

Buffer Stocking Policy in the wake of NFSB: *Concepts, Empirics, and Policy Implications*

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List of Acronyms

AAY	Antyodaya Anna Yojana
APL	Above Poverty Line
BPL	Below Poverty Line
CACP	Commission for Agricultural Costs and Prices
CAG	Comptroller and Auditor General of India
CAP	Covered & Plinth
CCT	Conditional Cash Transfers
CSO	Central Statistics Office
DAC	Department of Agriculture & Cooperation
DCT	Direct Cash Transfer
DES	Directorate of Economics & Statistics, Ministry of Agriculture
DFFPD	Department of Food & Public Distribution
FCI	Food Corporation of India
MSP	Minimum Support Price
MT	Million Tonnes
NFSB	National Food Security Bill
OMSS	Open Market Sale Scheme
OSR	Operational Stock Requirements
OWS	Other Welfare Schemes
PDS	Public Distribution System
PSUs	Public Sector Undertakings
TE	Triennium Ending
TPDS	Targeted Public Distribution System
UID	Unique Identity
UIDAI	Unique Identification Authority of India
WFP	World Food Programme



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Summary

The National Food Security Bill (NFSB) envisages distribution of about 61.2 mt of cereals, primarily rice and wheat, through the existing public distribution system (PDS). To fulfill the underlying legal commitment, it is important to ensure adequate availability of grain with the public authorities. This necessitates a relook at the buffer stocking norms devised for every quarter. The quantum of operational stocks to be held at the beginning of every quarter will be decided by synchronizing the commitments that government is making to people each month and the inflow of grains in government godowns through its procurement mechanism each month. This paper attempts to empirically map what the desirable stocking requirements could be in the wake of the NFSB under alternative assumptions about risk coverage and with/without limited reliance on imports.

Accordingly, under the most likely scenario of autarky (i.e., not even limited reliance on imports), the desirable buffer stock norm, as on 1st of July, is estimated at 46.7 mt of rice and wheat. This would cover the operational needs under NFSB as well as insure against 95 percent risk regarding drop in production of wheat and rice, based on past 20 years of production pattern. If one allows for at least 5 mt of possible imports whenever need arises, then the level of desirable stocks would be 41.7 mt as on July 1st. This means that current buffer stocking norm of 31.9 mt as on July 1st, needs a major revision in the wake of NFSB.

Despite a significant increase in the level of desirable buffer stocks needed in light of NFSB, the likely stocks with FCI on 1st July, 2013 are going to be around 82 mt, based on the expected procurement of wheat at 32 mt in the ongoing Rabi Marketing Season. If the actual procurement turns out to be less than 32 mt, the likely stocks will be accordingly somewhat lower than 82 mt as on July 1st, 2013. Still, these will be far in excess of the desirable buffer stocks, the “excess” is likely to be around 30-40 mt. The value locked in these “excess stocks”, evaluated at their economic cost, ranges from Rs 70,000 crore to Rs 92,000 crore. This infusion of “excess” money into the economy without corresponding flow of goods is evident in the paradox of rising prices of rice & wheat amidst overflowing stocks in government godowns. It is creditable that India is currently in a state of ‘plenty’ but holding excessive stocks in godowns, which serve no worthwhile purpose, begs the question of economic efficiency in public expenditure. It will be much rational policy choice to liquidate these “excessive” stocks. The money, i.e., around Rs 80,000 crore under the most likely scenario, would certainly come in handy in the current times of high fiscal deficit and the increased availability of wheat and rice in the markets would rein in high food inflation, especially cereal inflation.

One way to reduce these bulging “excessive stocks” is to give the option to states and its beneficiaries under PDS, where PDS systems have been integrated with ‘Aadhaar’ and the probability of leakages is reduced significantly, to lift 3-6 months of their off-take requirements at a discounted price, where the discount would be equal to the cost of carrying by the FCI. Another option could be OMSS at the last year’s MSP plus a maximum of 5 percent towards



taxes/cesses etc., i.e., wheat at Rs 13500 per tonne and rice price at Rs 19000 per tonne, ex-Punjab. The losses incurred would be administrative expenses in procurement and statutory levies (which are in the nature of centre-state fund transfers), but this would still save the large costs of carrying excess stocks as well as the capital that is locked in these stocks. Yet another option would be to let the PSUs and private sector export another 10-12 mt of wheat and rice from government stocks at the same price. This would help tide over the current account deficit and earn valuable foreign exchange. The current price, being offered for wheat export ex-Punjab of Rs 14840/tonne (MSP plus statutory levies etc that FCI has paid during the procurement process) is not attracting much private sector participation, and the PSUs themselves cannot export either, as the global wheat prices are showing a declining trend. So the offer price will have to take cognizance of market realities. The availability of these surplus stocks also opens up an opportunity for India to contribute 2-3 mt for a South Asian foodgrain reserve and extend humanitarian aid to Afghanistan and some other African countries through the World Food Programme (WFP) or through bilateral cooperation.

Once the current problem of excess buffer stocks is solved, the provisions of physical entitlements under NFSB itself need to be revisited. In recent years, the government has procured more than one-thirds of the total production and more than half of the marketed surplus of rice & wheat. Such large scale public procurement has strangled the private trade (as has been the case in Punjab, Haryana and now Madhya Pradesh & Chhattisgarh). Of the total market arrivals of wheat and rice in these states, more than 80-90 percent is bought by the government, indicating a *de-facto* state take-over of grain trade. This reminds one of the failed experiment of wheat trade take-over in 1973-74. Bringing back the private sector into grain trade should be high on government agenda, and not driving them out of markets. It may be worth noting that the cost of a simple departmental labour (loader) of FCI is 7 to 8 times the cost of contract labour doing the same job. With government monopsony, these costs are going to escalate and so would be the statutory levies being imposed by various state governments, making the entire operation of NFSB a very high cost phenomenon.

It may be noted here that internationally, conditional cash transfers (CCTs), rather than physical distribution of subsidized food, have been found to be much more efficient in achieving food and nutritional security. Therefore, the foodgrains policy needs to have a door that allows switching from physical handling and distribution of foodgrains to cash transfers/food coupons/smart cards and cover food subsidy under the 'Direct Benefit Transfer' (DBT) scheme. In the first phase, surplus states (in terms of production and consumption of cereals) and cities with a population of 1 million or more (currently 33 as per 2011 census) could move straightaway to cash transfers. If one moves towards this direction, the desirable level of buffer stocks could be just 10-15 mt, which basically takes care of the exigencies. This can save and release large amount of government expenditure, which in turn can be used to augment the level of welfare schemes. There is a need to innovate in our food management and welfare policies so that same expenditure brings much higher returns in terms of tackling hunger and malnutrition of this country.



Buffer Stocking Policy in the wake of NFSB: Concepts, Empirics, and Policy Implications

I. Backdrop

1. The National Food Security Bill (NFSB) is knocking at the doors of Indian Parliament. If passed, it is going to be the biggest ever experiment in the world for distributing highly subsidized food by any government through a 'rights based' approach. The NFSB envisages distribution of about 61.2 mt of cereals, primarily rice and wheat, through the existing public distribution system (PDS) and other welfare schemes (OWS), which, as per government's estimates, will cost the exchequer roughly Rs 1,25,000 crore as food subsidy for the full one year roll out.

