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India's Foodgrains Policy: An Economic Theory Perspective

KAUSHIK BASU

The simultaneous occurrence of high food inflation and large foodgrain stocks in our granaries has been a matter of concern. The aim of this paper is to understand the fundamentals of our foodgrains market and policy that lead to this situation and to suggest policies for rectifying this. The central argument of the paper is that it is imperative that we look at the entire system of food production, food procurement and the release and distribution of food. Trying to correct one segment of this complicated system is likely to end in failure. The paper argues that there are two different motives for foodgrain procurement by the state – to provide food security to the vulnerable and to even out foodgrain price fluctuations from one year to another. Further, how we procure the food has an impact on how we release the food, and vice versa. Inspired by the sight of foodgrains going waste, it is often made out to be that our central problem is that of poor foodgrain storage. This paper disagrees with this popular view. While we no doubt should improve our storage facilities, it is important to be clear that this in itself will not lower the price of food. To achieve that we need to redesign the mechanics of how we acquire and release food on the market.

This is a revised version of the Sukhamoy Chakravarty Memorial Lecture delivered at the Delhi School of Economics on 10 December 2010.

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1 Introduction

Less than 15% of India's national income comes from agriculture and close to 60% of India's labour force lives off agriculture. There is little surprise in the fact that India's rural population leads impoverished lives.

From October 2009 to March 2010 the year-on-year food-price inflation announced every week hovered around 20%. It has declined since then, though it still remains above comfort level.

What is troubling is the amount of food stocks that we have continued to hold during this period of high prices. As Table 1 (p 38) shows, our grain procurement remains fairly steady from year to year and, it may be added, that our reserves are way above our stated buffer norms. This should immediately make us suspect that we may not have succeeded in the role of evening out fluctuations in food production as effectively as it could have. The strategy used for releasing foodgrains in India has scope for improvement.

Around May-June 2010 the international price of wheat was approximately 30% cheaper than wheat in India. In other words, India's residents were paying more than what they would have had to if they could access the international market or, even better, if our own grain was released on the market. Though, as this paper will clarify, the mechanism of the release is important and needs to be designed carefully to ensure that the impact on prices is substantial, Table 1 testifies to the fact that the quantities released have been quite inadequate.

The above four observations, in the four opening paragraphs, may appear at first sight to be disparate observations on the Indian economy. In reality, they have a common thread running through them. They illustrate a pervasive weakness that runs through India's foodgrains policy. In the name of helping the farmer and the consumer and, likely, even with the intention of doing so, we have ended up creating a foodgrains policy framework that has not got high marks on either account. Many of India's poor households do not get adequate food and many of our farmers remain impoverished, especially the small ones with no marketable surplus. While India does need to increase agricultural productivity, creating wrong incentives can stall the natural process of industrialisation and the emergence of labour-intensive manufacturing activities in some regions, by keeping disproportionately large numbers of people engaged in agricultural activity.

We have, rightly, tried to put in place a mechanism for acquiring food so as to subsidise the poor and have ready reserves should hard times come. Yet we need to work much harder to develop a good system to release the grain when those hard times come. This was the lament with which the well-known

Abhijit Sen Committee Report (Sen 2002) began, but the problem continues to persist even today.

Fortunately, there is now a new resolve to correct these defects. We can see this in the various right-to-food campaigns in the country and the government's decision to enact a food security bill, which will enshrine people's right to a basic amount of food as a legal prerogative. Enshrining as a legal right what is impos-

Table 1: Aggregate Foodgrain Procurement
(2004-10, lakh tonnes)

Year	Rice	Wheat	Coarse Grains	Total Procurement (Rice+Wheat+Coarse Grains)
2004-05	246.85	167.95	8.27	423.07
2005-06	276.56	147.87	11.51	435.94
2006-07	251.06	92.26	0.00	343.32
2007-08	287.36	111.28	2.03	400.67
2008-09	336.85	226.89	13.75	577.49
2009-10	297.12*	253.82	4.08*	555.08

* As of 9 July 2010. The reporting cycle for rice is 1 October to 30 September. The source for this and other tables that follow is the Ministry of Finance.

possible to fulfil is not a good idea since that debases the very idea of a right and promotes lawlessness by adding to the list of laws that are there only to be violated. However, the right to food is well within the powers of the Indian government to satisfy under most realistic scenarios and, moreover, this is a need that all civilised societies ought to try to fulfil. Hence, this is a move in the right direction and it provides an opportunity to improve our food distribution system.

But it is critical to understand that it is not enough to throw money at the problem. The new bill needs to be accompanied by a new mechanism for reaching support to the poor.¹ We have to design the entire foodgrains policy skilfully in order to ensure that we can fulfil the right to food that we are about to confer on our citizens, and at the same time ensure that our fiscal system is able to withstand the expenditure. For economic policy one has to understand the restrictions placed on the policymaker by the laws of the market, and then design mechanisms that can steer through and utilise those laws instead of being undone by them.

The popular view, understandably alluring, that all the government has to do to support poor consumers and poor farmers is to direct subsidies at them, and make sure that anybody caught cheating the system and adulterating food is punished misses the important question: punished *by whom?* For that we have to rely on another layer of bureaucracy and police force, which will open another layer of opportunity for cheating the system.

It would be wonderful if people were innately honest and self-monitored their behaviour; and the government ought to educate the citizenry to develop these qualities. But to *assume* that they have these qualities when they do not is to risk designing a flawed mechanism that will be pilfered and adulterated. A comprehensive study by Khera (2010) shows that 67% of the wheat meant to be delivered to the poor misses the target. In other words, to reach one kilogram of wheat to poor households we end up directing three kilograms of wheat at them.

In designing effective policy we have to recognise that the level of honesty varies from one society to another, politically unpalatable though such a view may be.² We have to realistically assess the level of honesty among the enforcers of a society and then create systems that take account of this in laying out the mechanism through which the policy is to be administered.

