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Editorial

Ours is a country where agriculture sector plays a vital role in nation's economy, employs more than fifty per cent of our population and contributes significantly to India's GDP. Being the mainstay of majority of the population, this important sector, undoubtedly, deserves the much needed attention in today's scenario, when the country's growing population and their rising living standards are leading to an ever increasing demand for the agricultural products.

Since last three years of this Government, a lot of focus is being given on farmers' welfare. Be it the increased budgetary allocations for the agriculture and allied sectors, or various production and crop centric schemes, there have been all out efforts to ensure income security and better livelihood for farmers by protecting them from the uncertainties of the weather, increasing their farm productivity and ensuring a better price for their produce.

Prime Minister Shri Narendra Modi has set the goal of **Doubling the Farmers' Income** by 2022. For this, he has outlined a **Seven Point Strategy** which includes a slew of regulatory and marketing reforms in addition to improved irrigation facilities, provision of better quality seeds and prevention of post-harvest losses.

While the Government has been increasing the budget for agriculture and allied sectors every consecutive year, **Seven Point Strategy** lays down a clear framework through which we can attain farm prosperity. A big focus area in this is going to be irrigation. **Pradhan Mantri Krishi Sinchayee Yojana** has been formulated with the vision of extending the coverage of irrigation '**Har Khet ko pani**' and improving water use efficiency '**Per drop More crop**' in a focused manner with end to end solution on source creation, distribution, management, field application and extension activities.

Then there is provision of quality seeds and nutrients based on soil health of each field. With better irrigation facilities, this is expected to increase farm yield significantly. In this regard, distribution of **Soil Health Cards** has already reached an advanced stage. After production, comes the issue of post harvest losses which are significantly higher in India. PM's Seven Point Strategy plans to tackle this through large investments in warehousing and cold chains to prevent post-harvest crop losses and promotion of value addition through food processing. This would not only ensure food and nutritional security of our nation, but also generate a large number of jobs in rural areas.

On the marketing end, strategy is to remove the market distortions by the creation of a **National Agriculture Market** which would connect agriculture mandis electronically. This would make the process transparent and ensure better price discovery for farmer's produce. A significant progress has already been made on this front. Also, the introduction of crop insurance scheme **Pradhan Mantri Fasal Bima Yojana** to mitigate risks at affordable cost may go a long way in providing a sense of security in the minds of Indian farmer who is often at the receiving end of nature's vagaries.

Besides this all, there is focus on promotion of ancillary activities like dairy, poultry, beekeeping and fisheries as these activities can generate additional income to farm households and provide employment to rural youth. **Pramparagat Krishi Vikas Yojna (PKVY)** has been launched to promote organic farming and development of potential market for organic products. This would be specifically benefit horticulture development. Several initiatives have also been put in place to make India self-reliant in the production of pulses and oilseeds. A dedicated Kisan Channel, **DD Kisan** was also launched to provide 24x7 information to farmers regarding weather updates, agri-mandi data etc.

In sum, we can say that in past, the emphasis has been more on agricultural output, rather than on farmers' incomes. But this narrative has changed now and rightly so. Of course doubling farmers' income by 2022 is a challenge. But with a good strategy, well-designed programmes, adequate resources and good governance in implementation, this target is achievable.

DOUBLING OF FARMERS' INCOME : AGRICULTURAL GROWTH AND FARMERS' WELFARE

Dr. Ashok Dalwai

It is also important to appreciate, that investments in agriculture sector not only benefit the sector per se but also impinge positively on non-agricultural sectors. These benefits are realized through forward linkages, such as, agricultural output becoming input for food processing; and through backward linkages, whereby, the demand for non-agricultural goods and services increases. In sum, it is important to recognize the critical role of investments - both public and private, in the agricultural sector to achieve high growth rates.

Continuing Critical Role of Agriculture in India Agriculture is the principal source of livelihood for about 48 per cent of the population of the country. It caters to the food security of the nation besides generating exportable surpluses. It provides the bulk of wage goods required in non-agriculture sector and most of the raw materials for the industrial sector. Agriculture, with its allied sectors, is unquestionably the largest livelihood provider in India, more so, in the vast rural geographies. It contributes significantly to the Gross Domestic Product (GDP)¹ of the nation's overall economy, though in terms of percentage, it has been declining. This also highlights the need for increasing the size of agri-GDP (agri-GVA since 2012-13)², so that per capita share of the farmers dependent on the sector improves.