2. In an earlier discussion paper, we have spelt out various challenges of this Bill, ranging from its fiscal requirements to need for stabilizing farm production, to ensure proper storage of the procured grains, and to transport them through railways, to the challenge of plugging leakages in PDS¹. We have also suggested various options to gradually move towards conditional cash transfers (CCTs), starting with 33 cities with each having a population of more than one million, and then to food surplus areas, especially farmers, and then finally to food deficit areas. This suggested scheme has the potential to save the government around Rs 40,000 crore each year without sacrificing its equity objectives.

3. But that's not the purpose of this paper. Here we concentrate on another important issue: what would be the buffer stocking requirements if the NFSB is passed in its current form? The current prevailing buffer stocking norms of the Government of India are 31.9 mt as on July 1st each year. Would this amount suffice in the wake of NFSB requirements? If not, what should be the new norm, and how it is to be calculated? This is critical to know in today's scenario, as the country is currently loaded with large stocks. On July 1st, 2012, e.g., it had 80.2 mt, and is likely to have similar or even higher amount this year, despite emerging as the largest exporter of rice (around 10 mt in calendar year 2012) and exporting about 5.6 mt of wheat in FY 2012-13. Thus, there seems to be a major deviation between actual stocks the state agencies are holding and what is (or perhaps what would be) the buffer stocking requirements. Since it has

¹ CACP Discussion Paper 2 on "National Food Security Bill: Challenges and Options" by Ashok Gulati, Jyoti Gujral, T.Nandakumar with Surbhi Jain, Sourabh Anand, Siddharth Rath, and Piyush Joshi (December, 2012) points out that the real cost of this Bill will be more than Rs 6,00,000 over three year period. This will be necessitated by the need to invest in agriculture to stabilize production, invest in storage and railways facilities, as also to create a more effective organizational structure for food management.



huge implications in terms of costs and risks, it is of utmost importance that we spell out the new buffer stocking norms well before the implementation of the Bill starts. This would help the policy makers as well as the country to know the risks and true costs involved in implementing the NFSB.

4. Accordingly, in this paper, we first delineate the concepts of various types of stocks and then try to empirically map what the stocking requirements would be in the wake of this NFSB, and under alternative assumptions about the degree of risk coverage, reliance on imports, etc. (section II). In section III, we compare the current level of stocks that the country is likely to have as on July 1st 2013, and what to do of the “excessive stocks”. We also estimate cost of inaction on that front, which the country will have to bear without serving any worthwhile purpose. In section IV, we suggest the way forward to improve economic efficiency of public expenditure by liquidating “excess stocks”, rein in cereal inflation, reduce fiscal and current account deficits. If heeded, this advice can pay rich dividends as it involves around Rs 80,000 crore which are locked up in “excessive stocks” without serving any worthwhile purpose.

II. Concepts and empirical mapping of Buffer Stocks

5. The literature on stocking policies² suggests that stocks can be conceptualized at least along three lines, each one targeting a different function inherent in buffer stocking policies. These are:

- (i) *Operational stocks*: to be used to feed various safety net and welfare schemes such as the PDS and OWS delineated in NFSB. The quantum of this stock depends on the obligation of the government is making to people under these schemes. Under the current NFSB, this obligation is about 61.2 mt of cereals³.
- (ii) *Strategic reserves for stabilization*: to be used mainly as a buffer against any drought or any other unforeseen shocks, when production drops or normal movement of grains is obstructed. Under such circumstances, open market prices generally shoot up and these strategic reserves can be utilized to stabilize the cereal prices. Under the current envisaged NFSB, which would provide highly subsidized grain (at one-eighth to one-tenth of the economic cost) to almost two-third of the population, the purpose of stabilizing the prices for the remaining markets takes a back seat.
- (iii) *Base level stocks or “dead stocks”*: a certain minimum stock which is generally not available at a short notice of 2-3 months. This concept is akin to “dead storage” in any reservoir.

² Khusro (1973); Raj Krishna & Ajay Chibber (1983), Technical Groups on Buffer Stock norms (1975, 1981, 1988, 1997 & 2003)

³ <http://pib.nic.in/newsite/PrintRelease.aspx?relid=95441>



Generally, these are in transit or in far flung areas, and cannot be put to use within 2-3 months' notice. With technological advancements in storage and movement of grains and increased accessibility, these stocks have become redundant.

6. Although conceptually these are different stocks, in practical terms, these stocks are fungible and can be used for alternative purposes delineated above. The minimum buffer-stock levels to be maintained during different periods of the year are fixed by the Government. A Technical Group on Buffer Stocking Policy, created in 1995, periodically reviews buffer stocking policy and suggests minimum and maximum levels to be maintained and the grain mix for consideration of the Government. The Technical Group is chaired by the Secretary of the Ministry of Food, and members include representatives from Ministry of Agriculture, FCI, and the Planning Commission. In light of the NFSB, what one needs to estimate is the total amount of grain stocks that would be needed to ensure that the government can effectively perform its three functions, i.e., distributing subsidized grain to 67 percent of population, to minimize risks emerging from droughts or floods etc, and to ensure a fair degree of price stabilization of basic staples like rice and wheat. We discuss each one in some detail below.

II.A Requirement of Operational Stocks under NFSB, 2011

7. The quantum of operational stock needed will be first decided by the commitments that government is making to people each month, the inflow of grains in government godowns through its procurement mechanism each month, and then working out what would be needed for say each month or each quarter. Under NFSB, upto 67% of the population would be provided a uniform entitlement of 5 kg per person per month at highly subsidized prices of Rs 3, Rs 2, Rs 1 per kg for rice, wheat, coarse grains respectively. The entitlement of Antyodaya Anna Yojana (AAY) households, which constitute poorest of the poor will, however, be protected at 35 kg per household per month (i.e., 7 kg per person per month assuming 5 persons per household). It has also been proposed that the existing allocation of foodgrains to the States/UTs would be protected, subject to it being restricted to average annual offtake during last three years (2009-10 to 2011-12). Accordingly, the requirement for average monthly PDS offtake is calculated as 2.3 mt for wheat (27.6 mt annually) and 2.8 mt for rice (33.6 mt annually) as detailed in Table 1.