The exasperation that our citizenry feels about foodgrain rotting in poorly maintained storage facilities is understandable.³

However, the solution may not be as obvious as appears at first sight. Consider one popular demand, namely, that the government should simply open its granaries and let people take the food at very low prices. What is not always understood is that, if the grain is given away at a low price to whoever comes to buy, it is likely that a part of this food will get picked up by traders and resold to government through the procurement window. In other words, government will end up subsidising repeatedly for the same foodgrain.

The central argument of this paper is that, in creating better foodgrains policy, it is imperative that we look at the entire system of food production, food procurement and the release and distribution of food. How we procure the food has an impact on how we release the food, and vice versa. Inspired by the sight of foodgrain going waste, it is often made out to be that our central problem is that of poor foodgrain storage. This paper disagrees with this popular view. While we no doubt should improve our storage facilities, it is important to be clear that this will not lower the price of food. To achieve that we need to redesign the mechanics of how we acquire and release food on the market.

The paper does not go into the long-run problem of agricultural productivity and strategies for increasing this. This is indeed an important problem and much has been written on it.⁴ It is assumed throughout that a modicum of self-sufficiency in food is desirable. This immediately means that the state will have the responsibility of maintaining a certain amount of food stocks. There are economists who believe that we should not do so, leaving it instead to private traders to maintain their own stocks and use imports and exports to even out fluctuations in endogenous prices. The position taken in this paper is that for, especially, a big country like ours, it is politically risky to rely entirely on private traders and international trade to iron out excessive price fluctuations.

2 India's Foodgrain Market: Description

There has been a popular feeling that the recent inflation is caused by poor foodgrain management. As is so often the case with complex economic matters, the reality is more complicated than popular perception. In the case of the recent Indian experience (second half of 2009), it is both true that food inflation is high and our foodgrain management leaves a lot to be desired. But it is not clear that the latter is causing the former. Poor management may keep the prices of some foodgrains higher than they need be, but inflation, defined as a sustained increase in price, is not caused by this, which would typically require a sustained deterioration in foodgrain management for which there is no evidence.⁵

This, however, does not change the fact that we need to improve our agricultural productivity and the management of the market for foodgrains. The latter is the subject matter of this paper. As explained above, the flaw in the system is that, while we have steadily procured foodgrains, especially wheat and rice, we have not done equally well in releasing the grain when the need arises. Doing the former and not the latter has meant that the net effect has been to raise the average price of food. Also, a good market intervention, as discussed in greater detail in the next sections, entails buying up when prices are low and selling when prices are high. Comparing procurement and inflation data

Table 2: Lifting Position of Wheat by State/UT Governments/NAFED/NCCF for Distribution to Retail Consumers under OMSS (D) for October 2009 to March 2010 (in '000 tonnes)

Name of the State/UT	Allotment	Lifting	% Lifting
Andhra Pradesh	18.68	0.00	0.00
Arunachal Pradesh	3.07	0.00	0.00
Assam	132.49	34.18	25.80
Bihar	11.76	0.44	3.74
Chhattisgarh	9.88	1.09	11.03
Delhi	181.29	96.15	53.03
Goa	3.21	1.60	50.00
Gujarat	34.22	15.99	46.72
Haryana	43.25	0.00	0.00
Himachal Pradesh	99.05	11.28	11.39
J&K	81.58	22.58	27.68
Jharkhand	7.35	0.00	0.00
Karnataka	38.26	3.03	7.93
Kerala	81.32	23.63	29.06
Madhya Pradesh	110.98	14.92	13.44
Maharashtra	149.54	2.60	1.74
Manipur	6.32	0.00	0.00
Meghalaya	7.35	3.68	50.00
Mizoram	3.77	2.04	54.01
Nagaland	15.14	1.00	6.60
Orissa	65.72	0.00	0.00
Punjab	177.96	0.00	0.00
Rajasthan	174.96	138.75	79.30
Sikkim	1.48	0.64	43.22
Tamil Nadu	65.09	34.54	53.07
Tripura	8.94	0.00	0.00
Uttar Pradesh	106.24	0.00	0.00
Uttarakhand	52.96	0.00	0.00
West Bengal	375.74	0.00	0.00
A&N Islands	1.60	0.00	0.00
Chandigarh	0.00	0.00	0.00
D and N Haveli	0.09	0.09	100.00
Daman and Diu	0.00	0.00	0.00
Lakshadweep	0.25	0.00	0.00
Puducherry	0.76	0.00	0.00
Grand Total	2,070.33	408.23	19.72

reason for this will become clear later.

Second, after we release the food, we should not try to excessively monitor what the buyer of the food does with it. As per present practice, the food that is released through open market operations by the Food Corporation of India (FCI) is sold to millers, and only rarely to traders. These millers are then prohibited from selling the wheat to yet other buyers and make profits from this. However, if our aim in releasing food is to lower the price, it is not clear why we should prohibit further reselling of the food. And the instinctive urge to prevent anybody from making a profit – and creating a bureaucracy to monitor this – does more harm than good. What we should do instead is allow people to strive to make a profit but design a system which uses this striving to achieve social well-being.

The consequence of having such severe rules about what the buyer of food from FCI can do with the food means that the zest for buying FCI food will be low. At times when the price of food is high and we want to lower it, it is a mistake to curb the traders' and the millers' freedoms. This would result in poor offtake of

it is clear that little effort has gone into creating such a cycle. The years 2006-07 and 2007-08 were ones of low inflation for both rice and wheat. There is no evidence of extra procurement in those years. In fact, wheat procurement actually fell in those two years. Given that 2009-10 is an inflationary year, one would have expected lower procurement but that was not the case.

The theory of how we can improve our foodgrain management will be discussed in the next sections. However, some simple lessons that will come out of that can be stated in advance. First, we have to have a ready set of rules of how and when to release foodgrain, a kind of Standard Operating Procedure (SOP). There should be no need to have special cabinet committees to take the decision. If prices are rising, there has to be a rule about the *automatic* release of food. Moreover, the release should be in small batches – the

foodgrains and prices remaining high. In general, we manage to release less food than we plan and, moreover, the release is even more inadequate when done through the Open Market Sale Scheme (OMSS), as Table 2 shows.