India's agriculture sector has been undergoing a structural change with respect to its farm size, cropping pattern and share in the national GVA. It would benefit all concerned with policy formulation and implementation, to recognize that agriculture sector is the largest private enterprise in the country. It is logical, therefore, to enable the spirit of private enterprise of the farmers to excel itself. So far, the nation's broad focus has been on achieving higher production and realize food security, which has been done

with satisfaction. However, it has also spawned a number of issues that challenge sustainability and one sees agrarian crisis today. In the wake of this, it is more appropriate to adopt farm income-centric approach in preference to production at any cost as the basis of agricultural policy. The farmer has to be facilitated to operate his farm-enterprise on the basis of profitable returns.

However, promotion of agriculture as a true self-enterprise will have to be defined by sustainability of resources and inclusiveness of people. Sustainability refers to appropriate use of natural resources, protection of bio-diversity and environmentally compliant technologies with a view to ensuring the food & nutrition security of



¹ **Gross Domestic Product (GDP)** is the broadest quantitative measure of a nation's total economic activity. More specifically, GDP represents the monetary value of all goods and services produced within a nation's geographic borders over a specified period of time.

² **Gross Value Added (GVA)** is the measure of the value of goods and services produced in an area, industry or sector of an economy, in economics. In national accounts GVA is output minus intermediate consumption; it is a balancing item of the national accounts' production account.

In simple language, $GVA = GDP - \text{Taxes on products including import duties} + \text{subsidies on product}$. GVA came to be introduced in India in January 2015. And GVAs are being calculated for all the sectors of the national economy including agriculture. However, in case of national economy, both GDP and GVA are calculated. GVAs are now available from the year 2012-13 based on 2011-12 prices.

the growing population. And, inclusiveness implies the need to provide equal opportunities for all categories of agricultural households including the agricultural landless labour and the small & marginal farmers to grow and earn net family incomes at levels much higher than they do now.

The State of India's Agriculture : An Examination

As per 2011 Agricultural Census, number of agricultural workers in the country were 26.3 crore comprising 11.87 crore of cultivators and 14.43 crore of agricultural labourers. This in terms of percentage of the total number of agricultural workers accounted for 45.1 per cent and 54.9 per cent respectively. In comparison, the corresponding figures for the year 1951 were 9.72 crore of total number of agricultural workers, consisting of 6.99 crore of cultivators (71.9 per cent) and 2.73 crore of agricultural labourers (28.1 per cent). It is clear, that not only has there been an increase in the total number of agricultural workers, but also relative to the total number of cultivators, the numbers of agricultural labourers have increased. It is also important to learn from these statistics, that while the percentage of people depending on agriculture has reduced to 48 from the high of 80 in 1951, in terms of absolute figures, the dependency on agriculture sector for employment, income and livelihood has increased.

At current prices, the size of the agriculture GDP (including Agriculture, Forestry & logging and Fisheries) stood at Rs. 19,06,348 crore (Rs.1.90 million crore) in the year 2013-14. Exclusive of Forestry and logging, the size of agri-GDP (including Field Crops, Horticulture, Animal Husbandry & Dairying and Fisheries alone) worked out to Rs.14,95,591 crore (Rs.1.49 million crore).

As a share of the total Gross Value Added (GVA)

of the nation's economy at 2011-12 prices, the GVA of agriculture sector has been declining. It has declined from 17.8 per cent in 2012-13 to 17.5 per cent in 2013-14 to 16.3 per cent in 2014-15 and to 15.3 per cent in the year 2015-16. That agri-GVA of 15.3 per cent in the year 2015-16 supported nearly 50 per cent of the population makes it explicit, that the purchasing power of the farmers is at a level less than desired. The percentage of farmers below poverty line in 2011-12 based on total household (farm and non-farm) income in the country was 22.5 per cent and obviously a situation that needs amelioration. The data also brought out wide state variations. The percentage of farmer-population below poverty line in the same year was as low as 0.5, 3.2 and 4.3 in the States of Punjab, Kerala and Haryana respectively. In contrast, the percentage below poverty line was as high as 45.3, 35.1, 33.0 & 32.1 in the States of Jharkhand, Chhattisgarh, Assam and Odisha respectively.