Table 1: Requirements under NFSB, 2011

	(Million Tonnes)		
	Wheat	Rice	Total
Requirement for Beneficiary Population (67% of 1.215 billion @ 5 kg per person)	22.0	26.8	48.8
Addl. Requirement for AAY (@2 kg for 2.5 crore households of 5 persons per household)#	1.4	1.6	3.0
Estimated Requirement for OWS	2.9	3.6	6.5
Additional requirement for protecting the average annual off-take of States*	1.3	1.6	2.9
Total Annual Requirement	27.6	33.6	61.2
Monthly Requirement (Annual Requirement/12)	2.3	2.8	5.1

Note: 1. Rice to Wheat ratio for the total foodgrain requirement has been assumed to be 55:45 on the basis of the ratio in total procurement during 2007-08 to 2011-12 which was 54.5 % (Rice) & 45.5% (wheat)

2. The population of India according to the census 2011 is 1.215 billion

Beneficiaries under AAY are entitled to 7kg per person

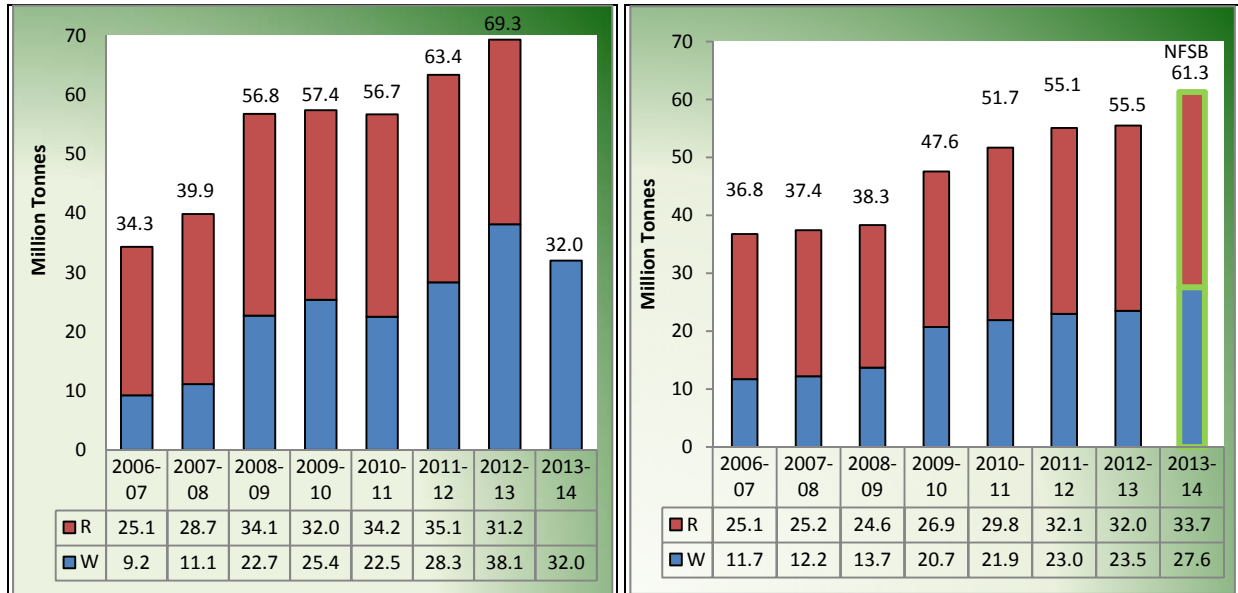
* Average annual off-take of three years (2009-10 to 2011-12)

8. Against this annual requirement of 61.2 mt for PDS and OWS, one must see what has been the magnitude and pattern of total procurement and off-take for say last five-six years. Figure 1 presents these changes in procurement and off-take since 2006-07. It is clear that over these years, procurement has significantly ramped up from 34 mt in 2006-07 to 69 mt in 2012-13 – exceeding the expected requirement under NFSB. However, it may be remembered that much of this period (2007-11) is dominated by export bans on wheat and common rice, which led to higher procurement and accumulated stocks. But on the off-take (for TPDS & OWS) front, the corresponding figures moved from about 37 mt in 2006-07 to 55.5 mt in 2012-13. It may be noted here that in most of the years, actual off-take has been lower than the allocations made by the Centre (CAG Report, 2013⁴). Thus, overall the procurement levels in recent years have been in line with the requirements under NFSB.

⁴ Report no.-7 of 2013-Union Government (Ministry of Consumer Affairs, Food and Public Distribution) - Report of the Comptroller and Auditor General of India on Performance Audit of Storage Management and Movement of Food Grains in Food Corporation of India



Figure 1: Trend in Procurement and Off-take since 2006-07



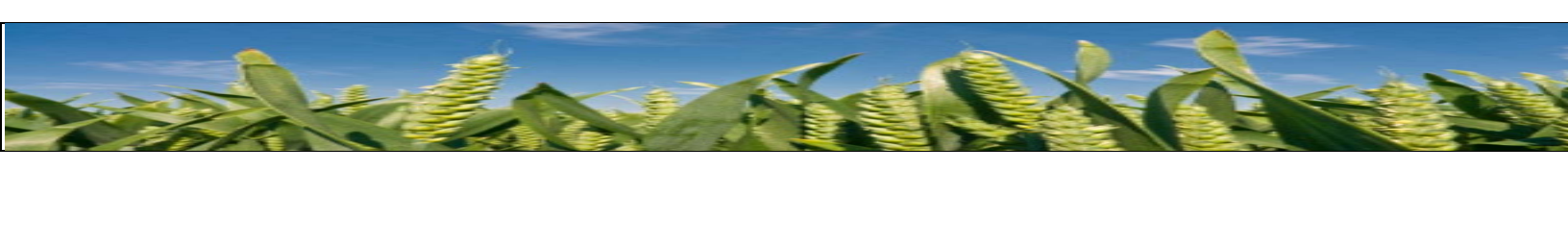
Source: DFPD, FCI

Note: Procurement for Rice for 2012-13 marketing season is as on 9th May, 2013 and procurement for wheat for 2013-14 marketing season is assumed to be 32 mt, in consultation with officials from Food Ministry.

The off-take for 2012-13 is available till the month of February, 2013. Assuming the off-take remains the same in March 2013 as in February 2013, the off-take for the full year 2012-13 has been estimated. The off-take for 2013-14 is requirement as per NFSB.

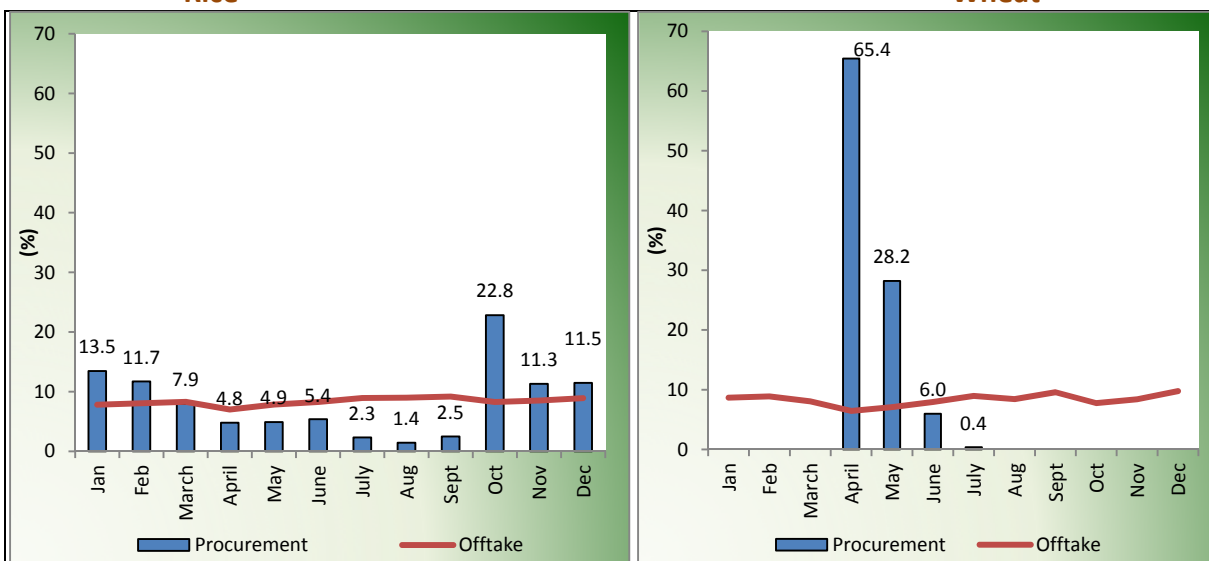
9. In 2013-14, the procurement of wheat was initially estimated to be 44 mt by the Government after due consultation with state governments, before the procurement season began in March-April, 2013. Gradually, it was realized by the end of April that it may not touch 44 mt, but stop at around 40 mt. With each week passing in May 2013, the estimate is being reduced and by the middle of May, it was being realized that total procurement of wheat may not cross 32 mt. Such a drop in procurement estimate from 44 mt to 32 mt within less than two months is a cause of concern, and indicates the challenges in honoring the commitments under NFSB. What has led to this is a separate issue, and various theories are doing rounds from fall of wheat production to private sector coming back to purchase, to farmer’s holding stocks in the hope that prices would go up further later in the year, and so on.