The right policy is to place as little restriction on the buyers of foodgrains as we can and to permit them to make profits by selling the foodgrain to the ultimate consumers. The profit of the trader and the miller is of course not the aim of the government but it is the instrument through which government can reach food to the poor.

This does not mean that we should not have any strategy to limit the profit, but simply that this must not be done by creating disincentives for the trader or the miller for buying up grain and selling it to the ultimate consumer. The secret of keeping profits low and delivering food to the ultimate consumer is to release the procured grain in small quantities to large numbers of traders and millers and giving them the freedom to make profits. Competition will drive prices down through natural market forces. Good policy consists of exploiting the laws of the market, not denying that they exist.

3 Theory of Food Market Intervention

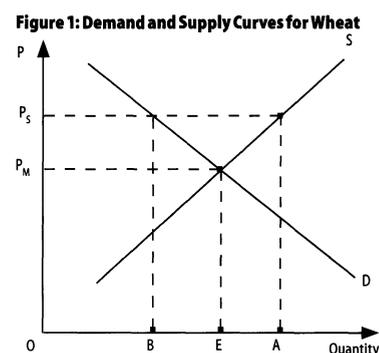
In what follows, I use a simple structure to convey some of the central ideas of foodgrain management. We can focus on any particular grain.

For the most part I will think of this to be wheat. In Figure 1 I have drawn a demand and a supply curve for wheat represented by, respectively, D and S .

As the price of wheat declines, the demand for wheat rises and the supply of wheat falls. This explains the slopes of the two curves. If the market is left free, with no government intervention, the price will settle at p_m , where demand equals supply. This is referred to as the "free market equilibrium price".

There are good reasons not to leave everything to the free market, even though there is a conservative school of thought that will advise you to do just that. We may feel that at p_m farmers get too low a price for their labour or that p_m is too high a price for the poor households. In India we have grappled with both these perceptions and they call for some carefully scripted government action. Consider the case for supporting the farmers. One method that has actually been used in India is to announce a Minimum Support Price (MSP). This is the procurement price at which government offers to buy up as much as the farmers are willing to sell. If the MSP is set below p_m , a moment's inspection of Figure 1 makes it clear, no one will sell to the government and the market price will continue to be p_m . Hence, for an MSP to have an impact, it has to be set above the market price, for instance, at the point marked p_s in the figure.

Before moving on, it is worth pointing out that it is not merely the need to support farmers that lead to an MSP policy but the valid perception that the state ought to keep a stock of foodgrains



ready for bad times that can lead to the same kind of intervention. I shall return to this later.

Suppose now the government announces a MSP of p_s , as shown in Figure 1. It is clear that farmers will sell OB units of grain directly to ordinary people and BA units of grain to the government. The government buys up the supply in excess of the market demand. In India, in a typical year the government buys up a little less than one-third of the total production. In other words, BA is typically close to one-third of OA . Contrary to a belief within the government bureaucracy, there is nothing sacrosanct about this ratio.

With this MSP policy the government will now have reserves equal to BA units of wheat in its storage facilities. The amount of money the government would have spent acquiring this grain is equal to BA multiplied by the MSP, in this case, p_s .

Now, consider the problem of off-loading this grain. If the government decides to sell this grain at a price above p_s in order not to incur a loss, there will be no buyers. This is because those willing to buy grain at a price above the MSP would have already got their grain (in this example, OB units of grain). If this is the pricing policy used by FCI, there is no way the government will be able to off-load the stocks on to ordinary consumers. Observers often fret at reports of procured grain lying unattended to, rotting and being eaten up by rats, and the belief is that this is the reason consumers do not get to consume this food. But that gets the causality wrong. Ordinary people do not get to buy the grain not because rats get at it but because of flaws in our foodgrains policy.

It is often argued in official documents that unless food is sold by government at a price above the purchase price (plus other sundry costs like that of storage and transport), this will add to the fiscal deficit. What this misses out on is that, if by trying to sell it at such a price we do not manage to sell at all, the fiscal burden on government is even greater. This is because the cost of procurement is a sunk cost. What needs to be realised is that, from a fiscal accounting point of view, not selling procured grain is exactly equivalent to selling it at zero price.

It is important to recognise that the overall impact of the pricing policy just described is to raise the price of foodgrains, for at least a segment of consumers, to above what they would have had to pay (to wit, p_m) if there were no government intervention in the market for food. This is because an effective MSP is, by definition, a price higher than the free market equilibrium price. There is no getting away from the fact that having an MSP policy and selling some grain at or above the MSP (for instance, to households above the poverty line) means that we are selling grain to some consumers above the price they would have faced in a complete free-market outcome.

If all consumers are to get food below p_m , the only way to do this is for the government to buy up the entire food production at a price above p_m , for instance, at p_s , and off-load it on the market at some price, P , which is below p_m . This by definition places a fiscal burden on the state. The government would spend $(p_s - P)$ multiplied by OA to run this operation. And there would be another problem, it will be in the interest of people to buy the grain at P and sell it back again to the government at p_s and pocket the subsidy $p_s - P$ per unit of grain. It is not impossible that this

“revolving door strategy” of using the same grain to earn subsidy multiple times from the government has been employed by traders. I shall return to the problem of the revolving door subsidy and to pricing strategies that can deter or minimise such action later in the paper.

What the Indian government does in practice is to try to sell some grain at above the MSP (and this operation often has little success for the reasons explained above), and also releases some foodgrain below the market price to below poverty line (BPL) households and to some other special, vulnerable segments of the population. The net effect of this kind of government action is to give an upward push to the price of foodgrains that prevail in the open market. After government procurement, the “market” price is no longer p_m but p_s .