Can farmer's income be doubled? And what are the challenges?

The purchasing power of the farmer depends upon his average monthly income. The average monthly income of the farmers is available from the Situation Assessment Survey of Farmers conducted in 2003 (hereafter referred to as 2003 Survey) and Situation Assessment Survey of Agricultural Households, 2013 (hereafter referred to as 2013 Survey). The comparison of these two data sets based on 2003 and 2013 Surveys highlights the change in the average monthly income of the farmers. S. Chandrasekhar and Nirupam Mehrotra in their Article "Doubling of Farmers' Income by 2022-What Would It Take?"³ show the ratio of changes in the Real (in contrast to Nominal)⁴ average income of the farmers in different states in the year 2013 as compared to the year 2003, based on their own computation from unit level data. See Table 1A.

³ *Economic and Political Weekly (EPW)*, April 30, 2016, Volume LI no. 18, pages 10 to 13

⁴ **Real income** is income of *individuals* or *nations* after adjusting for *inflation*. It is *calculated* by *subtracting* inflation from the *nominal* income. *Real variables*, such as *real income*, *real GDP*, and *real interest rate* are *variables* that are *measured* in *physical units*, while *nominal variables* such as *nominal income*, *nominal GDP*, and *nominal interest rate* are measured in *monetary units*. Therefore, *real income* is a more useful *indicator* of *well-being* since it is based on the *amount* of *goods and services* that can be *purchased* with the income.

Nominal income is income expressed in money terms. It is income measured in current currency (Rupee, dollar etc.). In simple terms it is the currency amount written on one's pay cheque. Nominal income has nothing to do with the buying power of one's income. **Real Income** is **nominal income** adjusted for inflation.

Table 1A: Ratio of Average Monthly Income (₹) from Different Sources in 2013 to the Average Monthly Income (₹) from Different Sources in 2003

Major States	Income from Wages	Net Income from Cultivation	Net Income from Farming of Animals	Net Income from Non-farm Business	Total Income
Punjab	1.56	1.80	2.39	0.68	1.67
Haryana	1.20	1.85	--*	0.57	1.93
Rajasthan	1.36	1.60	3.99	1.63	1.63
Uttar Pradesh	1.00	1.38	3.76	0.99	1.31
Bihar	1.28	0.80	0.44	0.55	0.83
Assam	0.69	1.15	2.45	0.51	1.02
West Bengal	1.18	0.62	1.44	0.76	0.91
Jharkhand	1.09	0.78	5.88	0.56	1.13
Odisha	1.41	1.79	33.35	1.54	2.08
Chhattisgarh	1.25	2.05	1.58	0.00	1.57
Madhya Pradesh	1.17	1.48	--*	0.59	1.75
Gujarat	1.34	1.18	1.84	1.30	1.36
Maharashtra	1.29	1.54	1.82	1.49	1.47
Andhra Pradesh	1.59	1.56	3.61	1.07	1.64
Karnataka	1.27	1.66	1.92	1.49	1.52
Kerala	1.21	1.43	1.58	1.62	1.36
Tamil Nadu	1.24	1.16	3.93	2.43	1.48
All India	1.22	1.32	3.21	1.00	1.34

Note: For the sake of compatibility, the authors adjusted 2003 income to 2013 prices using CPI-AL. So the comparison is in real terms and not nominal terms.

**Authors do not report this ratio since the net income from this source is negative in both the years.*

Source: Author's computations from unit-level data.

As seen from Table 1A, while Odisha is the only state that was able to more than double the real income of the farmers between these two survey periods, few other states like Haryana, Madhya Pradesh, Andhra Pradesh, Rajasthan, Chhattisgarh and Karnataka were also able to achieve substantive increase in the real income of the farmers. It may be appreciated, that the changes in income were in real terms in contrast to nominal income. Real income refers to the estimates after deflating the nominal income using an appropriate deflator like inflation rate. This shows the feasibility that exists for doubling the real income of the farmers within a given period of time.

