to follow these norms closely, government needs a storage capacity of 32 million MT. The buffer stock norms.
for wheat follow the logic of Table 3 with stock levels consistently declining from July. However, because of the need to carry reserves across the year, the norm at the beginning of April is 7 million MT. Rice procurement takes place in the first and last quarter of the calendar year. Hence, the rice buffer stocks norms do not display the marked seasonality in the storage demand calculations of Table 3 above.

### Table 4: Official Norms for Government Storage, million MT

<table>
<thead>
<tr>
<th></th>
<th>Rice</th>
<th>Wheat</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>July 1</td>
<td>11.8</td>
<td>20.1</td>
<td>31.9</td>
</tr>
<tr>
<td>Oct 1</td>
<td>7.2</td>
<td>14</td>
<td>21.2</td>
</tr>
<tr>
<td>Jan 1</td>
<td>13.8</td>
<td>11.2</td>
<td>25</td>
</tr>
<tr>
<td>April 1</td>
<td>14.2</td>
<td>7</td>
<td>21.2</td>
</tr>
</tbody>
</table>

39. With the passage of the Food Security Act, it is expected that grain procurement would go up. The Rangarajan Committee estimated a food distribution requirement ranging from 64 to 74 million MT of grain. These estimates do not include the split between rice and wheat. Historically, rice distribution has been nearly 2/3rds of total PDS sales. However, this was markedly different in 2009/10 when wheat distribution rose to almost half of PDS sales. With a 60-40 split between rice and wheat, rice and wheat procurement in the two scenarios is given in Table 5. Using the logic of Table 3, the peak storage demand arrives on January 1 when 3/4ths of rice procurement and 1/4th of wheat procurement would need to be stored. This is calculated in the adjacent columns. To this must be added the requirements of emergency/strategic reserves of 5 MT.

### Table 5: Demand for Storage by Government under the NFSB

<table>
<thead>
<tr>
<th>Scenarios</th>
<th>Total Procurement</th>
<th>Rice procurement</th>
<th>Wheat procurement</th>
<th>Rice storage on Jan 1</th>
<th>Wheat storage on Jan 1</th>
<th>Total storage on Jan 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>64</td>
<td>38.4</td>
<td>25.6</td>
<td>28.8</td>
<td>6.4</td>
<td>35.2</td>
</tr>
<tr>
<td>2</td>
<td>74</td>
<td>44.4</td>
<td>29.6</td>
<td>33.3</td>
<td>7.4</td>
<td>40.7</td>
</tr>
</tbody>
</table>

40. The total peak storage would therefore be around 46 million MT. Note that rice procurement not only happens in the last quarter of the calendar year but in fact, also happens in the first quarter of the calendar year. As a result, Table 5 assumes more seasonality in procurement and storage than what actually occurs. Hence the peak storage requirement calculated above is an upper bound. How does this compare to existing capacities?

41. The FCI, the central government agency responsible for procurement and storage of grain for the PDS, has a storage capacity of 32 million MT. Over the past five years, the capacity has fluctuated between 24 and 29 million MT. About half of the capacity is hired and this gives FCI some flexibility in changing capacity. Most of the capacity exists in the form of godowns. Around 10% of storage is Cover and Plinth (CAP) storage. Here foodgrains are stored in the open (but on an elevated platform) covered by special polythene covers. Such storage is of lower quality and its use has sometimes been criticized. Approximately half a million MT of storage capacity is in the form of silos. Unlike godowns, where grain is packed and stored in jute sacks with no climate controls, silos are structures for bulk storage under climate controlled conditions. Usually, silos also have other facilities for bulk handling like weighing, drying and transport.
42. Approximately 30 MT of storage capacity also exists with the Central Warehousing Corporation and the state warehousing corporations. Since FCI hires around 14 MT of capacity from these corporations, total public sector storage capacity is approximately 48 MT. Of course, not all of the capacity in the state and central warehousing corporations is available for foodgrains; it is also used for other agricultural and industrial goods. Assuming that the FCI has hired all the capacity that is possible from the Central and State Warehousing Corporations, then the gap between the FCI’s existing capacity (32 MT) and the required capacity (46 MT) is around 14 MT. If the CAP storage is to be done away, the gap rises to 17 MT. Coincidentally, in the 11th plan, the FCI identified a gap of 16 MT of capacity that needed to be created. Government funding restricted new capacity creation to the newly emerging procurement states, hill states and the states in the northeast.

43. The slow pace of capacity creation, the pressures of existing stocks and the possibility of a substantial expansion of the PDS because of the Food Security Act have all created a climate of urgency on construction and modernization of storage facilities. The calculations in Table 5 suggest that the gap in capacity is around 17 MT of which a small amount of additional capacity has been created. Yet while such additional capacity creation would help, the pressures may not cease. Peak stocks in 2010 and 2011 were 60 MT and above. According to some reports, peak stocks in 2012 may go beyond 70 million stocks. Going by peak procurement levels, the additional capacity required is on the order of 30-35 MT. This level is much higher than calculations of seasonal storage requirements (together with emergency reserves) even with an expanded PDS that confirms to the Food Security Act. What explains this discrepancy?

44. Our computations of peak seasonal storage capacity are based on the government's commitments to the public distribution system. Similarly, it is also forms the basis for the official norms on buffer stocks. However, what the government buys from farmers i.e., procurement, does not match the PDS requirements. This can be seen in Figure 2 which plots the annual figures for procurement and PDS sales. Since the early 1990s, procurement has consistently exceeded PDS sales. This is also the explanation why there have been recurrent crises of excess stocks and therefore storage capacity. It should be noted that this happened when the annual PDS commitment was at around 30-40 MT.

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12 In the analysis of gaps between capacity and demand, possible spatial mis-matches are ignored. For instance, the gaps are particularly severe in the so-called 'non-traditional states that are now contributing to the procurement pool (Andhra Pradesh and Chhattisgarh).
45. The explanation for why the government ends up acquiring stocks greater than what it needs for the PDS is complex. What is clear is that the difference is too large to be explained by the need for emergency reserves. The explanation lies in the procurement process and the fixation of the procurement price. For a hypothesis in this regard, see Kotwal, Murugkar and Ramaswami (2011) below.