So for people who buy foodgrains at the market price, the price they face is above the price they would have had to pay in case there was no government intervention. This is inevitable but it is important to remember that people who buy foodgrains at the market price in India includes millions of poor people who either do not have BPL cards or live in areas without easy access to outlets run by our public distribution system (PDS).⁶

If we (1) want farmers to get a price above the free market price, p_m , (2) want consumers to get as much or more food than what they would have got if the food market was left completely free, then it is inevitable that the government has to incur a fiscal cost. To ask for (1), (2) and that all government operations in the food market be commercially viable – let me call this (3) – is to ask for the impossible. Objectives (1) and (2) inevitably place a fiscal burden on the state and make (3) impossible. This is as should be.

4 Redesigning India's Foodgrains Policy: Price Stabilisation

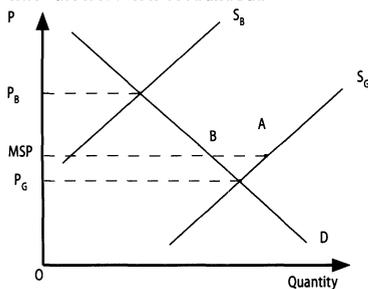
An ideal foodgrains policy ought to have the following features.

- (1) The government should maintain a buffer with the aim of using it to hold down prices during times of food shortage, and
- (2) Government must make sure that the poor and the vulnerable have access to food at all times. This second feature is connected to the general idea of food security (Datta 2010).

If trade remained open at all times, holding a buffer would be considered a costly and unnecessary strategy; but this overlooks the politics of trade and the fact that nations can be held to ransom by threatened stoppage of trade. In 1974 when, facing a famine, Bangladesh needed to import food from the US, it was denied this on the ground that Bangladesh had trading relation with Cuba. It is therefore natural for most nations to want to be reasonably self-sufficient in food. India is no exception. Both the above objections are achievable for India but neither would be a trivial exercise. This explains why, despite pronouncements to the contrary, we still have so many gaps in our food policy. What we have underestimated is the need for careful design to enable us to achieve the above objectives.

To analyse foodgrains policy to achieve (i) and (ii), we must begin by recognising that agricultural production tends to be vulnerable to exogenous shocks, stemming from a variety of factors such as fluctuations in weather conditions, floods, pest attacks and fluctuations in wage rates. For simplicity assume that

Figure 2: Demand and Supply Curves for Food When the Weather Is Good and Bad



foodgrain supply can be high (good weather) or low (bad weather) with probability half each.

Figure 2 describes these two scenarios. Let D be the aggregate demand curve for food. The aggregate supply curve is s_G if the weather is good and s_B if the

weather is bad. If, as just discussed, the purpose of maintaining foodgrains reserve with the government is to be self-sufficient in times of food shortage, we have to have a policy whereby food is acquired by the state when supply is plentiful (that is, the weather is good) and released when the supply is meagre (that is, the weather is bad). To be a net buyer of food under all circumstances, as our government has tended to be, is wrong strategy. We have to be prepared to switch the MSP window on and off.

There is one caveat worth stressing here. I am here considering a procurement and release policy that is entirely concerned with self-sufficiency and price stabilisation. I am at this time ignoring the objective of providing cheap food at all times for the poor and vulnerable, that is, objective (ii), mentioned above. This will be discussed in Section 5. Note for now that if government was procuring for both objectives (i) and (ii) then it would have to procure over and above what is needed to hold prices down in times of shortage. This can be a fairly substantial amount. Of the 33.6 million tonnes of rice was procured in 2008-09, 22 million tonnes were for the PDS. Under such circumstance it is possible that the state would have to procure foodgrains in good and bad times, in order to have enough grains for price stabilisation *and* support for the poor and vulnerable. However, the broad thrust of my argument would still be unchanged. We need to vary our procurement, taking in more when the weather is good, supply plentiful and prices low and less (and may be nothing) when the weather is bad and prices high.

I should clarify that this does not mean that we actually close down the MSP window in periods of food shortage but simply not raise the MSP in such periods. In Figure 2, if we hold on to the MSP shown, then automatically there will be no procurement in periods of bad weather. It is fine to aim to acquire one-third – or whatever fraction we decide to settle on – of the aggregate food stock produced but the aim must be to do so *on average*, buying more in good times and less in bad times.

As is evident from Figure 2, if there is no state intervention, in good weather the equilibrium food price will be, p_G , as shown in the figure, and, in bad weather, food price will be p_B , as shown. The average food price, call it p' , will be a weighted average of p_B and p_G , where the weights are given by the probabilities of bad and good weather, respectively. We shall take the view that p_B is intolerably high and so we need state action to hold down prices during bad weather. One way of achieving this is for the government to announce an MSP above p_G and below p_B . This will allow government to buy up foodgrains during times of bounty and release them in times of shortage. Figure 2 illustrates a particular

MSP. This will mean that in good weather government will buy BA units of foodgrain and the market price of foodgrain in times of good weather will be the MSP.

The procurement of food during times of bounty is just one side of the coin. To have a successful food management system it is equally important to have a method of food disbursement during times of food shortage. Interestingly – and this is a point that is not understood well at all in government – the amount of dampening effect we have on food price depends critically on “how” the foodgrain is released. The same total amount of grain offloaded on the market through different mechanisms can have very different effects on the price.

Also note that, if the government procures more than it releases, the average market price will be higher than p' . This is not surprising at all. If government becomes a net hoarder, its effect has to be to raise the average price. A small increase in average price in order to stabilise excessive fluctuations may be worth it. But in the case of India the release has fallen well short of procurement. The statement by a senior member of this government⁷ that, when it comes to hoarding, it is the Government of India that leads the pack is not off the mark.⁸

I may remark here that, as pointed out in Government of India (2010, Chapter 2), to commit to holding a certain minimum reserve at all times is a meaningless policy. It is exactly equivalent to holding no reserves. If the reserves are never to be used, they may as well not be there. There is no advantage in holding reserves that must be held at all times. In fact their only effect is the price increase that will occur as a consequence of the procurement of the reserves from the market. If we look at the data concerning stocks and norms, shown in Table 3 (p 42), what stands out is the fact that we hold stocks way above the minimum buffer norm and the minimum buffer norm is virtually never violated.