S. Chandrasekhar and Nirupam Mehrotra vide the same Article (as referred to vide para 3.1) report on ratio of average monthly income from

different sources in 2013 to the average monthly income from different sources in 2003, based on their own computation of data. See Table 1B.

Table 1B shows, that the farmers' income comes from 4 (four) different sources and indicates the sector-wise intervention that will have to be made to achieve higher order of farmers' incomes. Net Income from cultivation as shown in Table 1B included income from agriculture and horticulture.

The Table also brings out the fact, that the changes in the average monthly income are higher in case of cultivators owning higher farm size compared to those with smaller farm sizes, demonstrating that farm size and monthly income of a farmer are positively correlated.

The average size of holding by size group has been changing into an adverse situation over time.

Table 1B: Ratio of Average Monthly Income (₹) from Different Sources in 2013 to the Average Monthly Income (₹) from Different Sources in 2003.

Size Class of Land Possessed	Income from Wages	Net Income from Cultivation	Net Income from Farming of Animals	Net Income from Non-Farm Business	Total Income
<0.01	1.01	0.34	3.40	0.63	1.13
0.01-0.40	1.07	1.09	2.78	0.67	1.10
0.41-1.00	1.26	1.40	2.61	1.08	1.38
1.01-2.00	1.23	1.50	3.31	1.61	1.52
2.01-4.00	1.26	1.54	5.39	1.23	1.59
4.01-10.00	1.81	1.76	7.88	1.33	1.85
>10.00	1.23	2.06	3.58	1.32	2.02
All Classes	1.22	1.32	3.21	1.00	1.34

(Source: Author's computations from unit-level data.)

As per 2010-11 Agriculture Census, the average size of holdings by size group is as follows:

Table 2A:

(Figures in ha.)

Sl. No.	Size Group	Average Farm Size
1	Marginal farmers	1.39
2	Small farmers	1.42
3	Sem-medium farmers	2.71
4	Medium farmers	5.76
5	Large farmers	17.38
6	All holdings	1.15

As seen above, the size of holdings in the marginal and small size categories has reduced to an extent where farm viability gets challenged. Further, the structure of holdings has changed substantively and today about 86 per cent of the total number of holdings in the country are under marginal and small farmers' categories. Thus, the average size of operational holdings, as seen above is as low as 1.15 ha. It is a steep decline from the average size in the year 1970-71.

As per 2013 Survey, the average monthly income of the agricultural household at All India level was Rs. 6,426/- and its composition from different sources as a percentage of the total was as follows:

Table 2B:

Sl. No.	Source of Average Monthly Income	Percentage
1	Cultivation (agriculture and horticulture)	47.9
2	Income from farming of animals	11.9
3	Income from salary	32.2
4	Non-farm business	8.0
	Total	100.00

Further, 2013 Survey brought out, that as against the average monthly income of Rs. 6,246/-, the average monthly consumption expenditure was Rs. 6,223/-. This is reflective of the vulnerability of the farmer in terms of adequacy of his income to meet family expenses and create savings that can be plowed back as investments on his farm.

The changes in the farmers' income are linked in a major way to the growth rates of agriculture sector. During the 11th plan period (2006-07 to 2011-12), the agriculture sector registered an average growth rate of 3.3 per cent as against the target of 4 per cent. The growth rate of the sector during ongoing 12th plan period (2012-13 to 2017-18) has been less than targeted on account of poorer performance in 2012-13 and two severe consecutive droughts in the years 2014-15 and 2015-16. However, the current year, 2016-17 has shown growth buoyancy. Based on 3rd Advance

Estimates of production, the year 2016-17 is expected to register a growth rate of 4.3 per cent. The estimated output are 272 million metric tonnes (mmts) of foodgrains and 287 mmts of fruits & vegetables surpassing the earlier respective record of 265 mmts and 284 mmts achieved in the year 2013-14. It is important to register robust and consistent growth rates in the sector in order to keep at bay agrarian distress and raise the farmers' income, so that they are able to realize higher standard of living and also generate savings required to meet capital investment needs. In the absence of savings coupled with non-availability of required quantum of institutional credit, the farmer is driven to borrowings from money lenders. As per annual reports of National Crime Records Bureau (NCRB), Ministry of Home Affairs, Government of India, amongst various reasons pushing the farmer to suicide, indebtedness is an important one. As per 2013 Survey, about 52 per cent of the agricultural households in the country were estimated to be indebted and the average amount of outstanding loan per agricultural household was Rs.47,000/- (approx.).