Since the 1990s, with the exception of a single year, the government has bought more grain than it has sold through the PDS. Of course, the politics around the procurement price is a proximate reason. But there are other reasons too: most notably government miscalculation. At the higher levels of the government, there is immense paranoia about food shortages affecting the PDS. Politicians and bureaucrats perceive the costs of insufficient supplies but nobody is held accountable for excessive stocks and high prices. Predictably, the errors are in one direction. A near-universal PDS will considerably amplify the tendency of the government to carry excess stocks. Private trade will be displaced and so excess stocks in any one year continue to the next unless the cycle is broken by an exceptional event such as a drought.

46. The implication is that as long as the key structure of the procurement system is unreformed, there will always be a tendency to accumulate excess stocks. Indeed, it is likely, that an expanded PDS (consistent with the NFSB) will reinforce this tendency and the government may well carry stocks in excess of what has been even observed so far. However, from a social point of view, it is not clear that support for capacity creation ought to be guided by expectations of policy errors that cannot be sustained indefinitely. As noted earlier, there is a demand for higher capacity that flows from the growth process. In addition, there is the specific demand for capacity in the public sector because of PDS commitments. Such demands are easy to quantify and plan for. The demand that flows from ‘too high’ procurement prices is
harder to anticipate and therefore potentially risky to plan. The socially beneficial policy here would be to reform the procurement process (say from open-ended to closed-ended) so that it better integrates with the PDS. Currently, the procurement system is open-ended in the sense that the government is committed to buy whatever farmers wish to sell. A closed-ended procurement process would be one where the government buys only that much grain as to meet its distribution requirement.

47. Such reform of the procurement process will be hard. States that gain from open-ended procurement will oppose such a move. The government uses a rule of thumb by using the peak level of stocks of the last three years to calculate the storage gap (Planning Commission, 2011, p. 50). While this is a pragmatic response, it should be understood that the consequence is that storage capacity will lurch from one crisis to another. If capacity is insufficient today, the use of rule of thumb will ensure that it is in excess tomorrow. This has happened even in the recent past. Table 6 is reproduced from a report on the PDS submitted to the Planning Commission (Planning Commission 2011). This shows the total and net hiring of storage space by the FCI from 2001-2011. It can be seen that in response to `excess stocks' crisis of the early 2000s, the FCI hired as much as 20 MT of capacity in 2002.

48. As the crisis eased, the FCI `de-hired' the space until it dropped to a low of 8.7 MT in 2008 after which it again began to rehire space. While hiring, in principle, offers easy entry and exit into capacity, long-term contracts (discussed in the next section) preclude it. The government auditor, C&AG pointed out to the non-utilization of hired capacity in the 2000s and hence `avoidable' expenditure of over Rs. 10,000 million for the three year period ending March, 2007. As the Planning Commission report (2011) points out, such criticism led to de-hiring of storage space between 2002/03 and 2007/08. However, "the de-hired storage space was not always available for re-hiring once procurement started rising again from 2008-09 onwards." (Planning Commission, 2011, p. 43).

<table>
<thead>
<tr>
<th>POSITION AS ON:</th>
<th>Covered HIRED</th>
<th>CAP HIRED</th>
<th>GRAND TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.3.2001 CAPACITY</td>
<td>120.97</td>
<td>44.61</td>
<td>165.58</td>
</tr>
<tr>
<td>31.3.2002 CAPACITY</td>
<td>151.6</td>
<td>55.85</td>
<td>207.45</td>
</tr>
<tr>
<td>31.3.2003 CAPACITY</td>
<td>137.7</td>
<td>28.78</td>
<td>166.48</td>
</tr>
<tr>
<td>31.3.2004 CAPACITY</td>
<td>108.5</td>
<td>13.64</td>
<td>122.14</td>
</tr>
<tr>
<td>31.3.2005 CAPACITY</td>
<td>104.61</td>
<td>4.13</td>
<td>108.74</td>
</tr>
<tr>
<td>31.3.2006 CAPACITY</td>
<td>99.05</td>
<td>5.09</td>
<td>104.14</td>
</tr>
<tr>
<td>31.3.2007 CAPACITY</td>
<td>93.42</td>
<td>6.32</td>
<td>99.74</td>
</tr>
<tr>
<td>31.3.2008 CAPACITY</td>
<td>87.13</td>
<td>0.27</td>
<td>87.4</td>
</tr>
<tr>
<td>31.3.2009 CAPACITY</td>
<td>101.24</td>
<td>0.15</td>
<td>101.39</td>
</tr>
<tr>
<td>31.3.2010 CAPACITY</td>
<td>128.9</td>
<td>4.69</td>
<td>133.59</td>
</tr>
<tr>
<td>31.03.2011 CAPACITY</td>
<td>154.59</td>
<td>5.44</td>
<td>160.03</td>
</tr>
<tr>
<td>31.05.2011 CAPACITY</td>
<td>164.86</td>
<td>7.02</td>
<td>171.88</td>
</tr>
</tbody>
</table>

Net Hiring (01-02) 30.63 11.24 41.87
Net Hiring (02-03) -13.9 -27.07 -40.97
Net Hiring (03-04) -29.2 -15.14 -44.34
### VI. POLICIES FOR ENHANCING STORAGE

49. Constraints on public funding have favored policies of public-private partnerships. The *Grameen Bhandaran Yojana* is a centrally sponsored scheme that provides capital investment subsidy for small rural godowns. This program is not connected to FCI plans. The larger public–private partnership that is explicitly for the purpose of supporting capacity for FCI storage is one that consists of a government guarantee to hire godowns for a fixed number of years. The scheme first introduced in 2005 guaranteed hiring for five years. This was subsequently extended to seven and later, to ten years.

50. In the early versions of this scheme no tendering was followed and the procedure turned out to be non-transparent in many cases, especially for the selection of locations. As a result, the distances between procurement centers and godowns were sometimes too much. 7 MT of capacity was created, followed by a 10 year guarantee scheme under which around 2 MT of capacity creation has been sanctioned since July 2010.

