Direct Transfer of Subsidies in Fertilizers: Issues and Challenges for Supply Chain

Gangadhar Mishra,
Research Scholar, Department of Business Administration, Utkal University, Bhubaneswar

Abstract

Subsidies are necessary evils in our economy and more so in fertilizers. In the present scenario, the Government subsidizes manufacturers of fertilizers to ensure that the end product is affordable for farmers. The quantum of subsidy that manufacturers receive is the difference between their normative cost of production/ Import and the subsidized Maximum Retail Price (MRP)that fertilizers are sold at. India is the 3rd largest producer and consumer of fertilizers in the world and fertilizer contributes to 40-50 percent of agricultural productivity. At Rs 70,967 Cr during FY 2014-15 (RE),fertilizer subsidy is the second major subsidy element after Food subsidy followed by Petroleum subsidy. A subsidy, by its very nature, introduces two or more prices for the same good, and createsincentives for pilferage and diversion. As a result, the underprivileged suffer the most. Ensuringthat goods move in the supply chain at market prices can minimize the incentives for diversion.

Keywords: - Fertilizer,Subsidy,Land Holding,Nutrients,Supply Chain,Freight.

1. Introduction

Agriculture accounts for about one seventh of India's GDP, provides sustenance to nearly 65% of our Population. Besides, it provides crucial backward and forward linkages to the rest of the economy. Successive five-year plans have laid emphasis on self-sufficiency and self-reliance in food grain production and concerted efforts in this direction have resulted in substantial increase in agriculture production and productivity. This is clear from the fact that from a very modest level of 52 million MT in 1951-52, food grain production increased to about 264.7 million MT in 2013-14. In meeting the domestic requirement of food grains and also generating exportable surpluses, the significant role played by chemical fertilizers is well recognized.

The Indian National Food Security Act. 2013 aims to provide subsidized foodgrains to approximately two thirds of India's 1.2 billion people. To achieve this objective, agricultural productivity needs to be further increased which is possible only with balanced use of chemical fertilizers and bringing more cultivable land under fertilizer use.

The three major macro nutrients that are made available in different types of Fertilizers are Nitrogen(N),Phosphate (P) and Potassium(K).Nitrogenous Fertilizers mostly available in the form of Urea promotes vegetative growth in Plants where as Phosphatic Fertilizers promotes reproductive growth through root development, flowering and fruiting. Potassic Fertilizers promotes strong stem growth, movement of water in plants, flowering and fruiting as well as resistance to pests and diseases.

As of now, the country has achieved 80 percent self-sufficiency in production capacity of Urea. As a result, India could manage its substantial requirement of nitrogenous fertilizers through the indigenous industry. Similarly, 50% indigenous capacity has developed in respect of phosphatic fertilizers to meet domestic requirements. However, the raw-materials and intermediates for the same are largely imported. For potash (K) , since there are no viable sources/reserves in the country, its entire requirement is met through imports. The installed capacity has reached to a level of 132.58 LMT in respect of nitrogen and 70.60 LMT in respect ofphosphatic nutrient in the year 2014-15, making India the 3rd largest fertilizer producer in the world. The rapid buildup of fertilizer production capacity in the country has been achieved as a result of a favourable policy environment facilitating large investments in the public, co-operative and private sectors.

At present, there are 30 large size Urea plants in the country manufacturing Urea, 21 units manufacturing DAP and complex fertilizers and 2 units man -ufacture Ammonium Sulphate as a byproduct.Besides, there are 97 medium and small-scale units in operation producing Single Super Phosphate (SSP).The sector-wise installed capacity is given in **Table 1**:

Table 1:
Sector Wise Installed Capacity of Fertilizer in India

Sr.No	Sector	Capacity (LMT)		Percentage Share	
		N	P	N	P
1	Public Sector	37.64	3.87	28.39	5.48
2	Cooperative Sector	36.38	17.13	27.44	24.26
3	Private Sector	58.56	49.60	44.17	70.26
TOTAL		132.58	70.60	100.00	**100.00**

2. Objective

The Objective of this study is to map the issues and challenges Involved during the transition of pay out of Fertilizer Subsidy from the present framework of reimbursing the subsidy to the manufacturers to directly effect the payment and transfer to the farmers. The study tries to find the various reforms that are required to be implemented in the entire supply chain so as to go towards the direct transfer of subsidy regime to the ultimate consumers.