It is in the above context, that Government of India in its budget 2016-17 declared its commitment to doubling the income of the farmers over the period of 6 years (2016-17 to 2021-22). The budgetary announcement was preceded by the declaration of Hon'ble Prime Minister on 18th February, 2016, at his Bareilly address committing the nation to this goal. As seen from the contents of Table 1A, it is reasonable to target the doubling of the income of the farmers, if only all the states are able to register higher growth rates on a consistent basis. Of course, high growth rate in production is a necessary condition, but not a sufficient condition. Greater emphasis is needed on reforms on the post-production segment, so as to enable the farmer to realize greater value & monetary returns on his produce.

As per data released by Central Statistical Organization (CSO) and Ministry of Agriculture, Government of India (as on 31.10.2014) on the

growth rates of Gross State Domestic Product (GSDP) in Agriculture sector for the period 2005-06 to 2013-14 at constant 2004-05 prices, many States / UTs could register average growth rates well above the national average of 4.10 for the corresponding period at shown below:

Major States:

Madhya Pradesh (10.345), Jharkhand (9.74), Chhattisgarh (8.03), Gujarat (6.20), Rajasthan (5.91), Maharashtra (5.90), Bihar (5.11), Andhra Pradesh (4.48) and Tamil Nadu (4.45).

Small States/UTs:

Puducherry (9.90), Mizoram (9.73), Arunachal Pradesh (6.80) and Tripura (6.15).

At the global level, China's Agriculture sector, for example, showed consistency in percentage of annual growth in value added. It grew at 4.17, 4.48, 3.81, 4.06 and 3.90 per cent respectively for the years 2011, 2012, 2013, 2014, 2015. That this growth came about on its already high agri-GVA base drives home the point, that India too can do it.

Agriculture sector which is defined by biological process, is by its very nature vulnerable to the vagaries of climate which impact the sector adversely. Further, it is also exposed to market uncertainties since production cannot be maneuvered as easily as in the case of industrial production system. This affects the farmers at every stage of production and post-production

systems, thereby influencing his income directly. It is, therefore, important to provide support to the farmers and enable them to negotiate such risks & uncertainties without compromising on their family expenditure needs, human dignity and life security. It is on account of such compelling reasons and in order to define its mandate more sharply, that Government of India has re-designated the Ministry of Agriculture as Ministry of Agriculture and Farmers' Welfare. Similarly, the Department of Agriculture & Cooperation under the Ministry is now called the Department of Agriculture, Cooperation and Farmers' Welfare (DAC&FW). The purpose is to bring focus on welfare of the farmers by ensuring coverage under various welfare schemes, simultaneously as it tries to create a conducive environment that supports higher growth rates in the farm sector.

Sectoral and Sub-Sectoral Growth Rates of GVA and identifying Priorities for Investments:

In order to achieve higher growth rates in any sector including agriculture, some pre-

requisites are facilitative policy framework leading to suitable programmes and projects supported by adequate investments from both public and private sectors, that contribute to increased Gross Capital Formation (GCF). It would always be necessary to prioritize sub-sectors for investments and efforts so as to achieve higher growth rates from the sector as a whole. Since agriculture sector comprises various sub-sectors including field crops, horticulture, animal husbandry, dairying and fisheries, it would be important to understand the composition of these sub-sectors and the growth potential that exists in respect of each of these. It would also help to remember, that the Internal Rate of Returns (IRRs) are not uniform across the sub-sectors.