51. Over time, the procedural issues have been streamlined to induce greater private sector participation. For instance, prior experience in the industry is no longer necessary. Godowns are now guaranteed to be rented within one month of completion and the time frame for rent payments fixed. The FCI does not directly transact with the private party. The intermediary is the Central or State Warehousing Corporation (CWC or SWC). Rentals are paid to the CWC or SWC which has responsibility for the maintenance of godowns and quality of stocks. The private party contracts with the CWC/SWC.

52. It should be noted that the partnership in these schemes is quite limited. Essentially, the private party offers storage structures in exchange for fixed rentals. However, preservation services and storage management continues to be with the public agency (CWC/SWC). An alternative arrangement might be to also outsource storage management to the private sector.

53. It is arguable that the current arrangement does not harness the efficiency of either the private or public sector. In the current arrangement, the private sector organizes the financing (in which the government might have an advantage), while the public sector manages the storage space (in which the private warehousing corporations may have an advantage). Therefore, an alternative and possibly more efficient arrangement would be for the FCI to do the financing (raise funds in the market) and then to obtain competitive bids for construction, preservation and storage management.
54. The other policy direction has been to evolve a framework for Public–Private Partnerships (PPPs) in the construction of grain silos. Most of India’s storage needs are met by godowns where grain is stored in bags. Modern silos where grain is stored in bulk under controlled conditions are few. This will call for more investment. The payoffs from silo storage also come from adoption of integrated bulk handling so that the grain is packed only at the final stage of disbursement. This would therefore require appropriate systems for transport and for silos in consuming states as well. A comprehensive framework for PPPs in this sector is still awaited from the Planning Commission. However, few PPP experiments have already happened.

55. The most well-known example of one of these partnerships is the partnership of FCI with Adani Agri-Logistics. Adani operates under a build, own and operate policy where the FCI offers a 20 year guaranteed rental. Another example is the agreement between LT Foods and the Punjab government.

56. Adani has built silos with a capacity of 550,000 tons at a capital cost of Rs. 6,500 million in 2006. The two big silos of 200,000 tons capacity are in Moga (Punjab) and Kaithal (Haryana). Smaller silos are at the field depots of Mumbai, Coimbatore, Hooghly, Chennai and Bengaluru. The silos are equipped to weigh the grain, test for quality and for mechanical cleaning and fumigation. Adani silos also come with their own specially designed rail wagons that can transport loose grain instead of bagged grain. In the Adani facility, the government pays Rs. 2000 per ton per year for a minimum guaranteed tonnage (of 400,000 tons). In addition, the company charges Rs. 500 for each additional ton. The LT foods silo is smaller at 50,000 tons built at a cost of Rs. 360 million. Here the contract is for a period of 30 years. However, its commercial operation experienced delay because of disagreement between the government and LT Foods on the reimbursement rate.

57. The key obstacle to investment in silos is that as they are more capital intensive, commercial viability requires Rs. 10-12 per sq. ft rentals (per month) against Rs. 6 per sq. ft per month rental for conventional bag storage. Second, silos are highly complementary to related infrastructure of logistics and transport. When all of this is in place – at both producing and consuming points – then there are payoffs in terms of reduced costs regarding handling and reduced losses from damage. At this stage, therefore, silos are not viable without viability gap-funding from the government.

58. It has been suggested that silo viability can be improved by providing finance at concessional interest (at the RIDF rate of 6.5%) as against the project lending rate of 12% for agricultural infrastructure. Another policy initiative would be to declare silos as “mandis” or regulated agricultural market so that grain can directly arrive in bulk from farmers instead of going via the Agricultural Produce Marketing Committee markets.

59. Of all the policy initiatives directed at storage capacity, the construction of silos naturally falls in the PPP domain. Firstly, it is capital intensive and financing is therefore critical. The public sector partner is more favorably placed to access finance at reasonable rates from development institutions (such as the National Bank for Agriculture and Rural Development) or from multi-lateral lending agencies. Second, unlike the godown PPP, the existing PPPs in silos hire storage space as well as storage management expertise from the private party. The quality and quantity risk (subject to minimum commitments) is fully borne by the private party. Third, investment in silos needs a coordinated approach – for the full payoffs from silos comes from the network externalities of having silos at producing and consuming centers and transport.
infrastructure tailored to silo storage. The government can take such a wide view for investments in this sector which is not possible for a private party.

VII. PROCUREMENT REFORMS: DECENTRALIZED PROCUREMENT

60. Procurement serves dual purposes: by supplying grain to the PDS and offering a Minimum Support Price (MSP) to farmers for rice and wheat. While the second objective could have an economic rationale (of assuring guaranteed prices to risk-averse farmers who do not have access to insurance markets), procurement is driven also by a political goal of safeguarding the interests of rice and wheat producers.

61. It is in this connection that a major perceived issue with procurement has arisen: its lack of balance; it is concentrated overwhelming in the grain surplus regions of Northern India. This is particularly so for wheat. Approximately 70% and above of procurement is from the northern states of Punjab and Haryana. The remainder is primarily from Madhya Pradesh and Uttar Pradesh. In rice, Punjab and Haryana states account for a third of procurement. Andhra Pradesh, Chhattisgarh, Uttar Pradesh, and Orissa states account for the remainder.

62. In 1997/98, the Government of India introduced a scheme of decentralized procurement. The primary goal was to extend the benefit of MSP to farmers in states beyond the traditional procuring zones. Subsidiary goals were to cater to local preferences of grains and to save on transport costs of the FCI. Under this scheme, the state government agrees to undertake grain procurement on behalf of the government of India. The central government reimburses the entire expenditure incurred by the state government. Table 7 displays the states that have agreed to decentralized procurement. In 2009/10, decentralized procurement contributed to around 12 MT out of a total procurement of 57 MT (Economic Survey, 2011).