3. The Subsidy Framework Today

With the intent of maintaining equitable distribution of fertilizers and ensuring their availability at fair rates, the Government prescribes maximum prices at which fertilizers may be sold. Fertilizer subsidies have ensured that food security is attained by sustaining a minimum level of usage, and thereby maintaining good agricultural productivity.

In the present scenario, the Government subsidizes manufacturers of fertilizers to ensure that the end product is affordable for farmers. The quantum of subsidy that manufacturers receive is the difference between their normative cost of production and the subsidized Maximum Retail Price (MRP) that fertilizers are sold at. Subsidies are disbursed only on receipt of fertilizers in the districts.

The first fertilizer sale involves a transfer from domestic manufacturers and import sources to dealers/ wholesalers. The dealers sell the fertilizer stocks to the retailers from whom the farmers purchase the product. Cooperative producers have their own network for fertilizer distribution which comprises of state, district, taluk/block and village level societies.

As per the current practices, all farmers (irrespective of farm size) are entitled to subsidized fertilizers.As can be seen from the table below, there is no discrimination between 62% marginal farmers with land holding of less than one hectare and the large and medium farmers with land holding of more than five and ten times as that of a marginal farmer.

Table-2:
Farmers' Profile in India based on Land Holding

Category	Basis	Percentage (%)
Marginal	land below 01 hectare	62%
Small	land between 01 and 02 hectares	19%
Semi Medium	land between 02 and 04 hectares	12%
Medium	land between 04 and 10 hectares	6%
Large	land more than 10 hectares	1%

Source: A.K.Srivastava,2012,Agricultural Census-Indian Experience,Ministry of Statistics and Programme Implementation,Government of India,New Delhi

In the current framework manufacturers have not been able to achieve significant efficiency and inventiveness due to their reliance on subsidies. It is hoped that by embarking on an incremental reform path, the manufacturing of fertilizers can be freed from unnecessary regulatory control and modernized while empowering farmers to purchase a vital input from a more efficient market and the entire system is rationalized o that fertilizer subsidy is optimized.

4. Fertilizer Supply Chain

The quantity of fertilizer mandated to move in the supply chain is based on demand consolidated by the Department of Agriculture and Cooperation (DAC) and the DOF, in consultation with the State Governments and manufacturers. Both, annual requirements and seasonal needs are calculated based on the availability of rainfall data and production/import schedules of

manufacturers. Distribution takes place as per the monthly supply plan finalized by the abovementioned stakeholders. A Fertilizer Monitoring System (FMS)is used to monitor the day-to-day dispatches/imports, movement, receipt and sale of fertilizers in the districts.

The fertilizer market comprises of 2 major product types – urea and NPK (complex) – produced, imported and sold in 23 different grades. While urea makes up half of the total market, other complex fertilizers account for the remainder. Of the total urea distributed/consumed, close to 80% is indigenous while the rest is imported through 3 designated canalizing agencies[21].

The costs associated with urea imports are borne by the Government and the MRP at which the imported urea is sold to the farmers is treated as recovery. While imports are expensive and are dependent on international prices of urea at a prevailing time, it is worth noting that expenditure is relatively less in cases where Off Take agreementshave been signed with other Governments.

Subsidy for all domestic urea producing units is different due to a range of factors such as pre-set norms, cost of fuel, technology, taxes, etc. The subsidy is exclusive of freight, which is reimbursed separately. The total subsidy pay out and subsidy pay out for Fertilizers is given in Table-3.

Table - 3
Details of Subsidies

(In Crores of Rupees)