To understand properly the economics of foodgrains release policy we need to resort to a little algebra. Let the demand function displayed in Figure 2 be given by:

$$D = D(p), D'(p) < 0 \quad \dots(1)$$

Let the supply function for bad weather displayed in Figure 2 be given by:

$$S = S(p), S'(p) > 0 \quad \dots(2)$$

Hence, the equilibrium price in bad weather, p_B , is defined implicitly by

$$D(p_B) = S(p_B) \quad \dots(3)$$

Recall that in good weather the government accumulates grain and in bad weather releases grain or that is, at any rate, what a good government ought to do. Suppose government has X metric tonnes (or, in brief, units) of grain that it wishes to release on the market during bad weather (when the natural food supply is low). The way the FCI releases much of this grain is to have large packages, say of 1,000 metric tonnes each, and sell these to $X/1,000$ buyers. Then it is up to these buyers to consume and supply the grain thus acquired to consumers, as they desire.

It will now be argued that the efficacy of the policy depends enormously on the size of these packages. This has been discussed in several meetings of expert groups and I want to here explain the logic of this formally. For wide applicability it is useful to tell this story in somewhat abstract terms. Suppose government creates

Table 3: Minimum Buffer Norms Fixed and the Actual Stock Position of Rice and Wheat in the Central Pool during 1 April 2003 to 1 April 2010 (in lakh tonne)

Date	Rice		Wheat		Total		Percentage at which Actual Stock Position is Higher vis-à-vis Buffer Norms
	Actual Stock	Minimum Buffer Norms	Actual Stock	Minimum Buffer Norms	Actual Stock	Minimum Buffer Norms	
1 April 2003	171.57	118	156.45	40	328.02	158	207.61
10 July 2003	109.74	100	241.94	143	351.68	243	144.72
1 October 2003	52.41	65	184.27	116	236.68	181	130.76
1 January 2004	117.27	84	126.87	84	244.14	168	145.32
10 April 2004	130.69	118	69.31	40	200	158	126.58
1 July 2004	107.63	100	191.52	143	299.15	243	123.11
1 October 2004	60.92	65	142.23	116	203.15	181	112.24
1 January 2005	127.63	84	89.31	84	216.94	168	129.13
1 April 2005*	133.41	122	40.66	40	174.07	162	107.45
1 July 2005	100.71	98	144.54	171	245.25	269	91.17
1 October 2005	48.49	52	102.9	110	151.39	162	93.45
1 January 2006	126.41	118	61.88	82	188.29	200	94.15
1 April 2006	136.75	122	20.09	40	156.84	162	96.81
1 July 2006	111.43	98	82.07	171	193.5	269	71.93
1 October 2006	59.7	52	64.12	110	123.82	162	76.43
1 January 2007	119.77	118	54.28	82	174.05	200	87.03
1 April 2007	131.72	122	47.03	40	178.75	162	110.34
1 July 2007	109.77	98	129.26	171	239.03	269	88.86
1 October 2007	54.89	52	101.21	110	156.1	162	96.36
1 January 2008	114.75	118	77.12	82	191.87	200	95.94
1 April 2008	138.35	122	58.03	40	196.38	162	121.22
1 July 2008	112.49	98	249.12	201#	361.61	299	120.94
1 October 2008	78.63	52	220.25	140	298.88	192	155.67
1 January 2009	175.76	138**	182.12	112	357.88	250	143.15
1 April 2009	216.04	142	134.29	70	350.33	212	165.25
1 July 2009	196.16	118	329.22	201	525.38	319	164.70
1 October 2009	153.49	72	284.57	140	438.06	212	206.63
1 January 2010	243.53	138	230.92	112	474.45	250	189.78
1 April 2010	267.13	142	161.25	70	428.38	212	202.07

* New buffer norms wef April 2005.

Buffer norms for wheat includes food security reserve of 30 lakh tonnes from 1 July 2008 onwards.

** Buffer norms for rice includes food security reserve of 20 lakh tonnes from 1 January 2009 onwards.

single packages or bundles containing x units of grain and sells these to X/x ($\equiv n$) traders.

Let us check how these traders will behave. Note that the market “available” to these traders is given by

$$D(p) - S(p) \equiv d(p) \quad \dots(4)$$

I am here following the kind of model developed by Encaoua and Jacquemin (1980), Dixit and Stern (1982) and Basu (1993), involving a limited number of oligopolistic traders or firms and a price-taking fringe of buyers and sellers. So what is being assumed here is that the demand and supply functions, $D(p)$ and $S(p)$, come from small price-taking agents. The residual demand, $d(p)$, is what is catered to by the traders who receive grain from FCI as part of the government’s food release policy. If, for instance, the price of food is p , the price-taking agents will demand and supply $D(p)$ and $S(p)$, respectively. Hence, the traders who have acquired grain from FCI will face a net demand of $D(p) - S(p) = d(p)$.

It is worth checking that the bad weather free market equilibrium price, p_B , is given by $d(p_B) = 0$.

To analyse how these traders will behave I will make one more simplifying assumption, purely for mathematical ease. I will assume that $d(p)$, defined above, is a linear function. So from now on

$$d(p) = a - bp, \quad \dots(5)$$

where $a > 0, b > 0$. I shall refer to this as the “net demand function”.

Clearly we may write the inverse net demand function as:

$$p = A - Bd(p), \quad \dots(6)$$

where $A = a/b$ and $B = 1/b$.

Suppose FCI has, by whatever mechanism it chooses, handed over x units of grain to each of n traders (recall $n = X/x$). What will the equilibrium price of grain be? To answer this, first ignore the fact that each trader has a limited amount of grain (x units) in hand and ask how much grain would each trader sell on the market in a Cournot equilibrium?