10. But to obtain reliable estimates of buffer stocking norms on quarterly basis, one needs to know the monthly off-take of both rice and wheat and also the pattern of procurement. If we examine the annual pattern in monthly procurement and off-take, we find that while off-take is quite evenly distributed over different quarters, procurement, especially for wheat, is concentrated in some quarters (Figure 2). More than 90 percent of wheat is procured in the



months of April and May. Rice procurement is less concentrated compared to wheat. About 45 percent of total rice procurement takes place in the quarter October to December and 33 percent in the first quarter of calendar year. As the procurement is not evenly distributed over months and quarters, the procured grain is required to be kept in storage to match with the off-take. Thus, the pattern of off-take decides stock level to be kept in different months, quarters to meet requirement of PDS and other welfare schemes. To optimize the level of stocks at the beginning of each quarter, the inflow (procurement) during that quarter needs to be synchronized with the outflow (off-take) during the same quarter.

Figure 2: Monthly Pattern in Annual Procurement & Off-take, TE 2012



Source: DFPD, FCI

11. Thus, the stocks to be held at the beginning of the remaining quarters needs to be calculated by matching the inflows and the outflows. The average pattern of procurement over the last three years is assumed as the pattern of inflow in each quarter. The monthly off-take, as calculated before, is assumed to be uniform at 2.8 mt for rice and 2.3 mt for wheat. Assuming that at the beginning of marketing year (1st October for rice and 1st April for wheat) when fresh procurement begins, the stocks with the central agency should be enough to fulfill 1/2/3 months of off-take requirements, three estimates for the level of operational stocks at the beginning of each quarter are determined. Accordingly, on synchronizing the inflows and the outflows, the level of operational stocks to be held has been calculated in table 2 (a) & (b).



II.B Methodology for Empirically Mapping Quarterly Operational stocks Requirement (OSR)

12. In order to work out the desirable stock requirements at the beginning of each quarter, essentially three steps have been followed sequentially, separately for rice and wheat.

Step 1: Firstly, the level of stock, that would be required at the beginning of the procurement season, needs to be defined say R_t . This level would be based on the estimates of the operational authorities (such as FCI and Deptt of Food) of the number of months required to turnaround the current procured grain into the distribution network. A well-oiled and efficient machinery can perhaps turn it around within one month; a reasonably comfortable time could be two months and extra luxury would be three months. Our discussions with officials reveal that two months stocks at the beginning of the procurement season would be pretty comfortable to get the operations in place with regard to turning around the procured grains into the distribution network. Therefore, 2 months requirement is taken as the most likely scenario (Scenario II) but simulations for 1 month requirement (Scenario I) are also undertaken under the presumption that the operational machinery will become efficient over time. But, unfortunately, if the current machinery is saddled with more inefficiency with time, then stocks for even 3 months requirements may be required (Scenario III).

Step 2: The level of procurement desired for the whole year (DP_t) is estimated based on the assumption of desirable stocks (R_t) at the beginning of procurement season. This would equal the annual requirement under PDS & OWS (O_t) plus the desirable stocks (R_t). As has been estimated in table 1, the monthly requirement for wheat and rice under NFSB would be 2.3 mt and 2.8 mt respectively. The annual requirement (O_t) can be calculated from these monthly estimates.

$$\text{i.e., } DP_t = R_t + O_t$$

Step 3: This is a critical step as in this the flow of procurement in each quarter is worked out based on the average of the quarterly share of annual procurement (p_i where i refers to the quarters) during the last three years. These shares give us the quarterly pattern of procurement during the year i.e, the inflows ($I_i = p_i * DP_t$). This procurement in each quarter, then, is adjusted by deducting the offtake for PDS and OWS (O_i). It may be noted that while the pattern of procurement varies in each quarter and so would the inflows, but the outflow of off-take is likely to be constant or uniform. So at the end of each quarter, there would be a carryover stock from the previous quarter gap between inflows and outflows ($=I_i - O_i$). This carryover stock of one quarter is further adjusted by the difference between inflows and outflows of the next



quarter which gives us the carryover stock for the next quarter and so on. These would give us the desirable operational stocks to be held at the beginning of each quarter.

13. The steps are illustrated separately for wheat & rice in table 2(a) & 2(b) with the assumption that scenario II (2 months requirement) is the most likely scenario. In case of wheat, the desirable stocking requirements at the beginning of procurement season would be equal to the off-take in two months i.e., 4.6 mt⁵ (R_t). This means that as on 1st April when the procurement season starts, country should already have 4.6 mt of wheat relating to 2 months off-take during April-May. In the meantime, fresh procurement will come during the April-June quarter, which can then be put into distribution from June onwards. With this assumption that $R_t = 4.6$ mt stocks, the corresponding desired level of procurement (DP_t) for the whole year would be $R_t + O_t = 4.6 + (2.3 * 12) = 32.2$ mt. But during the first quarter, 99.6 percent (p_1) of the desirable procurement (DP_t) will be procured i.e. $I_1 = p_1 * DP_t = 0.996 * 32.2 = 32.1$ mt. But the offtake (O_1) during quarter 1 (q_1) will be only 6.9 mt. So at the beginning of the second quarter, there will be a carryover stock of 25.2 mt ($I_1 - O_1 = 32.1 - 6.9$). During the second quarter, only 0.4 percent (p_2) of the desirable procurement would flow in i.e inflow (I_2) would be 0.1 mt ($I_2 = p_2 * DP_t = 0.004 * 32.2$), while the outflow (O_2) would be again 6.9 mt. This will leave a carryover stock of 18.4 mt ($I_1 - O_1 + I_2 - O_2 = 25.2 - 6.8$) at the beginning of quarter 3. Then, in quarter 3 & 4, there are no inflows of procurement (I_3 & $I_4 = 0$) and outflows of 6.9 mt are there (O_3 & $O_4 = 6.9$ each). So at the end of quarter 3 and beginning of quarter 4, the carryover stocks are 11.5 mt ($I_1 - O_1 + I_2 - O_2 + I_3 - O_3 = 25.2 - 6.8 - 6.9$). Now, at the end of quarter 4 and the beginning of the next procurement season, we would be left with a carryover stock of 4.6 mt ($I_1 - O_1 + I_2 - O_2 + I_3 - O_3 + I_4 - O_4 = 25.2 - 6.8 - 6.9 - 6.9$). So the desirable operational stock at the beginning of each quarter for wheat would be 25.2 mt (as on 1st July), 18.4 mt (as on 1st October), 11.5 mt (as on 1st January) and 4.6 mt (as on 1st April). This is also explained in table 2 (a) which illustrates the other two scenarios also.