		Actuals 2006-07	Actuals 2007-08 2008-09	Actuals	Actuals 2009-10	Actuals 2010-11 2011-12	Actuals	Actuals 2012-13	Actuals 2013-14 2014-15	Revised	Budget 2015-16
	A. Major Subsidies	**52935**	**66638**	**123206**	**134658**	**164516**	**211319**	**247493**	**244717**	**253913**	**227388**
1.	Food Indigenous(Urea)	24014	31328	43751	58443	63844	72822	85000	92000	122676	124419
2.	Fertiliser Imported (Urea)	12650	12950	17969	17580	15081	20208	20000	26500	38200	38200
3.	Fertiliser	3274	6606	10079	4603	6454	13716	15133	11538	12100	12300
4	Sale of decontrolled fertiliser with concession to farmers	10298	12934	48555	39081	40766	36089	30480	29301	20667	22469
	Total Fertillizer Subsidy	***26222***	***32490***	***76603***	***61264***	***62301***	***70013***	***65613***	***67339***	***70967***	***72969***
5.	Petroleum Subsidy	2699	2820	2852	14951	38371	68484	96880	85378	60270	30000
	B. Other Subsidies	**4190**	**4288**	**6502**	**6693**	**8904**	**6622**	**9586**	**9915**	**12779**	**16423**
6.	Interest Subsidies	2809	2311	3493	2687	4680	5049	7270	8137	11147	14903
7.	Other Subsidies *of which*	1381	1977	3009	4006	4224	1573	2316	1778	1632	1520
	Subsidy on import of pulses	...	...	...	*168*	*450*	*250*	*270*	*158*	*10*	*10*
	Subsidy on import of edible oils	...	...	...	*198*	*513*	*366*	*617*	318	..	...
	Total-Subsidies	**57125**	**70926**	**129708**	**141351**	**173420**	**217941**	**257079**	**254632**	**266692**	**243811**

Source: Expenditure Budget Volume I, 2015-16,Ministry of Finance, GOI

Phosphatic and Potassic (P&K) fertilizers were decontrolled and de-canalized in 1992. Up until 31st March 2010, MRP of P&K fertilizers were indicated by the Government. In fact, since February 2002till 31st March 2010, MRPs of P&K fertilizers were unchanged. From 1st April 2010, the Government hasimplemented Nutrient Based Subsidy (NBS) for P&K fertilizers and the MRPs of these fertilizers have been left open for rationalization by manufacturers. The NBS is announced on an annual basis, taking into account benchmark prices. It is uniform for imported as well as indigenously produced P&K fertilizers. The total budget provision for P&K fertilizers for 2015-16 isRs. 22,469crore out of a total budgetary allocation of Rs 72,969 crore.

For complex fertilizers, the subsidy is released in 2 tranches:

1. On-Account claim, which comprises of 85-90% of the total subsidy amount. This fraction is released on the basis of the quantity received in the district either at the manufacturer's or at the dealer's warehouse.
2. Balance claim, which comprises of 10-15% of the total amount. This tranche is released after the on-account quantity is sold to the dealer or retailer, as the case may be (First point sale).

For indigenously manufactured Urea, two types of claims of subsidy are being disbursed:

1. Regular claims: Quantity dispatched from plant/port and corresponding receipt in that particular month i.e. quantity received against dispatches made in the current month.

2. Residual claims: Quantity dispatched in the current month but received in the subsequent month. These claims each month pertain to quantities dispatched in the previous month, and are settled at the subsidy rate of the month of dispatch.

The DOF has notified the distribution margins for different grades of fertilizers. In the case of urea, the dealer's distribution margin is Rs. 180/MT. For cooperatives, the margin is slightly higher at Rs. 200/MT. The margin is deducted from the MRP in Urea.As for PNK fertilizers, the margin is included in the subsidy. It stands at Rs. 275/MT. The dealer passes on a portion of the margin (usually Rs. 130 in the case of urea and Rs. 190-200 in the case of other fertilizers) to the retailer.

For both P&K fertilizers and urea, freight subsidy is reimbursed to the companies on receipt of fertilizers in the districts based on the quantities that are being claimed on the on-account/regular claims. Railway freight is reimbursed at actual cost, while the road freight is given, as an Interim measure on a normative basis based on an average of distances in the districts and a normative rate depending on prevalent road transport rates in the respective state.

5. State of the Industry

Production of fertilizers in the country has remained largely stagnant during the past decade; the growing demand for fertilizers has been met mainly through rising imports. In the phosphate sector, the country is by and large import-dependent for critical phosphatic inputs such as rock phosphate and phosphoric acid. Rock phosphate import is about 52-53 lakh MT against indigenous availability of 13-14 lakh MT. About 25 lakh MT of phosphoric acid is imported against the indigenous production of about 13-14 lakh MT. Even indigenous production of phosphoric acid is based on imported rock phosphate. Almost 90-95% of the P&K requirements are met through imports, either in the form of finished fertilizers or fertilizer inputs.

Presently, the country has no known source of potash and the entire requirement is met through imports. Indigenous production of rock phosphate is very limited and is available only through mines in Rajasthan and Madhya Pradesh. The quality of indigenous rock phosphate is low in terms of Phosphorus Pentoxide (P2O5) content and is mainly suitable for the production of Single Super Phosphate (SSP) fertilizer.