<table>
<thead>
<tr>
<th>S.N.</th>
<th>Name of the State</th>
<th>Procurement of items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>West Bengal</td>
<td>Rice</td>
</tr>
<tr>
<td>2.</td>
<td>Uttar Pradesh</td>
<td>Rice/Wheat</td>
</tr>
<tr>
<td>3.</td>
<td>Madhya Pradesh</td>
<td>Wheat</td>
</tr>
<tr>
<td>4.</td>
<td>Chhattisgarh</td>
<td>Rice/Wheat</td>
</tr>
<tr>
<td>5.</td>
<td>Uttarakhand</td>
<td>Rice/Wheat</td>
</tr>
<tr>
<td>6.</td>
<td>Andaman and Nicobar Islands</td>
<td>Rice</td>
</tr>
<tr>
<td>7.</td>
<td>Orissa</td>
<td>Rice</td>
</tr>
<tr>
<td>8.</td>
<td>Tamil Nadu</td>
<td>Rice</td>
</tr>
<tr>
<td>9.</td>
<td>Gujarat</td>
<td>Wheat</td>
</tr>
<tr>
<td>10.</td>
<td>Karnataka</td>
<td>Rice</td>
</tr>
<tr>
<td>11.</td>
<td>Kerala</td>
<td>Rice</td>
</tr>
</tbody>
</table>

Source: Dept. of Food and Public Distribution
http://fcamin.nic.in/dfpd/EventDetails.asp?EventId=667&Section=policy&ParentID=0&Parent
=1&check=0

63. States, however, have complained about procedural issues that dumps additional costs on them. The procedure is for states to be reimbursed amounts in line with economic cost norms for that state (as fixed by the FCI). The states are irked by delays in reimbursement and lack of access to inexpensive credit facilities. If the scheme is revised to allow upfront subsidy transfers to states, it would facilitate greater adoption by them.

64. Can outsourcing procurement to State agencies or even to private agencies promote greater efficiency? What is clear is that there exists scope to improve on the costs incurred by
the FCI in procurement, storage and distribution. Since this is an activity also done by private agents, it is useful to compare government costs with private costs to ascertain the efficiency of government interventions. In their review of literature about distribution costs, Jha and Srinivasan show that private traders operate at costs lower than those incurred by the government agency in the areas of marketing, storage, trade and transport despite several controls and restrictions imposed upon them. They note that the trading costs and wholesale marketing margins of private traders in 2000-01 were around half those of the government agency for wheat and around 3/4 for rice.

65. In India, the government publishes the “economic cost” its intervention agency, the FCI incurs in procuring, transporting and distributing grain to various stock points. This together with the additional distribution cost to the retail outlets is the government’s cost of delivering grain. By comparing it with retail prices of grain, the efficiency of government operations can be evaluated. Table 8 compares the economic costs of FCI with market prices in 2004/05 and 2009/10. As the distribution cost of PDS retail outlets is not included in the economic cost, the difference between the costs of private and public supply of grain is even higher than that indicated by Table 8.

<table>
<thead>
<tr>
<th></th>
<th>2004/05</th>
<th>2009/10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rice</td>
<td>Wheat</td>
</tr>
<tr>
<td>Economic Cost</td>
<td>13.04</td>
<td>10.19</td>
</tr>
<tr>
<td>Median Price</td>
<td>10.75</td>
<td>9</td>
</tr>
<tr>
<td>Median Price of bottom 4 Deciles</td>
<td>10</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Economic Cost is from various issues of Economic Survey of Government of India. The retail prices are our calculations from the consumer expenditure survey data of NSSO.

66. The discrepancy between economic costs and retail prices has been noted in earlier studies. Dutta and Ramaswami (2001) used this to demonstrate that in 1993/94, 27% of government budgetary expenditure on food subsidy in the state of Andhra Pradesh was wasted by inefficiency of government agencies. The figure for the state of Maharashtra in the same year was 16%. A more recent study (Planning Commission, 2005) finds that in the year 2003/04, delivery through the private sector was more efficient in all states except Kerala. The evidence indicates that at the all-India level, the government’s food subsidy costs would have been lower by 35% if the government costs matched that of the private sector. Jha and Ramaswami (2012) showed that in 2004/05, FCI costs exceeded market consumer prices of rice by 20% and that of wheat by 8%. They also undertake a variety of robustness checks to control for seasonal and spatial variation in market prices.

67. The comparative higher costs of FCI suggest that there can be gains from outsourcing procurement to the private sector (subject to the condition that they procure at the MSP). In fact, private sector agencies were involved in procurement for FCI in 2005/6 to 2007/8. Over one million MT of grain was procured in Orissa, Bihar and Madhya Pradesh states. Farmers were given MSP through bank checks. These private agencies were reimbursed on deliveries of rice and wheat to designated FCI depots. In this model, storage and grain preservation is the responsibility of the private sector. The way it worked was, bids were invited from private agencies based on a costing sheet (specific to each state) of the FCI. The costing sheet indicated that maximum permissible bids. Hence, by its very construction, private procurement can happen only when it is more efficient than FCI procurement.
68. The policy was abandoned in 2008 but has been revived again. However, there has been little interest in it – not because private players believe that they cannot outbid FCI costs, but because FCI procedures for reimbursement are cumbersome. For instance, even when private agency bids have been accepted, the FCI insists, at the time of reimbursement, on documentation of all costs. This leads to significant delay in payments that private agencies are unable to bear. While private agencies are comfortable with payment on delivery and with supplying proof that growers are paid MSP, they find the documentation costs burdensome.

VIII. PROCUREMENT REFORMS: COMPUTERIZING THE PROCUREMENT NETWORK

69. Procurement has both spatial and temporal dimensions. Grain is purchased at many locations and purchases happen over several months. Grain purchases are aggregated and moved to warehouses from where it is supplied to the public distribution system. A complication that occurs with rice is that it is procured in the form of paddy. It then leaves the government system to be milled by private rice mills and returns to the government system in the form of rice.

70. These operations have been computerized in the decentralized procurement operations of Chhattisgarh. The state procures five MT of paddy through 1,500 Primary Agricultural Cooperatives. The grain is moved and stored in the warehouses of the Chhatisgarh Civil Supplies Corporation from where it enters the public distribution system.