14. The case of rice is a little more complicated, as the pattern of procurement is widely spread out while the off-take is 8.4 mt per quarter⁶. Following the same logic, we concentrate on scenario 2, i.e., we want 5.6 mt (R_t) at the beginning of procurement season. This means that as on 1st October when the procurement season starts, country should already have 5.6 mt of rice relating to 2 months off-take during October-November. In the meantime, fresh procurement will come during the Oct-Dec quarter, which can then be put into distribution from December onwards. With this assumption that $R_t = 5.6$ mt stocks, the corresponding

⁵ The monthly off-take for wheat is 2.3 mt under NFSB (table 1).

⁶ The monthly off-take for rice is 2.8 mt under NFSB (table 1).



desired level of procurement (DP_t) for the whole year would be $R_t + O_t = 5.6 + (2.8*12) = 39.2$ mt. During the first quarter, 45.6 percent (p_1) of the desirable procurement (DP_t) will be procured i.e. $I_1 = p_1 * DP_t = 0.456 * 39.2 = 17.9$ mt. But the offtake (O_1) during quarter 1 (q_1) will be only 8.4 mt. So at the beginning of the second quarter (q_2), there will be a carryover stock of 9.5 mt ($I_1 - O_1 = 17.9 - 8.4$). During the second quarter, 33.1 percent (p_2) of the desirable procurement would flow in i.e inflow (I_2) would be 13.0 mt ($I_2 = p_2 * DP_t = 0.331 * 39.2$), while the outflow (O_2) would be again 8.4 mt. This will leave a carryover stock of 14.1 mt ($I_1 - O_1 + I_2 - O_2 = 9.5 + 13.0 - 8.4$) at the beginning of quarter 3. Then, in quarter 3, 15.1 percent (p_3) of the procurement comes in i.e $I_3 = p_3 * DP_t = 5.9$ mt with offtake at 8.4 mt, the carryover stocks, at the end of quarter 3 and beginning of quarter 4, are 11.6 mt ($I_1 - O_1 + I_2 - O_2 + I_3 - O_3 = 14.1 - 2.5$). Now, at the end of quarter 4 and the beginning of the next procurement season, with an inflow of 6.1 percent i.e 2.4 mt, we would be left with a carryover stock of 5.6 mt ($I_1 - O_1 + I_2 - O_2 + I_3 - O_3 + I_4 - O_4 = 11.6 + 2.4 - 8.4$). So the desirable operational stock at the beginning of each quarter for rice would be 9.5 mt (as on 1st January), 14.1 mt (as on 1st April), 11.6 mt (as on 1st July) and 5.6 mt (as on 1st October). This is also explained in table 2 (b) which illustrates the other two scenarios also.

15. Given that the 4 quarters are based on the procurement year (i.e., Apr-March for wheat & Oct-Sept for rice), a formula based on inflow and outflow patterns can be devised. The level of stock, that would be required at the beginning of the procurement season i.e., at the beginning of the first quarter (q_1), would be based on the estimate of the number of months required to turnaround the current procured grain into the distribution network. The requirement for this number of months would be the level of operational stocks required at the beginning of the first quarter (q_1).

$$S(q_1) = R_t,$$

For the other quarters, the formula could be devised as follows:

$$S(q_i) = \sum_{j=1}^3 (I_{i-j} - O_{i-j}), \text{ where } i=2,3,4$$

where S= operational stocks required at the beginning of the quarter

R_t = Desirable Requirement for number of months at the start of the procurement season

O_i : Off-take in a quarter

I_i = Inflow during a quarter = $p_i * DP_t$

p_i = Triennium average of share of procurement in annual procurement during the quarter

DP_t : Desirable Procurement during the year = Annual Off-take ($\sum O_i$) + R_t



Table 2 (a): Operational Stock Requirements (OSR) for Wheat in Different Quarters

(Million Tonnes)

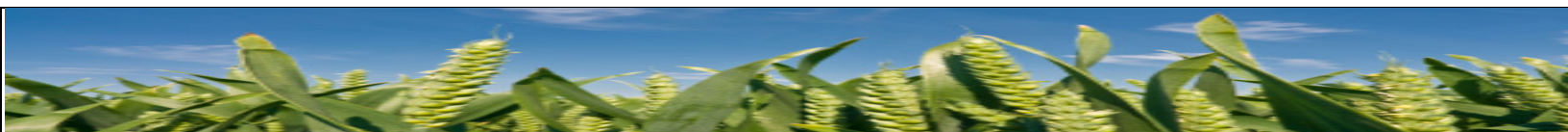
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Desirable Procurement	29.9	32.2	34.5
Apr-June			
Inflow @ 99.6% of total Procurement	29.8	32.1	34.4
Outflow	6.9	6.9	6.9
Carryover on 1st July (Inflow-Outflow)	22.9	25.2	27.5
July-Sept			
Inflow @ 0.4% of total Procurement	0.1	0.1	0.1
Outflow	6.9	6.9	6.9
Carryover on 1st Oct (Carryover on 1 st July + (Inflow-Outflow during July-Sept))	16.1	18.4	20.7
Oct-Dec			
Outflow	6.9	6.9	6.9
Carryover on 1st Jan (Carryover on 1 st Oct - Outflow during Oct-Dec)	9.2	11.5	13.8
Jan-Mar			
Outflow	6.9	6.9	6.9
Carryover on 1st Apr (Carryover on 1 st Jan - Outflow during Jan-Mar)	2.3 (1 Month requirement)	4.6 (2 Month requirement)	6.9 (3 Month requirement)

Table 2 (b): Operational Stock Requirements (OSR) for Rice in Different Quarters

(Million Tonnes)

Desirable Procurement	36.4	39.2	42.0
Oct-Dec			
Inflow @ 45.6% of total Procurement	16.6	17.9	19.2
Outflow	8.4	8.4	8.4
Carryover on 1st Jan (Inflow-Outflow)	8.2	9.5	10.8
Jan-March			
Inflow @ 33.1% of total Procurement	12.0	13.0	13.9
Outflow	8.4	8.4	8.4
Carryover on 1st Apr (Carryover on 1 st Jan + (Inflow-Outflow during Jan-March))	11.8	14.1	16.3
Apr-June			
Inflow @ 15.1% of total Procurement	5.5	5.9	6.3
Outflow	8.4	8.4	8.4
Carryover on 1st July (Carryover on 1 st Apr + (Inflow-Outflow during Apr-June))	8.9	11.6	14.2
July-Sept			
Inflow @ 6.1% of total Procurement	2.2	2.4	2.6
Outflow	8.4	8.4	8.4
Carryover on 1st Oct (Carryover on 1 st July + (Inflow-Outflow during July-Sept))	2.8 (1 Month requirement)	5.6 (2 Month requirement)	8.4 (3 Month requirement)



16. Table 2 (a) & (b) gives the level of operational stocks for rice & wheat which are required to be held at the beginning of each quarter. Adding the two would give us an estimate of the total operational stock requirements under alternative assumptions of 1/2/3 months' requirement as detailed in table 3. The scenario with 2 month requirement is taken as the most feasible as it is the optimal time for turnaround of fresh procured stocks.