Additionally, sulphur and sulphuric acid are available from oil refineries and smelter industries respectively, but the quantities are limited and the country is a net importer of both. The lack of long term availability of natural gas for urea plants, high cost of imported RLNG, gas prices and volatility in prices have impeded new investments in the urea sector. About 17-18 lakh MT of sulphur and the same amount of ammonia are imported.

6. Legal Framework

Subsidy for decontrolled P&K fertilizers and urea is provided based on the approval of the Cabinet Committee on Economic Affairs (CCEA). The Fertiliser Control Order provides a framework for the fertilizer sector. While the Central Government is responsible for providing subsidies to the manufacturers, State Governments are responsible under the FCO for maintaining the MRP and quality of fertilizers sold in the market.

7. Shortcomings of the Current Framework

The current subsidy framework has its limitations in terms of visibility of the entire supply chain, disbursement of timely subsidy claims, leakages as well as efficiencies in production.

The present Fertilizer Monitoring System implemented by the DOF is an effort to promote more transparency in the system as well as make subsidy disbursements more efficient. However, more visibility and transparency in the fertilizer supply chain from production to receipt at the retailer's point needs to be captured in the system for efficient decision making. Additional data should be captured to strengthen the FMS tool. It should be able to track the movement of fertilizers end-to-end, from the plants/ports to the farm gate, including the various transactions in the supply chain. Availability of extensive data will enable a more efficient supply chain on the back of realistic demand projections.

Since the claims submitted by the manufacturers have to be corroborated with documentation maintained by wholesalers and retailers, processing a claim is time consuming. As a result, there are delays in transferring the bulk of the subsidy component that comes from the Government. In the Interim, the manufacturers have to arrange for working capital to sustain production. In addition to affecting the manufacturing cycle, delays can have an unfavorable impact on imports and availability of fertilizers which can adversely influence agricultural production. The overall efficiency of the industry is lessened, as is the case with many subsidy-reliant businesses.

Subsidized fertilizers are also prone to leakages. Urea, Muriate of Potash (MOP) and Single Super Phosphate (SSP) are allegedly illegally diverted for industrial use. Urea is used for the production of urea formaldehyde which is used in garment manufacturing, melamine production, fish farming, milkproduction and soap manufacturing among other industries. MOP is used for manufacturing potassium chlorate which finds applicability for explosives, match and fire-cracker industries. SSP is used for the production of di-calcium phosphate, an animal feed. There is anecdotal evidence indicating that fertilizers are also smuggled out of the country to neighboring ones where prices for equivalent products are higher.

Reliance on imports leaves prices of fertilizers, feedstock and raw materials vulnerable to exchange rate fluctuations as wells as the international basket of crude oil prices. The impacts of these factors are being considered under the existing pricing system. The effect of increase/ decrease in the prices of inputs due to exchange rate variation is on the subsidy especially that of urea as it is sold at a fixed MRP to the farmer.