71. A computer network and an associated database links the primary agricultural cooperatives, warehouses and the Food and Civil Supplies Department. Procurement data is entered in off-line mode at the procurement centers and is uploaded to the central server on a daily basis. Motorcycle runners carry the data to the locations with network connectivity.13

72. This kind of electronic information system has several advantages. First, it has enabled rapid payments of procurement dues to farmers. Second, the information system offers real-time information on procurement, grain movement and stocks to decision-makers. As a result, the system is forced to match data on these key variables and so diversions will result in discrepancies that show up on the system. Third, the system is also extended to distribution centers and the movement of grain from warehouses to these centers. As a result, it enables automation of allocations and grain movement to the distribution centers. The importance of such automation is described in the next section.

73. Despite its many advantages, computerization would not be easy in many of the other states. Chhattisgarh extensively used primary agricultural societies/cooperative societies as points of procurement and therefore bypassed the traditional agricultural markets governed by the Agricultural Produce Marketing Committee Acts. In states where this is not possible, obtaining the cooperation of the Agricultural Produce Marketing Committee (set up under the Act) would be essential.

IX. DISTRIBUTION REFORMS

74. After grain reaches designated FCI supply depots within a state, further distribution of grain is then the responsibility of the state government. The logistics of grain distribution has a

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13 For a detailed description see Dhand et.al (n.d.)
well-defined structure. First, there has to be a list of beneficiaries together with their entitlements. Such a list at a particular location would dictate the amount of grain to be allocated to that location for every month. The amount of grain to be supplied to a location is, however, not the same as the allocation. Supplies depend on the allocation as well as the stocks already held at the location (amounts not sold from previous supplies). The supply order leads to the movement of grain from the state warehouses to supply depots. In most states, the retailer picks up supplies from these depots. In states with ‘door-step delivery’ the supplies are delivered at state expense to the FPS. Finally, FPS retails the grain to the listed beneficiaries according to their entitlements. In sequence, the following are the principal activities of the distribution system:

1. **Listing of Beneficiaries.** This includes classification of households into poorest of the poor or Antayoda Anna Yojana (POP/AAY) households, Below Poverty Line (BPL) households and Above Poverty Line (APL) households.

2. **Issue of Ration (Entitlement) Cards to Beneficiaries.** This is the principal means of identifying the beneficiary as belonging to any one of the above groups.

3. **Authenticating Transactions.** The FPS retailer is legally bound to sell grain only to the listed beneficiaries and that also according to the entitlements defined for the group to which they belong (APL, BPL and POP/AAY). In many states, the standard practice of authentication is for the beneficiary to show the ration card to the designated FPS retailer. Existing practice ties a beneficiary to a particular FPS. At the time of purchase, the details of purchase are entered in the ration card.

4. **Grain storage, movement and supply to FPS.** The FPS retailer obtains grain from the supply depots (usually managed by state civil supply warehouse corporations). This is a monthly operation and the FPS retailer pays for this in advance. The supplies to the FPS retailer are authorized by a supply officer who takes into account unsold stock from previous supplies and the allotments done on the basis of the number and type of beneficiaries.

Once the beneficiaries are listed and ration cards issued, activities (3) and (4) recur every month. Although distribution has a well-defined structure, it has been hard in practice to administer this system efficiently. One of the most well studied aspects of the PDS has been the leakages of grain from the subsidy system. The sizeable difference between the issue price (at which grain is sold to the consumer) and the market price creates incentive for profitable and illegal arbitrage. In government records, the arbitraged grain is recorded as being sold at the issue price and therefore part of the legitimate sales of subsidized grain to households. However, in fact, such sales are fictitious.

In recent years, some states are attempting to address the loss due to illegal diversions by deploying information technology together with some administrative measures. The principal elements of distribution reform have been the following:

1. **Computerizing the database of beneficiaries.** This is essentially transferring the contents of paper records to a digital domain.

2. **New listing of beneficiaries.** A fresh listing could be motivated by the need to reduce exclusion and inclusion errors. Governments may wish to include eligible households that either did not exist or were left out during earlier listings. Similarly,
governments may wish to exclude households that were either wrongly included in earlier listings or have since become ineligible. The new listings could be done by the inclusion of new databases (such as BPL lists from various vintages) or by household verification. Verification could consist of door-to-door verification or it could include identification through biometrics. The latter would necessitate a fresh process of enrollment into the program.

3. **Issue of new ration cards.** A fresh listing of eligible households makes this essential. But even otherwise, these ration cards may be re-issued to incorporate features such as bar-coding and biometric ID.

4. **Authentication of transactions by smart cards and/or biometric identification.** In existing practice, authentication is typically done at the point of sale. The possession of a ration card is taken to be proof that the holder of the card is a registered beneficiary. However, the scale of leakages from the PDS in the form of illegal diversions of grain suggest that a fair number of ration cards are issued either to fake customers or that a single person controls a large number of ration cards. One way to resolve this is to require the customer to provide fool-proof identity at the time of accessing the FPS. There are possibly several ways of doing this. One way is through smart cards. Smart cards can be used to authenticate transactions either through numeric code identification (such as in a bank card) or through biometric identification. The latter requires the use of biometric scanners that reads and transmits the information to a central server where it is matched with previously registered biometrics.

77. Smart card based systems have been used in a pilot project in Chandigarh. In author's visits to the states, some of the respondents reported that the success of smart card systems has been mixed. The primary problem is that PDS retailers, whose interests are directly opposed to authentication, are entrusted with the management of smart card devices. As a result, there have been frequent problems with the functioning of smart card readers, many of which are suspected to be engineered. This could be a problem with any device reader (smart card, biometric) at the retail level. The other issue is one of infrastructure. For a reader to authenticate the transaction, it must do so against a database stored at a central server. Connectivity is therefore essential for this to happen.

78. An intermediate system that is employed in some states is the use of food coupons. Here consumers obtain food coupons against biometric IDs which are then redeemed at the FPS. In such a system, connectivity is not required at the FPS level; it is, however, required for the issue of food coupons.