Table 3: OSR (Wheat plus Rice) under alternative assumptions

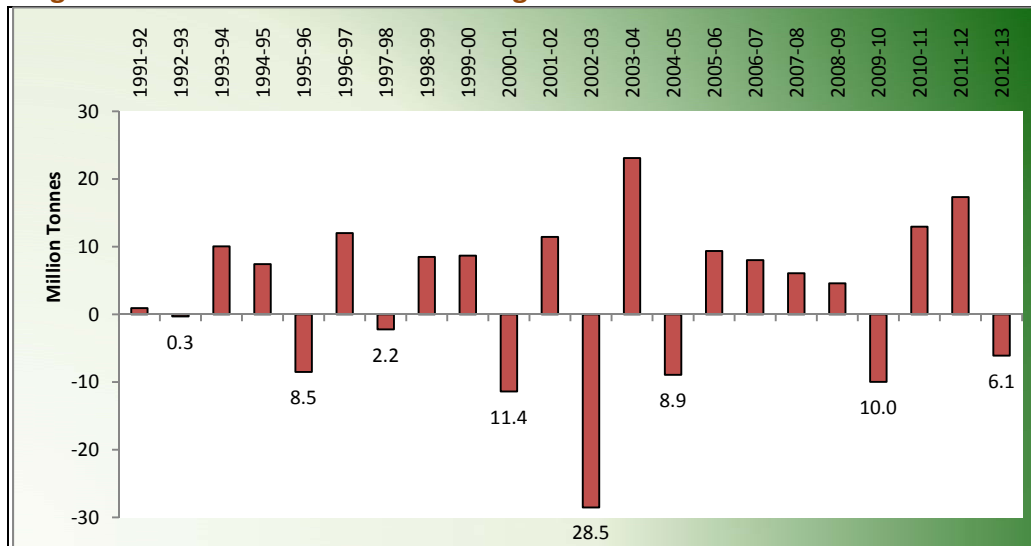
	1 month Requirement	2 month Requirement	3 month Requirement
1st July	31.8	36.7	41.7
1st Oct	18.9	24.0	29.1
1st Jan	17.4	21.0	24.6
1st Apr	14.1	18.7	23.2

II.C Strategic Reserves

17. Strategic reserves are needed to meet any serious shortfall in output. Therefore, level of buffer stock need to be closely linked to level of negative deviation in domestic output (Nand & Souck, 1971). Deviations in domestic output in rice & wheat from the previous year during the last two decades are shown in Figure 3. Highest decline in the total output of rice & wheat was 28.5 mt during year 2002-03 (and for all cereals, including coarse cereals, it was 35.8 mt) but that happened once in twenty years, i.e., with 5 percent probability. If one wants to have zero risk, based on last 20 years' experience, one will have to keep about 28.5 mt of wheat and rice (total) stocks as strategic reserves. But that may be very expensive and not really optimal. The next best could be to operate at 95 percent risk coverage instead of 100 percent. Under this scenario, strategic reserves could be around 10-12 mt as the next level of decline in production of wheat and rice (together) hovers around 10-12 mt (for total cereals it is maximum 16.5 mt in 2009-10).



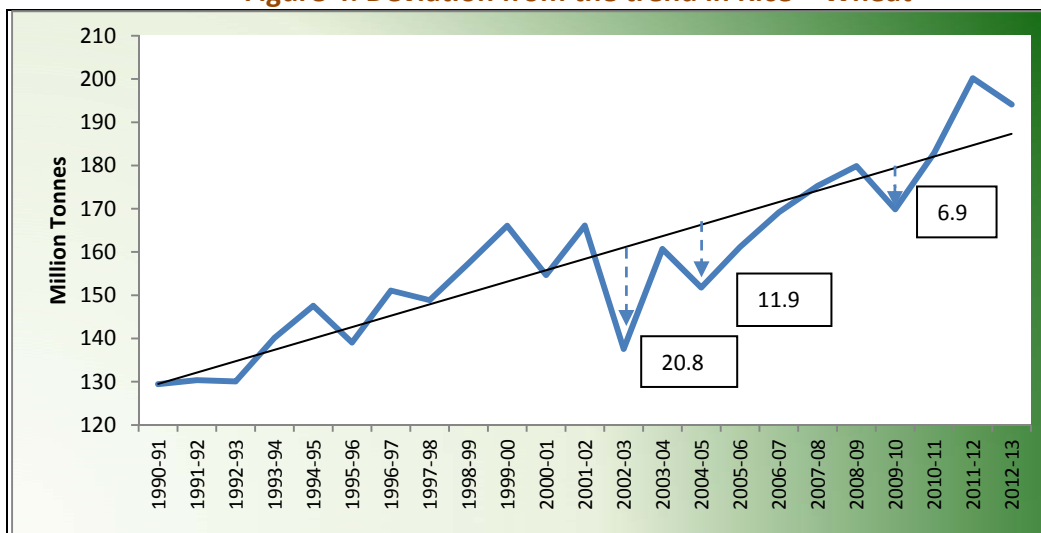
Figure 3: Year to Year Absolute Change in Total Production of Rice + Wheat



Source: DES

18. If we take the deviation of the actual output from the trend, the maximum decline (excluding 2002-03) for rice + wheat is 11.9 mt and for all cereals is 13.3 mt (Figure 4). The maximum decline in procurement during the last twenty years has been 8.0 mt in 2006-07. Thus, the desirable level of strategic reserves could be assumed as 10 -12 mt. Assuming a 55:45 ratio for rice and wheat (ratio in total procurement during 2007-08 to 2011-12), and a total strategic reserve of 10 mt, one can then keep 5.5 mt of rice and 4.5 mt of wheat.

Figure 4: Deviation from the trend in Rice + Wheat



Source: DES



19. These strategic reserves may be held in physical form or a part of it may be held in foreign exchange reserves. In an open world market and given the current level of foreign exchange reserves (hovering around US\$ 300 billion), it may be assumed that 5 mt (3 mt wheat and 2 mt rice) could be imported without putting any pressures on world markets; the world market of wheat being around 140 mt and of rice around 35 mt. The opportunities under liberalized external trade are in terms of reduced dependence on buffer stocks and greater dependence on trade for price stabilization (Jha & Srinivasan, 1999 & 2004). Maintaining physical buffer stocks for absorbing shocks due to production fluctuation were justified when India did not have enough foreign exchange reserves to buy grain in the international market (World Bank, 1999).