To answer this, in turn, first write the profit that a single trader expects to earn when it sells q units of grain and all other traders together sell Q units. This is given as follows.⁹

$$\pi = q(A - B(q + Q)) \quad \dots(7)$$

This assumes that grain that is not sold on the market by the trader is wasted. If the trader earns some nominal price μ for grain not sold on the market, then we would have to add $\mu(x - q)$ to the expression in (7) to get the actual figure of profit. I mention this here since it will acquire some significance in a later discussion.

Each trader tries to maximise his profit by choosing q , while taking Q to be given. Doing this maximisation and working out the Cournot-Nash equilibrium, it is easy to check that each trader will supply the following amount in equilibrium.

$$q^* = a/(1 + n)$$

In case q^* exceeds x , it is not possible for a trader to supply q^* . Given that profit functions of traders are strictly quasi-concave (this is easy to check), each trader will supply $a/(1 + n)$ or x , whichever is smaller. That is, the trader will supply $\min\{a/(1 + n), x\}$.

Since there are n traders, aggregate supply in the Cournot-Nash equilibrium will be, Q^* , defined by:

$$Q^* = \min \{na/(1 + n), nx\}.$$

Keeping in mind that $n = X/x$, that is, n is the ratio of the total grain released and the amount released in each bundle, we get:

$$Q^* = \min \{Xa/(x + X), X\}$$

Consider the case where

$$Xa/(x+X) < X \quad \dots(8)$$

Then, as x is made smaller, the equilibrium aggregate supply of foodgrains, Q^* , will keep rising. Hence, the Cournot-Nash equilibrium price of food, p^* , given by $p^* = A - AX/(x + X)$ will keep falling.

This establishes that, if the government’s aim (in times of drought) is to lower the price of foodgrains, it is not enough to release a large quantity of foodgrains, X . In addition, this should be released in small batches to many traders or directly to consumers.

Another interesting by-product of this theory is worth noting. If (8) holds, it means each trader, having acquired x units of grain, will choose to sell only a part of it and would not mind simply dumping the rest. This has nothing to do with speculative hoarding. It is natural behaviour on the part of oligopolists. One way to correct this is not to release food in bundles as the FCI does but at a fixed price per unit, giving traders the right to buy exactly the amount they want. In other words, we may consider releasing the food the same way that it is procured. That is, by announcing a price and then letting people buy the amount they want. The only problem with this is that we have to take some care to ensure that a few traders do not end up cornering the

entire stock. If this happens then food prices will not fall sufficiently and, in addition, there is the risk that these traders will sell the grain back to government when the procurement season comes. We can make the release price higher to curtail this risk but that in turn could hurt the consumer.

The main point remains that the method of fixing bundle size and then asking for tender calls from traders, as is often done by the FCI, is worth re-evaluating. This is an important matter but I do not go into this here, since it is not central to the concern of this paper. Let me stay with the assumption that FCI sells food in bundles of a certain size. If now (8) holds, each trader will have surplus grain in hand. That being so, the trader will not mind selling the surplus back to the FCI at the MSP. This means that we will get a certain amount of "foodgrain recycling", that is, the same food being sold repeatedly to the FCI, with the subsidy being picked up by the trader each time.

We may argue that, since grain can be sold back to FCI typically in the next round of open market purchase by government and procurement of wheat occurs each year after a few months of no procurement – as can be seen from Table 2, above – traders will incur some losses from decay and pilferage before they can sell to the FCI. A simple way to capture this is to assume that traders manage to get a discounted price $\beta(\text{MSP})$, where $\beta < 1$, when they resell the grain to FCI. As long as this is positive, there will be some foodgrain recycling. But if x is made small, the gap between X and $Xa/(x+X)$ falls and so the recycling goes down. This is one more reason to release foodgrain in small batches.

One caveat is worth mentioning here, Once we allow the possibility of selling foodgrain back to government, the opportunity cost of not selling grain on the market as discussed in the above model is not zero, but $\beta(\text{MSP})$. This means that when a trader supplies $q (\leq x)$ units of grain to the market, and all others together supply Q , the trader's profit is given by

$$\pi = [A - B(q + Q)]q + (x - q)\beta(\text{MSP})$$

The algebra presented above was done under the assumption of $\beta = 0$, that is, all unsold grain is simply wasted, there is no opportunity to recycle the same grain to the government at the MSP. A more detailed analysis would entail making correction for this, by using the above expression to represent each firm's maximand, but the substance of the analysis would remain unchanged. I therefore do not develop this formulation any further.

5 Food Security for the Vulnerable

I have not yet addressed the subject of the government's special responsibility to the poor and vulnerable households, that is, objective (ii), mentioned at the start of Section 4. The importance of this objective cannot be overstated. If we do not provide special support to the poor, small relative price changes or exchange entitlement shifts can lead to widespread suffering and even famines (Sen 1981; Dreze and Sen 1989; Basu 2009).

In India, a large part of objective (ii) is attempted to be satisfied by releasing to BPL households a part of the grain acquired by the government at a lower-than market price, through the approximately 5,00,000 fair-price shops or ration shops scattered across the nations. The Food Security Bill, currently being debated, tries to enshrine this same commitment as law.

As mentioned earlier, we have to be careful in granting rights too easily, since if we grant rights that are impossible to satisfy, then this simply devalues the meaning of a right and also perpetrates the culture of having laws that are meant to be violated. This can devalue the efficacy of all the laws in a nation (Basu 2010). But the right to food is an achievable right, with some qualifications carefully spelled out and so, to that extent, is a move in the right direction that India is about to take.¹⁰ The important qualification pertains to the possibility that there may come a time in the future when there is just not enough food for everybody. This can happen, for instance, following a nuclear war or an environmental calamity. What would it mean, in such a situation, for government to guarantee food security to all?