79. There are two major benefits of distribution reform. First, the authentication of transactions at the retail level eliminates fake and duplicate ration cards. Insofar as illegal diversion is recorded in government books as legitimate sales, such an avenue for diversion is shut. Second, the automation of retail transactions leads to real time information on supply gaps at each retail outlet. Hence, it is possible to connect this module with a back-end module of inventory management system (stocks and grain movement between different storage depots) resulting in automated supply and movement. This reduces paperwork and increases the timeliness of supplies.

80. Reliable costs for distribution reforms are hard to obtain. It depends on the number of beneficiaries. The costs reported by the states may not always fully account for the costs of in-
house resources. The best estimate comes from Madhya Pradesh. Here reforms have covered the activities mentioned in (1) to (4) above. Moreover, all of these activities have been outsourced to a private consortium for a period of five years. It is reasonable to assume that the consortium will recover its costs during this period. The government reimburses the consortium at the rate of Rs. 10.98 (inclusive of taxes) per transaction of each BPL card holder. With a population of 7 million BPL (and AAY/POP) cardholders, this means that total number of transactions (maximum) in a year is 84 million (7 x 12). Hence over five years, the total number of transactions is 420 million. At the agreed reimbursement rate, the maximum cost to the government is Rs. 4,611 million. This is the upper bound on the cost because calculations assume that all BPL card holders transact PDS grain every month. The private consortium has an additional source of earnings as well— from APL cardholders who directly pay for each transaction (unlike BPL cardholders whose cost is picked up by the MP government).

81. Across states and at the national level, there is awareness and advocacy about the use of information technology in distribution reforms. As mentioned earlier, responding to the petition about the right to food, the Supreme Court of India has issued a number of directives to the government. To derive a factual basis for their orders, the court has appointed a Central Vigilance Committee chaired by Justice D.P. Wadhwa to “to look into the maladies affecting the proper functioning of the Public Distribution System and also suggest remedial measures.” The committee has issued a number of reports on the PDS including one on computerization of PDS operations. In its report of 2009, the committee recommended “least human intervention and end-to-end automation and computerization of the complete PDS chain.”

82. The Expert Committee on the NFSB (2010) argued that that comprehensive computerization of the PDS network starting from the allocation of the grain, to the final delivery to the targeted beneficiary will go a long way in plugging the diversion of grain, bogus ration cards and the delivery of poor quality foodgrains to beneficiaries.

83. In 2011, the government of India constituted a task force (chaired by Nandan Nilekani) to work out a system of direct transfers of subsidy for kerosene, liquefied petroleum gas and fertilizers. Subsequently, the task force was also mandated to suggest an IT strategy for the PDS. On the ground, several states have already rolled out distribution reforms. Table 9 summarizes these efforts.

Table 9: Best IT Practices in PDS Across States

<table>
<thead>
<tr>
<th>Best Practices</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creation of centralized beneficiary databases</td>
<td>Chhattisgarh, Gujarat, TN</td>
</tr>
<tr>
<td>Cleaning up of duplicate beneficiaries through biometrics</td>
<td>AP, MP</td>
</tr>
<tr>
<td>Web based application for maintaining ration card database</td>
<td>Chhattisgarh, Gujarat, TN</td>
</tr>
<tr>
<td>Issuance of TPDS commodities thru Bar Coded RC</td>
<td>Chhattisgarh, Gujarat</td>
</tr>
<tr>
<td>Issuance of TPDS commodities thru Smart Card based ration cards</td>
<td>AP, Chandigarh, Haryana, Orissa (all are in Pilot stage)</td>
</tr>
<tr>
<td>Issuance of TPDS commodities thru Food Coupons</td>
<td>Bihar, Gujarat (Pilot), MP</td>
</tr>
<tr>
<td>Online biometric verification before transaction</td>
<td>Gujarat (Pilot)</td>
</tr>
</tbody>
</table>
X. INDIVIDUAL STATE EXPERIENCES

84. This section provides a glimpse of the variety of distribution reforms that are being attempted. A comparative assessment across Chhattisgarh, Gujarat and Madhya Pradesh states provides an opportunity to identify the generic issues, and to evaluate the possible strengths and limitations of the reform models on offer.

A. Chhattisgarh

85. This state has undertaken several kinds of reforms of the PDS:

1. Computerization of the Procurement System: Chhattisgarh is a surplus state in paddy and contributes to the central rice pool of the PDS. The procurement operations in the state are undertaken under the decentralized procurement scheme of the Government of India. The Chhattisgarh computerization of procurement has been described earlier in Section 7.

2. Timely management of supplies: The state is not dependent on FCI for supplies. It retains the portion needed for its PDS and the remainder is transported to the FCI godowns. Control over supplies together with a software solution that links state warehouses and procurement centers makes it possible to automate allocation, delivery orders and transport movement. Chhattisgarh offers “door-step” delivery by which the grain is delivered to FPS unlike the usual model where it is the responsibility of the FPS retailer to pick up the grain from the district supply depot.

3. Issue of bar-coded ration cards based on a computerized database of ration cards. Unlike some other states that have embraced PDS reforms, Chhattisgarh does not have an IT solution for transaction authentication. Instead, the new database was prepared on the basis of door-to-door verification. A smart card solution (without biometrics) is proposed to be deployed in urban areas for authentication.

4. Extended coverage. The Chhattisgarh PDS departs from the Central scheme in two ways. First, it covers more families under the BPL criterion than it is reimbursed by
the Central government. Around 70% of the population is covered under BPL or AAY/POP. Second, the rate for rice is Rs. 2 for BPL and Rs. 1 for AAY/POP, both of which are lower than the GoI rates. As a result, the state government incurs food subsidy expenditures of more than Rs. 10,000 million. Sensitivity to exclusion error and the political commitment to extended coverage is the principal feature of the Chhattisgarh model.

5. De-privatization of FPS. The FPS are run by self-help groups, gram panchayats and cooperatives. The government also increased the commissions sharply (by approximately 5 times). Supporters of the Chhattisgarh model claim that de-privatization has reduced leakages as the system is run by the people who have a stake in a well-functioning PDS. It should be noted that many other states have also experimented with these organizational forms and leakages have continued unabated.