20. Thus, the desirable stock norms as on 1st of each quarter including both operational stocks and strategic reserves are as shown in table 4. If we take the 2 months requirement of wheat and rice as the most likely scenario, then 46.7 mt of rice and wheat stocks, as on July 1st, are desirable buffer stocks to cover the operational needs under NFSB as well as to cover 95 percent risk of drop in production of wheat and rice. But this is under autarky, indicating India does not rely on imports at all. If one allows for at least 5 mt of possible imports whenever need arises, i.e., when actual stocks fall short of desirable stocks, then the level of desirable stocks would be 5 mt less, i.e., only 41.7 mt as on July 1st. This would basically match with the desirable level of stocks under scenario 1. So, in sum, anywhere between 41 mt to say 47 mt, would be a comfortable level of buffer stocks, covering both the operational needs of the NFSB as well as strategic reserves to take care of any drought or other exigency. This means that current buffer stocking norm of 31.9 mt as on July 1st, needs a major revision in the wake of NFSB.

Table 4: Desirable Buffer Stock Norms

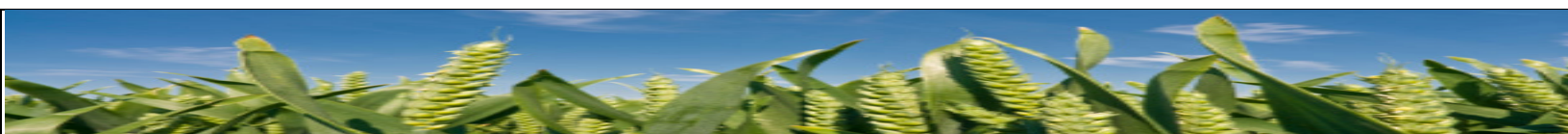
(Million tonnes)

	Wheat + Rice			Current Norms
	1 month Reqt	2 month Reqt	3 month Reqt	
1st July	41.8	46.7	51.7	31.9
1st Oct	28.9	34.0	39.1	21.2
1st Jan	27.4	31.0	34.6	25.0
1st Apr	24.1	28.7	33.2	21.2

Note: Assuming a 55:45 ratio for Rice & Wheat for Strategic Reserves of 10 mt

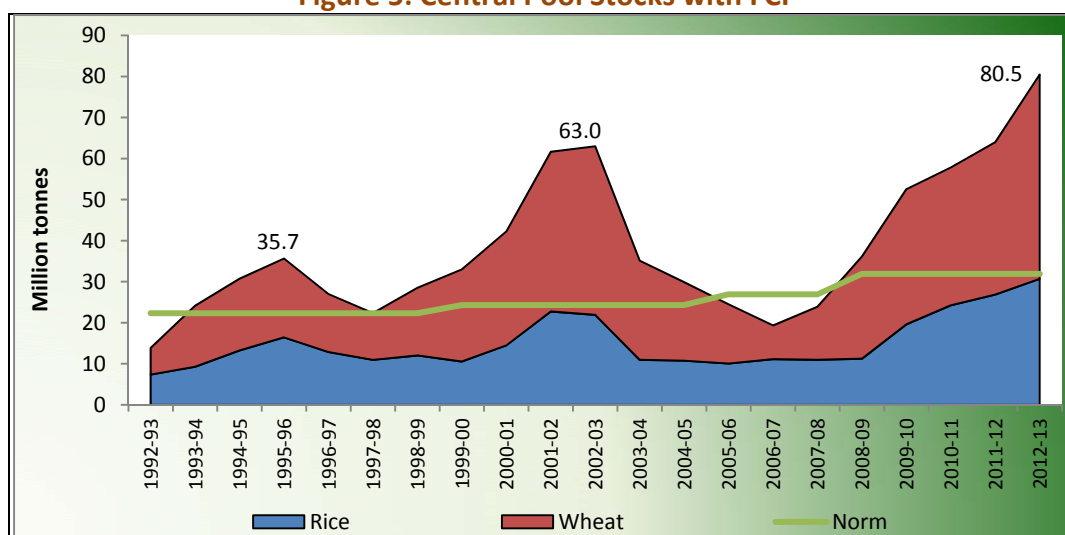
III. Central Pool Stocks: Current Status

21. As against the current buffer stock norm of 31.9 mt of rice & wheat (as on 1st July of each year), total Central Pool stocks were more than double at 80.5 mt (30.7 mt of rice and 49.8 mt of wheat) on 1st July, 2012 (Figure 5). The situation is not very different as on 1st April, 2013



– with 59.8 mt of central pool stocks and more than double the buffer stock norm of 21.2 mt. It has been estimated that central pool stocks would touch 82.2 mt on 1st July 2013, assuming that 1 mt wheat stocks would be liquidated through exports & OMSS (table 5). This is against the available covered storage capacity with FCI and State agencies of 53.4 mt. And if one adds CAP capacity of 18.5 mt, then total capacity is 71.9 mt as on 31st March, 2013.

Figure 5: Central Pool Stocks with FCI



Source: FCI

Note: Stocks are shown as on 1st July of each year.

Table 5: Estimated Likely Stocks on 1st July, 2013

	Wheat	Rice	Total
Stocks as on 1 st April, 2013	24.2	35.5	59.7
Expected Procurement during April to June, 2013	32.0#	5.2*	37.2
Expected Off-take in TPDS & OWS*	6.5	7.2	13.7
Assuming Wheat Stock Sales by Exports and OMSS	1.0	0.0	1.0
Expected Stocks on 1st July, 2013	48.7	33.5	82.2

(Million Tonnes)

based on consultations with officials of Food Ministry; *based on the trend over the last three years

22. As against the desirable stocks calculated above in table 4 (under autarky), on 1st July, 2013, the likely stocks held with FCI would be in excess of around 30-40 mt (table 6). The value locked in these “excess stocks”, evaluated at their economic cost, ranges from Rs 70,000 crore to Rs 92,000 crore. The economic cost of wheat is estimated at Rs 20100/tonne and of rice



around Rs 26,430/tonne for FY 2013-14. This infusion of “excess” money into the economy without corresponding flow of goods is evident in the paradox of rising prices of rice & wheat amidst overflowing stocks in government godowns.

Table 6: Likely Excess Stocks as on 1st July, 2013

Scenario (as on 1 st July)	Likely Excess Stocks (Million Tonnes)	Value of Excess Stocks at Economic Cost (Rs crore)
I: 1 month Requirement	40.4 (19.1R + 21.3W)	93,294
II: 2 month Requirement	35.4 (16.4R + 19.0W)	81,535
III: 3 month Requirement	30.5 (13.8R + 16.7W)	70,040

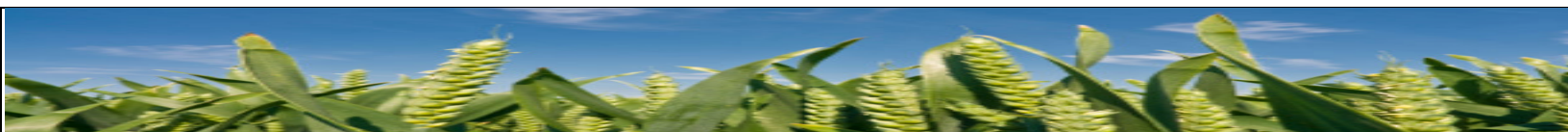
Note: Economic cost for 2013-14 for wheat is Rs 2010/qtl and Rs 2643/qtl for rice.