One way of making a commitment to food security while allowing for the above contingency is to assert that the government will try to ensure that as long as some people have enough to eat, everybody should have the right to a certain basic amount of food. Stated in this manner food security for all does not entail the false promise that there will be food for all at all times, but simply that government will ensure that everybody has access to a certain minimal amount of food and, in case there is an overall shortage of food in the nation (which cannot be corrected through imports) then everybody will share in the shortage.

With this clarification, let me leave the abstract theoretical underpinnings of the right to food aside and turn to some practical policy matters. Basically a food security law should take the form of ensuring that the poorest and the most vulnerable people are given access to a certain minimal quantity of food. The better-off people, it will be assumed, have the ability to fend for themselves.

The important lesson to keep in mind is that to achieve this objective it is not enough to have the right intentions. One has to design a delivery mechanism which can work in the kind of world that we have. India's rationing system has not worked well enough not for lack of good intention but because of insufficient attention to the details of the delivery mechanism. The problem arises from the fact that in India the food subsidy is handed to poor households via the ration shops. The government delivers subsidised grain to the store owner and the owner is then instructed to hand this over at the pre-specified price to BPL households and to some other categories of vulnerable households.

If the store owners were perfectly honest, this would work fine. But if they are not, then it is easy to see that many of them will give in to the temptation of making some easy money by selling off some of this subsidised grain on the open market where the price is higher and turning away some of the deserving poor households or adulterating the grain that is to be sold to those households. In reality both these happen. A recent study by Khera (2010) shows that 67% of the wheat meant to reach the poor end up missing the target, being pilfered or sold on the open market en route.¹¹

It is easy to respond to this by asking for better policing. Here again we have to be realistic. Trying to police such a large system by creating another layer of police and bureaucracy will come with its own problems of corruption and bureaucracy. This is where the question of systems design arises. An economic system is like an engineering system. We may and should lecture people on the importance of honesty and integrity but till that message

sinks in, it would be foolish to work on the assumption that people are robotic units that do the job they are supposed to do flawlessly. We have to take the laws of the market and the incentives people respond to and then design an optimal system for doing the job we want to get done.

It is with this in mind that the *Economic Survey 2009-10* discussed the option of designing a better mechanism for delivering foodgrain to the poor (Government of India 2010, Chapter 2).¹² The basic idea is that the subsidy should be handed over directly to the poor household instead of giving it to the PDS shop owner with the instruction that he or she transfer it to the poor. This can be done by handing over food coupons to BPL households, which they can use as money to buy food from any store. The store owner can then take the coupon to any bank and change it back for cash.¹³ To allow for differences in preferences, we can allow individual households to buy any food items within a pre-specified range with these coupons. The subsidy does not have to be a fixed amount for wheat and another for rice but a lumpsum for a list of goods (Planning Commission 2010). In the parlance of economics this can lead to a Pareto improvement.

Note that, since the stores get full price from the poor and, more importantly, the same price from the poor and the rich, they will have little incentive to turn the poor away. Further, the incentive to adulterate will also be greatly reduced since the poor now have the right to go to any store with their coupon. A system of coupons will imply that private traders will have a much larger part in the delivery system. Since buyers will have the right to go to any store to buy food using a combination of money and coupons they will go to stores that charge the most competitive prices and assured quality.

Worries have been expressed about fake coupons. But this is not a problem special to coupons. Even with money we have to contend with this problem. There is indeed a certain amount of faking of money that occurs¹⁴ but that does not paralyse the system as a whole. It will be likewise for coupons.

Concerns are also expressed that with coupons some households may not buy food at all and sell off the coupons and buy other goods. This is a legitimate concern. But that is no reason to jettison the coupons system. That would be like not offering poor workers a higher wage on the ground that they may spend it on alcohol. My preference is to in fact make the selling of coupons legal. After all, even in programmes, like the current one in India, where actual foodgrains are given to the households, we do not monitor to make sure that the foodgrains actually go down the alimentary canals of the poor. We take the view that, once we have reached food to them, if they decide to exercise their individual freedom and not eat it, that is their choice. We may not like their choice but trying to monitor it is likely to create greater problems.

Likewise with the coupons system. We are empowering the households to be able to have more food. If they then choose to spend the extra buying power on some other goods and services, it is not worth the bureaucracy trying to control this. It will be after all poor households that will gain from the doling out of the coupons. If they choose not to take the benefit in the form of food and buy something else, then it is not as big a tragedy as the benefit going to the owners of PDS stores as often happens in the current system.

Finally, what about the fact that over time, with successive rounds of inflation, the coupons will tend to lose value in real terms? This can be addressed by adjusting the value of coupons every year taking account of the past and expected food inflation.

Once persuaded about the merit of coupons, it is possible to take the argument even further and argue for not a direct grain transfer, nor a coupons transfer but cash transfer to the poor. This is the idea of a negative income tax and it has been proposed time and again in the economics literature. In a well-argued paper released by the Government of National Capital Territory of Delhi (2010), it is proposed that we go for cash transfer in lieu of giving subsidised food and fuel. The paper points to the “large-scale diversion of foodgrains” and the “manipulation of quantities and part supply of commodities” that occur under the current system.¹⁵

This is a legitimate policy suggestion and a system with directed cash transfers would, arguably, be better than the current one involving the direct delivery of foodgrains to the poor through pre-specified ration shops. Nevertheless, it could be argued that the best option is the intermediate arrangement of giving food coupons to the poor. This does create some incentive for poor households to spend their handout from the government actually on food, since all other uses will entail some transactions cost.¹⁶

What we may wish to do is to hand over the coupons to the adult woman in the household. There is ample evidence that the same amount of transfer handed over to the woman instead of the man in the household gets spent on goods that raise what would by most observer criterion be considered more central to the well-being of the household (Sen 1990; Desai and Jain 1994; Kanbur and Haddad 1994; Agarwal 1997). Moreover, the act of handing out coupons to women could lead to the benefit of empowering the women and raising the amount of say they have in household decision-making (Basu 2006; Jhabvala, Desai and Dave 2010). This same effect has now been reported from the employment of women under the National Rural Employment Guarantee Scheme (Pankaj and Tankha 2010).