6. Public Awareness. The extended coverage, the low price of rations and well publicized timely supply have served to create a public consciousness about the PDS and their rights to it. This, it has been suggested, has been a safeguard against illegal practices in the PDS.

86. Supporters of the Chhattisgarh model often claim that (near) universal coverage and de-privatization of FPSs are responsible for the model’s success. The implication is that this is a prescription for other states. Such claims need to be evaluated cautiously. It is, no doubt, true that the state government has been sensitive to exclusion errors resulting from targeting regimes. The willingness to spend out of its own resources is a stand-out feature and indicates extraordinary political will. As a result, the bureaucracy, in relation to other states, is also unusually pro-active in stamping out malpractices. Such political and bureaucratic will cannot be taken for granted elsewhere especially in the face of opposition from interests vested in the existing PDS. Indeed, even within Chhattisgarh, the model has not functioned with the same degree of success in urban areas.

B. Gujarat

87. The Gujarat model of reforms encompasses all the four components of distribution reforms sketched out earlier: computerization of the PDS database, new listing of beneficiaries, issuance of new, barcoded ration cards and transaction authentication using biometric ID. The project is at a pilot stage: one FPS in each *Taluka* of 22 districts has been selected for the pilot. The principal activities are the following:

1. All households are asked to re-register to obtain bar-coded ration cards. The process digitizes family particulars and requires an electoral photo id as proof of identity. Biometrics of family members are also recorded.

2. Bar-coded ration cards are issued and distributed.

3. Using these ration cards, the beneficiary visits an E-Kiosk (set up in the *gram panchayat* offices during the pilot) to obtain food coupons monthly. The computer operator uses a bar code reader device to enter the details of the beneficiary. Bar coded food coupons are issued on verification of biometrics.
The latter happens in real time and therefore requires connectivity with a central server.

4. The beneficiary redeems these coupons at the designated FPS.

5. The FPS retailer submits these coupons to the E-Kiosk. Again they are read by the scanner and entered into the electronic sales register of that FPS.

6. Against these electronic sales, allotments are made for the succeeding month which is picked up by the FPS from the supply depot. Although the intent is to also have a back-end inventory management system that is linked with the distribution network, that has not happened as of yet. When that does indeed happen, the system will be able to track storage, movement and lifting and automatically generate allotments and supplies.

*Gram panchayats are local self-governments at the village or small town level
* A Taluka is an administrative and geographical block consisting of an average of 80-100 contiguous villages.

88. The IT solutions have been deployed in-house in collaboration with NIC. The capital costs are estimated to be modest, at Rs. 800 million. The recurring costs are around Rs. 250 million per annum. These have to be seen as costs borne by the State and not total project costs. This is because some major costs such as that of the IT solution are borne by the Government of India through NIC.

89. The strength of the model is undoubtedly its focus on transaction authentication. In principle, the system ought to make leakages very difficult. However, the worry is that the model may be ahead of its time. Internet connectivity to gram panchayats (required for transaction authentication) is not as good as claimed. This causes delays in receipt of coupons – a cost that is doubly onerous because E-kiosks for most beneficiaries are more distant than the FPS. Another weakness of the model is its unconcern for exclusion errors. The requirement of electoral photo ID for the new ration cards is bound to exclude some of the poor. This is compounded by the difficulties in access to E-kiosks because of distance and poor internet connectivity. These problems could be severe because coupons are issued monthly. Bi-annual or annual issue of coupons would significantly lower the cost of access especially for poor consumers.

C. Madhya Pradesh (MP)

90. In terms of intent and scope, the MP model is similar to Gujarat. However, in terms of design and execution, the models are vastly different. Further, unlike Gujarat which is at the pilot stage, the MP model is at the roll-out stage with its first districts likely to `go live' in 2012.

91. Like Gujarat, biometric transaction authentication is at the heart of the MP model. The MP model is designed to be compliant with Aadhar, the nationwide biometric ID project of the Government of India. The Gujarat model is as yet independent of Aadhar but may be compliant with it in the future. The MP model is structured as follows:

1. Aadhar enrollment is a pre-requisite for PDS. Camps have been organized in villages (more than once) for households to offer their particulars and their biometric ID.
Organizationally, the Food and Civil Supplies Department is the Registrar to Aadhar in Madhya Pradesh.

2. Enrollment leads to a computerized database of PDS beneficiaries and to the issue of new Aadhar based ration cards.

3. Food coupons are mailed/couriered annually to the beneficiaries. On receipt, beneficiaries have to verify their biometric identification on a portable device. Internet connectivity for authentication is provided by commercial cell phone networks.

4. The beneficiary redeems the coupons at a designated FPS.

5. These coupons are picked up and transported to a scanning center at the State capital.

6. On verification of coupons, the electronic system generates a report of transactions and sales which can be used for allotments, supplies and movement.

92. The execution of the model has been handed to a private consortium consisting of HCL, Edenred and Virgo Softech. The government has no upfront costs but pays a service fee of Rs. 10.98 (inclusive of taxes) for each transaction. The model has several strengths worth noting. First, like the Gujarat model, it is also focused on transaction authentication – the key to stopping illegal diversions. It can also be seen that MP, like Gujarat, has avoided the smart card route because not only is it more demanding of infrastructure (internet connectivity at all retail points) but is also more prone to sabotage by interests opposed to transaction authentication. Second, the State has no upfront costs. All the risks of project implementation are borne by the consortium. Third, the system aligns the incentives of the vendors with that of the customers. The vendors get paid only if beneficiaries are enrolled and when they transact. Hence it is in their incentive to maximize their efforts toward enrollment and also timely dispatch and processing of food coupons.

93. The test of the model will be in the field. There are two major points of concern with regard to this. First, is the process of enrollment leaving out many of the eligible? – e.g., those who have temporarily migrated or those who are too old and/or infirm to attend village camps. In the same vein, if somebody is left out in the initial process of enrollment, is there an easy enough process for them to subsequently enroll? The strong incentives of the vendors should help in minimizing this concern. The second concern is the reliance of this model on Aadhar. For this model to work, households must receive Aadhar IDs on time. However, it does seem that for the moment, the issue of Aadhar IDs is not able to keep pace with enrollment. As a result, there are some delays in the project.