The share of Gross Value Added (GVA) of agriculture and allied sectors in the total economy at 2011-12 prices is given in Table 3 below:

The data contained in Table 4 and Table 5 that follow are useful in working out a growth strategy:

Table 3: Share of GVA of Agriculture and Allied Sectors in Total Economy

Figures as percentage

Year	Agriculture, forestry & fishing	Crops	Livestock	Forestry & logging	Fishing & aquaculture
2011-12	18.37	12.1	4.0	1.5	0.8
2012-13	17.8	11.5	4.0	1.5	0.8
2013-14	17.5	11.3	4.0	1.4	0.8
2014-15	16.3	10.2	4.0	1.3	0.8
2015-16*	15.4	9.3	4.0	1.3	0.8

* As per Provisional Estimates of Annual National Income 2015-16 and Quarterly Estimates of GDP (Q4) (latest available) released on 31.5.2016.

Table 4: Contribution of Livestock sub-sector GVA in Comparison to GVA from Agriculture, Fisheries & Forestry in terms of percentage

(Figures in percentage)

Year	Contribution of GVA from Agriculture, Fishing & Forestry (AFF) to total GVA from all Sectors (%)		Contribution of Livestock Sub- sector GVA to GVA from Agriculture, Fishing & Forestry (%)	
	At current basic prices	At constant basic prices	At current basic prices	At constant basic prices
2011-12	18.37	18.37	21.52	21.52
2012-13	18.04	17.72	22.01	22.36
2013-14	17.95	17.22	21.58	22.75

(Source: Statistical Year Book, India 2016. MOSPI)

Table 5: Comparison of the Contribution of respective GVAs of Livestock sub-sector and Crop sub-sectors in terms of total GVA from all Sectors at Current and Constant Prices (2011-12):

(Figures in percentage)

Year	Contribution of Livestock sub-sector GVA to total GVA from all Sectors		Contribution of Crops sub-sector GVA to total GVA from all Sectors	
	At current basic prices	At constant basic prices	At current basic prices	At constant basic prices
2011-12	3.95	3.95	12.04	12.04
2012-13	3.97	3.96	11.68	11.46
2013-14	3.88	3.92	11.77	11.1

(Source: Statistical Year Book, India 2016. MOSPI)

Growth Rate Variations of different Sub-Sectors of Agriculture, Forestry & Logging:

As seen in Table 6 below, various sub-sector of the Agriculture sector have registered varying growth rates of GVA, pointing to sub-sectoral interventions needed.

The contents of Table 6 exhibit the fluctuations in annual growth rates, that the agriculture as a sector has experienced. The Table also brings into focus the growth rate variations when different sub-sectors of agriculture are compared. Livestock,

as also Fishing & aquaculture, for example, exhibit greater growth potential compared to crop sub-sector.

Further, within the crop sub-sector that comprises field crops including cereals, pulses and oil seeds etc, as also horticulture (fruits, vegetables etc.), it is the horticulture sector that has been registering higher growth rates over the last decade. The data for the period 2010-11 to 2014-15 shows, that the country has witnessed a shift towards horticultural crops, which transition is continuing. While total area under horticultural crops increased by 18 per cent, the area under agricultural crops increased by just 5 per cent during this period. In the last decade, the area under horticulture increased by 2.75 per cent per annum and the annual production increased by 7.0 per cent. The year 2016-17 is estimated to end with a record horticulture output of 287 mmts from an area of 24.2 million ha., surpassing that of agricultural output in the country. The share of horticultural output as a percentage of agriculture now constitutes 30 per cent.

So far as field crops are concerned, it is generally believed, that growth in yield levels in India have plateaued. However, inter-state and inter-country comparisons demonstrate the scope that still exists for increasing the average yield of major crops in the country.

A comparison of the per hectare yields of select crops achieved in India with those of better

Table 6: Growth Rates in GVA for the Economy, Agriculture Sector and its Sub-sectors.

Year	Growth Rates in GVA (percent)						
	Total Economy		Agriculture, forestry & logging and fishing	Crops	Livestock	Forestry and logging	Fishing and aquaculture
	GDP*	GVA					
2012-13	5.6	5.4	1.5	0.2	5.2	0.3	4.9
2013-14	6.6	6.3	4.2	4.2	5.6	-1.5	7.6
2014-15	7.2	7.1	-0.2	-3.2	7.3	-1.0	5.0
2015-16*	7.9	7.8	0.2	-2.2	6.5	2.0	6.7

* As per Provisional Estimates of Annual National Income 2015-16 and Quarterly Estimates of GDP (Q4) (latest available) released on 31.5.2016.