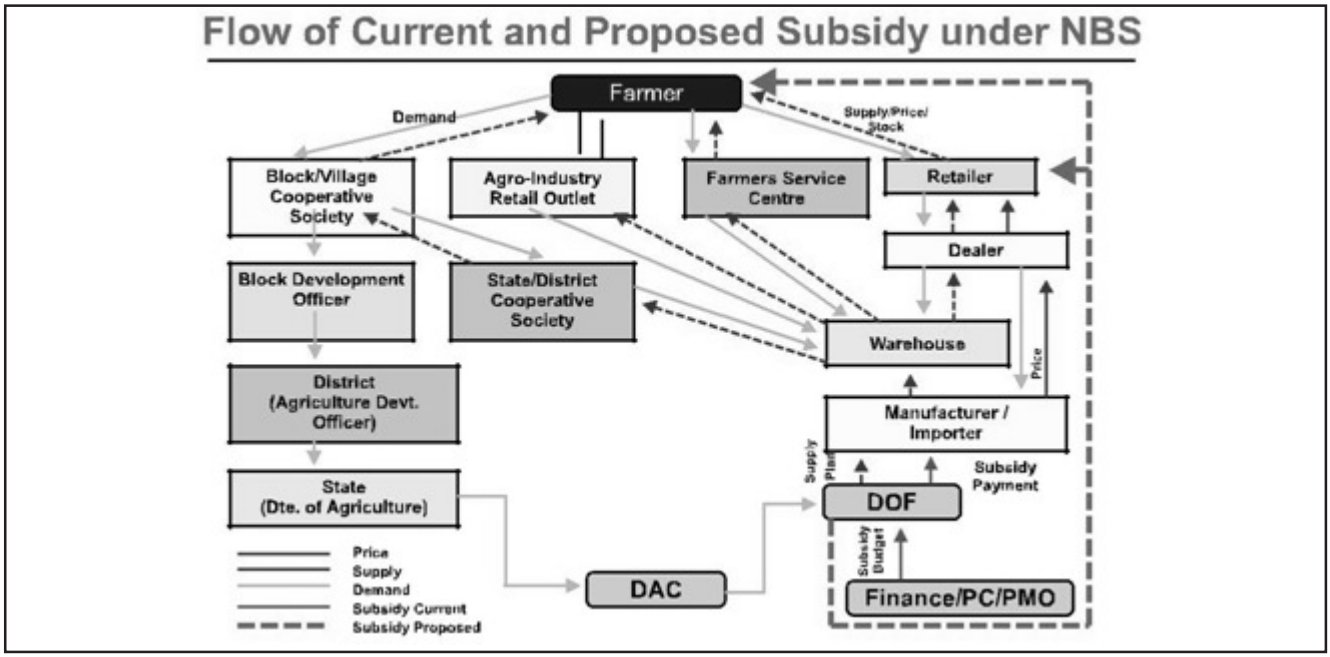
8. The proposed subsidy framework

To address the current challenges in the subsidy framework it is proposed that a phased approach to reform the subsidy disbursement mechanism be adopted. Presently, simplistically put, the fertilser subsidy is given by the Government to the Manufacturers/Importers directly. In the Interim proposed framework, the subsidy is planned to be provided to the retailers and ultimately to the intended beneficiaries (farmers).

It is proposed to be done in 3 phases:

Phase I: Information Visibility till the Retailer

Figure-1



Source: Interim Report of the Task Force on Direct Transfer of Subsidies on Kerosene,LPG and Fertiliser

The objective of this Phase is to create information visibility of the movement of fertilizers along the supply chain from the manufacturer till the retailer. After Phase I is implemented, it is envisaged that up-to-date information will be available, in the public domain, about the availability of fertilizers at the retailer level (last point of sale to the farmer). This would, in itself enhance transparency of fertilizer flow across the supply chain and would facilitate better delivery of the fertilizers to the end user.

Phase II: Subsidy Payment to Retailer

In the Interim stage, it is envisaged that the subsidy will be released to the retailer when he receives the fertilizer. This will involve transfer of subsidy directly to the retailer's bank account on receipt of fertilizer from the wholesaler. The advantage of this Interim stage was extensively discussed in the Task Force. It was recognized that this phase would have the advantage of the fertilizer moving at the full value across the supply chain upto the retailer. This stage will also provide crucial lessons for a smooth switch over to the next phase of direct transfer of subsidy to the intended beneficiary which is much more complex due to the scale as well as the eligibility issues involved. This phase is dependent on linking the retailers to the core banking network. This will also involve, inter-alia, the need to look into the payment procedures currently being followed by the Government of India. It is expected that the payment procedure adopted will be electronic, credible, and auditable and will not require extra deployment of manpower. The primary challenges in this phase would include increase in working capital requirements for stakeholders across the supply chain, increased credit requirement, space constraints at the retailer level, who now becomes the primary stockist, credit rating of retailer that may affect disbursal of subsidy and therefore supplies to farmers, issues in automated payment of subsidy, probable amendment of financial payment rules in Government and linkages with the core banking system for the retailers. The DOF has been mandated to address these challenges in a timebound manner with various stakeholders in government as well as outside.

Phase III: Subsidy Payment to Farmers

In the long run, once the coverage of Aadhaar is extensive throughout the country, and Aadhaar enabled payments are operational, it is envisaged that the subsidy disbursement to the farmer can be done directly into the bank accounts of the intended beneficiary. However, this phase would also require that the eligibility of who is an intended beneficiary is clearly mandated by the Government. It is proposed to be done in two phases:

1. Information flow on sales to individual farmers
2. Transfer of subsidy to farmers (intended beneficiary)

9. Planning the Transition-Challenges in Supply Chain

As with the re-engineering of any of any incumbent system, the transition from the current subsidy regime

to a more direct one will involve adjustments for all stakeholders. Meticulous planning on the back of incentive compatible subsidy architecture can smoothen the transition. A phased and linear approach that ensures incremental and convenient change has been prescribed, with the objective of making the evolution as seamless as possible. Potential challenges have been pre-empted and solutions for these prescribed, wherever possible.