94. Finally, unlike Chhattisgarh, the MP model does not embrace procurement and storage even though MP, like Chhattisgarh, is a surplus state (in wheat) and undertakes decentralized procurement in wheat. The gains in efficiency can be far greater if the procurement operation is automated and linked to the distribution network.
XI. CONCLUSIONS

95. The PDS has gained salience because of the proposed National Food Security Act which will enlarge the PDS financially and logistically. However, there are major concerns with the PDS: the seeming shortage of storage capacity, the ‘excess costs’ of the FCI, the exclusion errors that deprive the poor, the poor efficiency in transferring subsidies to households, the illegal diversions that happen because of dual pricing, and the fact that it is customer unfriendly. All of these issues have been documented by researchers for several years.

96. In recent years, however, there has been greater attention in policy and execution on what reforms could move the PDS toward greater effectiveness. No official document on PDS today would be complete without reference to the necessity of PDS reforms. As the implementation of PDS is the responsibility of the States, reforms have to happen at that level.

97. The aim of this study was to sense and assess the movement on reforms: in policy as well as on the ground. The presumption was that the failures with existing mechanisms are so widely experienced that various states have on their own have devised alternative mechanisms and frameworks. Accordingly, the source materials for our study were government documents (for policy), interviews with key officials, public sector managers, interviews with private players in logistics, IT and food coupons.

98. Both procurement and PDS reforms were considered. If the food security bill is legislated, the PDS will be considerably enhanced in volume. This will put additional pressure in turn on procurement and storage. Hence, reforms in procurement and storage have an immediate bearing on the functioning and cost of the PDS. Some of the misgivings about the food security bill actually arise from the pressure it would put on procurement and storage (Economic Advisory Council, 2011). It has been argued by others (Kotwal, Murugkar and Ramaswami, 2011) that meeting the challenges posed by an enhanced PDS would require not just reforms in procurement but also specific kinds of PDS reforms such as cash transfers.

99. Specific findings from this study are as follows:

1. The FCI is short of storage capacity. By our calculations, peak storage demand ought to be 46 MTMT while FCI currently commands approximately 32MTMT of capacity. Of course, 14 MTMT is still a major shortfall and capacity needs to expand by nearly 50%. However, the calculations are not as dire as would be suggested by methods that consider peak procurement in recent periods.

2. The peak demand calculations assume procurement to be in line with distribution. This need not happen. It is not clear as to how capacity can match stocks in a world of open-ended procurement. If capacity were to be in line with past peak procurement, storage crises (insufficient as well as excess storage) will recur cyclically.

3. Government support would be most crucial for PPP in silos. Silos are expensive, capital intensive and offer network economies.

4. FCI costs in handling procurement, storage and movement are higher than what comparisons with private sector would justify. Computerization and decentralization of procurement operations deserve support. Current policy imposes costs on states when they undertake decentralized procurement. However, the state also gains (at
the expense of the Central Exchequer) from the higher prices received by farmers within the state. The outsourcing of procurement to private companies is a proven model but now languishes because of needless oversight on inputs rather than output.

5. Distribution reforms have enormous potential since most states are starting at a high level of inefficiency. The necessity for these reforms is shared across the board at the center and in the states. However, the entrenched interests in the PDS are strong and political commitment in the states toward reform cannot be taken for granted even if it allows reforms to be initiated.

6. Distribution reforms promise to bring accountability and transparency in the PDS by digitizing records, by web information on stocks and allotment and by transaction authentication. Computerizing the supply chain and digitizing records are immediately feasible in all states. Transaction authentication requires proof of identity. Smart card based systems are better suited to urban areas with good internet connectivity but cannot function in areas with poor connectivity and are also more prone to sabotage. Food coupon systems based on biometric identification are more practical. However, they require to be designed with care. In particular, it should not impose additional costs of access on poor consumers.

7. Chhattisgarh, Gujarat and MP are following different models of subsidy reforms. The Chhattisgarh model is the most comprehensive. The state contributes its own resources to offer near-universal subsidies. This is backed by a real-time electronic information and decision system connecting procurement, stocks and allocations to distribution centers. The only component missing is transaction authentication at the retail level. The proponents of the Chhattisgarh model, however, believe that this is best accomplished by community oversight. The political and bureaucratic commitment to the program is the stand-out feature of the Chhattisgarh reform process. The computerized stock management system seen in Chhattisgarh is not prominent in either Gujarat or Madhya Pradesh. Biometric transaction authentication is the key reform pursued in both of these states. The technology choices made by the Gujarat model seems demanding of the connectivity infrastructure. The issue of monthly coupons increases the cost of access by households. On both these points, the Madhya Pradesh model is reassuring: coupons are issued annually and connectivity is provided by normal cell phone networks. Moreover, as the operators of the model are paid according to service levels, their interests are aligned with households. Taken together, the three states are impressive examples of bottom-up reforms.

8. The social gains of effective distribution reforms are large and therefore worthy of government support. However, the direct gains of these reforms do not accrue to those who bear the costs of reforms. For most states, the amount spent on food subsidy from own resources is negligible. Therefore, they are not direct gainers from distribution reforms. On the other hand, it is the central government that is the major financial beneficiary. Therefore, this calls for central policies that incentivize distribution reforms in states through cost-sharing and other means.
REFERENCES


Food Policy Reforms
A Rapid Tour of Possibilities

Reform of India's food policies is on the front burner. This paper takes a rapid tour of the reform possibilities in the areas of storage and logistics, procurement, and distribution. The paper proposes a method for determining the needs for seasonal storage and discusses what ought to be targets for capacity creation. This is followed by an examination of the policies toward storage and reforms in procurement. The paper lays out the principal components of reforms in distribution. These are pursued in greater detail in the context of three states: Chhattisgarh, Gujarat, and Madhya Pradesh.

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