**NOTE: Gross Domestic Product (GDP) includes GVA, taxes on Products including import duties and less subsidies on Products.

performing countries highlights the yield gaps that exist and can be bridged to the advantage of Indian farmer. Some cases based on FAO, 2014 data may be seen in the following paragraphs:

- (i) **Paddy:** As against India's average yield of 3.62 tonnes per ha., the world average stands at 4.53 tonnes per ha. The yields per hectare are as high as 6.74 tonnes (in China), 5.75 tonnes (in Vietnam), 5.13 tonnes (in Indonesia) and 4.42 tonnes (in Bangladesh).
- (ii) **Wheat:** As against the average yield of 3.03 tonnes per ha. in India, the global average stands at 3.27 tonnes per ha. The performance of a few other countries is 7.36 tonnes per ha (in France) and 5.04 tonnes per ha. (in China).
- (iii) **Maize:** As against the average yield per ha. of 2.75 tonnes in India, the world average stands at 5.57 tonnes per ha. The performance of yield per hectare is as high as 10.73 tonnes (in USA), 6.6 tonnes (in Argentina), 6.47 tonnes (in Brazil) and 5.99 tonnes (in China).
- (iv) **Total pulses:** As against the global average of 9.06 quintals per ha., the Indian average stands at a low of 6.54 quintals per ha. Some of the high performing countries have been able to achieve a high of 20.30 quintals (in Canada), 15.50 quintals (in China), 13.24 quintals (in Myanmar) and 10.30 quintals (in Brazil).

The inter-state comparisons within the country also highlight variations that exist in the performance amongst different States. For example, in case of foodgrains as a whole while average yield per hectare of the country is 2.10 tonnes, some of the high performing states have been able to achieve much better results. These include Punjab (4.40 tonnes/ha.), Andhra Pradesh (3.8 tonnes/ha.), Haryana (3.84 tonnes/ha.), West Bengal (2.73 tonnes/ha.), and Uttar Pradesh (2.47 tonnes/ha.). Many states are much below the national average. The yields are as low as 1.19 tonnes per ha. in Maharashtra, 1.62 tonnes per ha. in Karnataka, 1.53 tonnes per ha. in Chhattisgarh and 1.61 tonnes per ha. in Odisha and 1.36



tonnes in Rajasthan. Of course, some states like Rajasthan, Karnataka & Maharashtra are largely rainfed and that explains the low yields. However, as a whole what emerges is the existence of yield gaps, the scope for improving the performance and achieving high yields, all to the benefit of the farmers.

The sub-sectoral growth rate variations and yield gaps in case of major crops point to the potential that is available for registering higher growth rates by prioritizing the focus and efforts. It is obvious that livestock, horticulture, fisheries and aqua-culture hold great potential and deserve emphasis. Simultaneously, the focus has to be on realizing higher yield levels in case of field crops. This is important from the perspective of the country's food and nutrition security. By 2030, when India's population is estimated to swell to 150 crore, the requirement of foodgrains will be 334 mmts.

Enhancing Public Investments in Agriculture Sector:

Public investments designed to provide public good, such as infrastructure, knowledge creation through technical development & so on are necessary to support growth. Public investments are in the nature of investments made by Governments in creation of road infrastructure, markets, irrigation infrastructure, storage go-downs, cold chain infrastructure, etc. The investments can also come from private sector. Public sector investments can lead to greater efficiency in transaction at farmers' and, as also in private sector. For example, improving of road infrastructure leads to reduction in the cost

of transportation and thereby the cost of agricultural inputs that are generally provided by the private sector; the same road infrastructure improves the efficiency of output management by reducing the cost of marketing. While improving the ease of doing business, private sector investments are triggered by such intelligent public sector investments. Thus, efforts can be made to utilize public investments in such a way as to crowd in private investments and thereby enhance the total investments made in agriculture sector. At the implementation level, public investments can be raised by utilizing the allocations under various infrastructure schemes of Central and State Governments by tapping resources available under such schemes as Rashtriya Krishi Vikas Yojana (RKVY), Rural Infrastructure Development Fund (RIDF) etc. and by drawing convergence of resources from different programmes like MGNREGA.