Phase I

In the first phase, a robust information management system needs to be set up. Since the FMS has been a good starting point, there is a need to strengthen the existing software in addition to building supplementary systems. Data on the flow of fertilizers from the manufacturer level up to the retailer level on both receipt and sales needs to be captured.

DOF has entrusted the task of capturing the sales figures at the retailer level to the National Informatics Centre (NIC). It is proposed that the information to and from retailers be linked to the existing FMS. With the availability of reliable and timely sales data, the primary objective of disbursing subsidized fertilizers to the retailers in Phase II and ultimately to the intended beneficiary (farmer) in Phase III would be made simpler. Phase I and Phase II must be planned in such a way that there is a seamless transition from Phase I to Phase II.

This information can be corroborated with sales figures available with the DOF to ascertain the quantum of sale of fertilizers to the relevant constituency. During this phase (Phase I), the freight subsidy is proposed to be paid directly to the manufacturers, as is the case today.

The disbursement of subsidy to the manufacturers should be tied to the receipt and confirmation of fertilizers at the retailer level, thereby enabling a more accountable and transparent environment. Capturing data at all points of the supply chain can also enable better analysis of the current framework. Consumption patterns for various geographies, by kind of fertilizer, will enable better demand projection and supply.

In order to integrate data sources for a more effective information system, two major constraints will have to be addressed:

1. **Integrating with the retailer network:** Reaching out to, and working with the large number ofretailers estimated to be over 2,30,000 will prove to be a challenge. It may be assumed that these retailers will have varying levels of connectivity and technical prowess.

2. **Consolidating data from multiple retail supply chains:** Tracking the data from the supplynetworks of all retailers is likely to be a complex task since they may be sourcing fertilizers from multiple sources.

Technology solutions can help address the abovementioned concerns. Firstly, all important stakeholders viz. wholesalers, retailers, co-operatives, PACS and other institutional agencies involved in the sale of fertilizers should be registered since it will enable better mapping of the stock's journey. Secondly, a central server for SMS transactions and collation of information would be set-up. Finally, a transparency portal showing stocks at the retailer level may be an extremely useful monitoring and management tool. Both web and mobile based links at various points in the ecosystem will help in overcoming infrastructural constraints.

Phase II

In the second phase of the reform process, direct transfer of subsidies to the retailers on receipt of fertilizers may be considered. The evolution to this phase assumes the completion and stabilization of the first phase. As opposed to the present scenario where the wholesaler/dealer is the primary stockist, in the second phase, the retailers will be principal stock managers.

During this phase, the credit rating of retailers will be of importance. A significant change in this phase is that subsidies will be directly disbursed to the retailers, thereby shifting the realization of the working capital to them, and away from the manufacturers.

While there is an option to transfer the subsidy to the retailer only after the sale of the fertilizers to the farmers, instead of on receipt of stocks, there are various risks associated with it. Purchasing patterns by farmers for instance, are vulnerable to seasonal fluctuations. Moreover, the retailers' ability to sell stocks will depend on their credit ratings. This may create a chain of indebtedness for the retailer and can lead to unwarranted transaction costs and rent seeking behavior. Therefore, transfer of subsidies upon receipt of stocks at the retailer level is a better option in spite of marginal risks of diversion associated with the same. Various major concerns will need to be addressed by the DOF before moving from Phase I to II:

1. **Lack of storage space:** Inadequate storage facilities at the retailers'premises may inhibit theirability to maintain adequate stocks, thereby impacting need based re-distribution at the farm-gate.

2. **Recovery issues in case of sub-standard stocks:** There may be an issue of recovering subsidies incase sub-standard stocks are supplied. Currently, the manufacturers are penalized through pending bills of the company or they remit the requisite amount by way of cheques.

3. **Difficulty in certifying receipt and sales at the retailer level:** The current system incentivizes themanufacturers' statutory auditors to certify receipt and sales by the retailers since the disbursal of the manufacturers' subsidies is linked to the same. During Phase II, the responsibility of conducting these checks will have to be automated or given to another stakeholder.