It should be pointed out that “coupons” do not have to literally mean paper coupons. We can take advantage of the age of electronics to use more foolproof substitutes such as the smart card or, even better, no cards or coupons but direct banking executed from one’s hand-held cell phone. This latter is currently under development by the same authorities that are working on the UID system.

Let me finally turn to the criticism that it will not be the genuine poor who get hold of the food coupons. Better-off households and corrupt intermediaries may corner a part of the coupons supplied by the government. All that can be said about this problem is that it is not special to the coupons system. We currently face exactly the same problem whereby many of the BPL household certificates have been cornered by non-poor households. If we dovetail the coupons system with the UID or Aadhaar system that India is about to implement, then some of this problem can be addressed (UID Authority of India 2010). But even if we cannot do so, all that this criticism means is that the coupons or smart card or ration administered through the mobile banking system has several advantages over the current system but there are some dimensions on which it is no better. But since a policy that is better in some dimensions and as good in other dimensions is a better policy, the policy being recommended here seems well worth attempting.¹⁷

Once the smart card system comes into effect, the role of the PDS stores will diminish since they will come under competition from private traders. However, given the deep regional disparities in India and the fact that some part of the nation are sufficiently poor and remote as to be not attractive to private traders, PDS stores will continue to play a significant role for many years to come.

The subject matter of this paper, to wit, the regulatory framework of the foodgrain market, must not detract from the dire need to invest more in agriculture and increase agricultural productivity. Indeed, it is hoped that if we manage to make our foodgrain market more efficient, this will increase the incentives for farmers to produce more.¹⁸ So these reforms could also have a long run positive effect through higher productivity.

NOTES

- This point is made very effectively in Ninan (2010). The article rightly points to the need to direct some of the zest that we have shown to the quantity to be given at subsidised rate to how this may actually be delivered. The decision concerning the quantity would be moot if we do not resolve the mechanism question. Dutta (2010a, p 4) rightly points to the concurrence of high prices and overflowing warehouses as "an absurd situation".
- Actually it is not politically unpalatable once we recognise that innately human beings are very similar and the differences we see in the behaviour of different groups are a response to their histories and also possible equilibrium responses to one another. This in turn means that societies can undergo changes in these qualities. The qualities of honesty and trustworthiness in a group have value to the group that may not be there for each individual. I believe that societies that manage to inculcate these traits in their individuals tend to prosper economically (Basu 2010, Chapter 6). To that extent it is imperative to try to inculcate the quality of honesty in society. But that does not change the fact that in designing policy we have to take the people to be what they are and not what they ought to be. This may well be the single biggest underlying flaw in the design of our policies.
- This was what prompted a Bench of Justices of the Supreme Court of India on 27 July 2010 to admonish the government for wastage of procured foodgrains. This has also been widely reported in the popular media. For some recent writings on this, see, for instance, "India Lets Grain Rot Instead of Feeding the Poor", by S Halarnkar and M Randhawa and "After Rot, Panel Moves to Stem Grain Drain", by Z Haq in *Hindustan Times*, 27 July and 30 July 2010, respectively.
- For a recent comprehensive treatise on the subject see Vaidyanathan (2009).
- In a recent article, Chandrasekhar and Ghosh (2010) provide some convincing evidence of how the margins between wholesale and retail prices of some grains have actually grown. But it is not clear if this can be put down to something in the management of our foodgrains policy.
- For a brief description of the PDS and its evolution and also other related programmes, see Desai et al (2010).
- Queries concerning which ministry he or she is in will go unanswered.
- This same point is articulated very cogently in a recent newspaper article by Panagariya (2010).
- Of course we can allow for there being fixed costs associated with this activity. But since that will not have any effect on the first order condition and, therefore, on the behaviour of the trader, it is fine to ignore this here.
- It is also arguable that under certain parameters transferring food to some households confers positive externalities on others (Angelucci and De Giorgi 2009).
- It should be pointed out, in fairness to the ration shop owners, that the government sets the official prices for them to receive and sell foodgrains with such slender profit margin that, if the store owners were totally honest, they would not be able to make a living wage from running a ration shop full time (Khera 2010). Clearly, we are caught in a vicious circle. Prices are set based on the assumption that store owners will earn money illegally and store owners comply.
- For a short lucid description of such a system see Nandakumar (2010). While the proposal discussed

there is not identical to the one in the *Economic Survey 2009-10*, the broad thrust is the same.

- The idea of using coupons or smart cards to give the subsidy directly to the household is not a novel idea. It has been tried in several nations, including Sri Lanka and the United States. Several commentators on the Indian economy have proposed variants of it (see, for instance, Ahluwalia 2010; Dutta 2010; Jha and Ramaswami 2010; Planning Commission 2010).
- RBI estimates that eight notes per million pieces of paper currency circulating in India are fake.
- All this is not to deny that payment in kind also has some advantages. Theoretical arguments have been constructed to show that in situations with asymmetric information in-kind transfers may have advantage, in particular, that of self-selection (see, for instance, Blackorby and Donaldson 1988; Singh and Thomas 2000). On balance however, it seems to me that the advantages of payment in coupons or smart card outweigh the disadvantages. Some recent computations by Desh Deepak Verma of the Ministry of Consumer Affairs, Food and Public Distribution show that the gains from switching to a cash subsidy system can be between Rs 12,700 crore and Rs 15,500 crore.
- There are also interesting theoretical arguments why gifts to specific products can be socially efficient (Bruce and Waldman 1991). For a recent analysis of the economics of cash transfers, with illustrations from the Brazilian experience, see Vyasulu (2010).
- Recent evidence from the field in the related area of school vouchers suggests that the coupons system can lead to substantial gains, as reported in a recent article by Saranya Kapur in *Economic Times* (15 July 2010).
- The latter is addressed directly in Dev and Rao (2010).

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