IV. The Way Forward

23. The analysis in above sections clearly indicates that currently, there are ‘excessive’ stocks with the central agencies. This is despite the increased desirable buffer stocks needed to be held in light of NFSB. It is creditable that India is currently in a state of ‘plenty’ but holding excessive stocks in godowns, which serve no worthwhile purpose, begs the question of economic efficiency in public expenditure. It is a simple question of putting, say, Rs 80,000 crore to some useful purpose. And here are our suggestions to the government with a view to make food management meaningful and efficient, even with NFSB in its current form. And our suggestions basically ask for liquidating these “excessive” stocks in various forms as delineated below.

24. Firstly, the states where PDS systems have been integrated with ‘Aadhaar’ and the probability of leakages in the distribution system reduced significantly may be allowed to lift 3-6 months of their off-take requirements at a discounted price, where the discount would be equal to the cost of carrying by the FCI. These states in turn can ask the consumers to lift their 3-6 months quota at a time with a discount on the PDS price. The benefit is that the consumers under existing PDS can get larger quantities at the beginning itself, releasing some storage space for FCI. The danger is that if the PDS is leaky, the off-takes can come back to the procurement centre as the MSP would be much higher than the PDS price, and this can lead to another food scam.

25. Another option could be OMSS at the last year’s MSP plus a maximum of 5 percent towards taxes/cesses etc. At these rates wheat price will be Rs 13500 per tonne and rice price

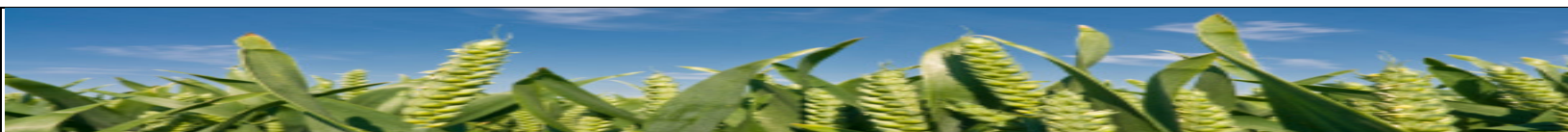


will be Rs 19000 per tonne, say ex-Punjab. The losses incurred would be administrative expenses in procurement and statutory levies (which are in the nature of centre-state fund transfers), but this would still save the large costs of carrying excess stocks as well as the capital that is locked in these stocks. If these stocks are liquidated, then the value encashed can help in bridging the fiscal deficit and also improve the flow of rice & wheat in the economy where cereal inflation is still hovering in double digits. Unloading about 8-10 mt of wheat and rice in the domestic market (OMSS) can surely tame and bring down cereal inflation.

26. The third option would be to allow the PSUs and private sector to export another 10-12 mt or so at an ex-Punjab price of Rs 13500/tonne for wheat and Rs 19,000/tonne for rice. This would help tide over the current account deficit as well as the deficit financing at home. The current price being offered for wheat export ex-Punjab is Rs 14840/tonne, which includes statutory levies etc that FCI has paid during the procurement process. But this is not attracting much private sector participation, and the PSUs themselves cannot export either, as the global wheat prices are showing a declining trend. If early action is not taken, and we feel India is already late in this by at least 4-5 months, then the chances are that India will have to carry this “excess” level of stocks for the next two years, unnecessarily costing the economy heavily without any purpose and that too at a time when CAD and fiscal deficit are already very stretched.

27. Fourthly, the availability of these surplus stocks also opens up an opportunity for India to be generous to regional and global needs. India could contribute 2-3 mt for a South Asian foodgrain reserve, an idea which was floated after the 2007-08 food price crisis. There could also be a window to use these surplus stocks for extending humanitarian aid to Afghanistan and some other African countries through the World Food Programme (WFP) or through bilateral cooperation. This can bring rich dividends to help the poor of the world, and also political goodwill for India, which is aspiring to be a global player.

28. Once the current problem of excess buffer stocks is solved, the provisions of physical entitlements under NFSB itself need to be reviewed. In recent years, the government has procured more than one-thirds of the total production and more than half of the marketed surplus of rice & wheat. Such large scale public procurement has strangled the private trade (as has been the case in Punjab, Haryana and now Madhya Pradesh & Chhattisgarh). Of the total market arrivals of wheat and rice in these states, more than 80-90 percent is bought by the government, indicating a *de-facto* state take-over of grain trade. This reminds one of the failed experiment of wheat trade take-over in 1973-74. We need to learn lessons from our failures without hesitation. Bringing back the private sector into grain trade should be high on



government agenda, and not driving them out of markets. Monopsony of any one player, be it the government or the private sector, is counter to the spirit of competition, and the nations who have tried to destroy competition in markets have suffered badly. India needs to avoid that path, and work towards “getting the markets right”. One should remember that the cost of a simple departmental labour (loader) of FCI is 7 to 8 times the cost of contract labour doing the same job. With government monopsony, these costs are going to escalate and so would be the statutory levies being imposed by various state governments, making the entire operation of NFSB a very high cost phenomenon.

29. It may also be noted here that internationally, conditional cash transfers (CCTs), rather than physical distribution of subsidized food, have been found to be much more efficient in achieving food and nutritional security. The case of Brazil with the largest CCT scheme, which has been instrumental in replacing poorly targeted subsidies, improving the quality of delivery of services and achieving desired improvements in social welfare, is worth emulating here. Therefore, there is an exigency to reframe the foodgrains policy with movement from physical handling and distribution of foodgrains to cash transfers/food coupons/smart cards and cover food subsidy under the ‘Direct Benefit Transfer’ (DBT) scheme.

30. In the first phase, surplus states (in terms of production and consumption of cereals) and cities with a population of 1 million or more (currently 33 as per 2011 census) could move straightaway to cash transfers⁷. States which are deficit in production may continue with the physical handling of foodgrains. One size may not fit all the states and there is need to innovate in our food management and welfare policies so that same expenditure brings much higher returns in terms of tackling hunger and malnutrition of this country. There are no two opinions about the fact that growth will not have much meaning if we are not able to drastically cut down hunger and malnutrition. The issue is how best it can be done with limited resources and more efficiently.

31. If one moves to the best international practices towards conditional cash transfers, the desirable level of buffer stocks could be just 10-15 mt, which basically takes care of the exigencies. This can save and release large amount of government expenditure, which in turn can be used to augment the level of welfare schemes. Our estimates, given in an earlier discussion paper of CACP, reveal a potential savings of Rs 40,000 crore per year, with a switch from physically handling grains under NFSB to conditional cash transfers. And that is surely not a small sum!

⁷ CACP Discussion paper No. 4



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