4. **Increase in working capital requirements across stakeholders in the supply chain**

5. **Automated payment release to the Retailer – This would require electronic payment of subsidy to the bank account of the retailer**

6. **Amendments, if any, to the payment rules and procedures in Government**

Technology interventions can lead to a smooth transition from Phase I to Phase II. A seamless payment infrastructure needs to be implemented during Phase II.

Phase II is a vital intermediary step in moving towards a direct-to-farmer subsidy delivery framework as it will integrate information systems with disbursal mechanisms. It is hoped that this phase will be completed by June 2012 before Phase III can be considered.

The Task force discussed the challenges for implementation of Phase II. It was decided that a Detailed Project Report (DPR) be prepared. The broad project timelines for Phase II are as follows:

Phase III

It is envisioned that in the third phase of the transition, subsidies will be directly transferred to the end users i.e. the farmers. The advent of this phase assumes stabilization of the second phase and clarity on the eligibility of the intended beneficiaries. The transfer in Phase III may be carried out in 2 steps:

1. The flow of information on the sale of fertilizers to farmers

2. Subsequent disbursement of subsidy to them

In order to move to the third phase, 3 potential issues will need to be addressed:

1. **Difficulties in assigning entitlements:** A clear and implementable methodology for definingentitlements must be developed. This will be a complex task considering the fact that land records are inaccurate and/or missing in some states. In addition, the nature of land tenure is inconsistent across the country as sharecropping and tenancy land tillage are prevalent in some parts. Fixing the quantum of subsidies will further be complicated by the fact that requirements of farmers will vary vis-à-vis cropping, fertilizer usage patterns, extent of rainfall, soil conditions, land holding/size etc.

2. **Inadequate liquidity in case subsidy is transferred post-sale:** If the subsidies will only bereleased after the purchase, there may be a problem of prior mobilization of funds for buying the fertilizers. Moreover, the entitlements will need to be altered frequently.

3. **Unfavorable impact on choices in case of set subsidies:** Fixed subsidies may force particularpattern of usage and will impede dynamic evolution based on actual conditions.

10. Conclusions

The extent of technological prowess will be crucial in determining the nature of transition to Direct Transfer of Subsidy. The entire supply chain starting from the Manufacturer to farmers need be integrated and embedded on a single ERP platform with flow of Physical goods and information on real time basis and further integration with Financial Institutions for transfer of subsidy amounts. A database of farmers with relevant information on land holdings, type of crop(s) etc. needs to be constructed in order for the subsidy disbursement to be rational and effective. The issuance, and subsequent linkage, of Aadhaar numbers to the farmer database will be vital in identifying the intended beneficiaries. Further, the Aadhaar Payments Bridge should be leveraged to route subsidies to the farmers.

References

1. Jinesh Jain et al , "Supply Chain Management: LiteratureReview and Some Issues", Journal of Studies on Manufacturing (Vol.1-2010/Iss.1), 2010, pp. 11-25.

2. A.K.Srivastava,2012,Agricultural Census-Indian Experience,Ministry of Statistics and ProgrammeImplementation,Government of India,New Delhi ,PP 22-27.

3. Gulati, Ashok (1990), "Fertilizer Subsidy: Is the Cultivator 'Net Subsidised'? Indian Journal of Agricultural Economics, Vol. 45, No. 1, Jan.-Mar. 1990, pp. 1-11.

4. Government of India (2008), "All India Report on Input Survey 2001-02" Agriculture Census

5. Division, Department of Agriculture & Cooperation, Ministry of Agriculture, Govt. ofIndia, New Delhi.

6. Government of India (2012)Report of the Working Group on Fertilizer Industry for the 12th Plan -2012 13 - 2016 17,Department of Fertilizers, Government of India, New Delhi.

7. Government of India (2014),Indian fertilizer Scenario -2013-14,Department of Fertilizers,Government of India, New Delhi.

8. Interim Report of the Task Force on Direct Transfer of Subsidies on Kerosene,LPG and Fertiliser

9. Ministry of Finance,2015-16,Details of Subsidy included in Annexture -3, Govt of India,NewDelhi, PP 154

10. FMS: monitoring of movement of fertilizers at various stages in the supply chain. ,http://urvarak.co.in/ accessed on 25.05.2015

11. Fertilizer Policy, http://fert.nic.in/ accessed on 07.06.2015