Research studies show evidences of correlation between public and private sector investments. For example, Baba et al. (2010) in their work focussed on agricultural growth and rural development in Himachal Pradesh found a positive and highly significant effect of public sector investment in agriculture on private investments in agriculture for the period 1969-2002. The marginal effect estimate of this relationship indicated, that an increase in public investment of Rs.10 brings about an increase of Rs.1.6 in private investments and the public-private investment elasticity is 0.3.

Studies in various countries including India and China show, that the rate of returns on public investments are higher in case of less developed areas. Evidence from the existing studies indicates that a greater “bang for the buck” comes from investments in relatively less favoured areas. Thus, such of those areas within the district and state, as also sub-sectors that still are considered marginal should be prioritized for higher investments with a view to realizing higher growth in GVA. The basic rationale for public investments in agriculture is predicated upon two main elements:

(i) They can contribute to overall efficiency of the sector; and

(ii) They can mitigate levels of inequality and poverty.

It is also important to appreciate, that investments in agriculture sector not only benefit the sector per se but also impinge positively on non-agricultural sectors. These benefits are realized through forward linkages, such as, agricultural output becoming input for food processing; and through backward linkages, whereby, the demand for non-agricultural goods and services increases. In sum, it is important to recognize the critical role of investments - both public and private, in the agricultural sector to achieve high growth rates.

Growth in Agriculture Sector and Welfare of Farmers:

Agrarian distress manifests itself as low income of farmers (evidenced by high percentage living below poverty line) farmers’ suicide which is not only unfortunate, but is also an avoidable event only if appropriate and timely interventions are made. The strategy has to be based on the pivot, that aims at growth on one hand and welfare on the other hand. The policies and programmes of Government of India are all designed to support growth impulses by facilitating the farmers to make informed decisions at every stage of production and post-production chain, while enabling him to walk the straight line abetted by welfare interventions. Some such examples are:

- Under the Soil Health Card scheme, the farmer will learn of the nutrient and physicochemical status of his soil and thereby decide on the

nature and quantum of fertilizers and soil amendments, that are appropriate to be adopted. Such evidence based decisions will result in reduced cost of cultivation and also make farming more sustainable.

- Similarly, the launch of unified National Agriculture Market (NAM) aims at integrating the agricultural wholesale markets over space and increase the universe of traders and enable a transparent and competitive price discovery on the farmers' produce, by making it compulsory for the market to conduct trade on e-auction platform. The information asymmetry that eNAM address by providing the farmer-producer access to real time data on price in different markets strengthens his ability to make an informed decision on whether to sell or to postpone for the time being.
- The comprehensive crop insurance scheme entitled "Pradhan Mantri Fasal Bima Yojana" rolled out with effect from Kharif 2016 aims at increasing the cultivated area under crop insurance coverage by making it possible for the farmers to buy insurance at very low and uniform rates of premium.

The focus of the Ministry of Agriculture & Farmers' Welfare is on introducing a set of agricultural reforms, with greater emphasis on post-production activities. The Ministry released on 24th April, 2017 a Model Marketing Act called 'Agricultural Produce and Livestock Marketing (Promotion & Facilitation) Act, 2017 (in short APLM Act, 2017). When adopted by the States & it will bring in multiple marketing channels and break the existing monopoly of APMCs. The purpose is to introduce competition and provide alternatives to the farmers to benefit from a competitive price offers on his produce.

The Ministry is now working on Model Contract Farming Act; as also 'Guidelines to Strengthen Storage, Infrastructure and Warehouse based Pledge Loan System'. All these interventions with intended focus on food processing, supply chain & value chain management will help the farmers to realize greater monetary returns on their produce and provide justification for higher investments in agriculture.

Considering the many constraints and challenges that the farmers will be required to negotiate as they try to improve their net incomes, their coverage under various welfare schemes also becomes important. There are large number of schemes run by both central and state governments, that include crop insurance, health insurance, public distribution system, old age pensions etc., and can be used to the benefit of the needy farmers.

Efficiency of Delivery as important as Policies & Programmes:

In order to achieve total welfare of the farmer, it is necessary to not only adopt facilitative policy, but more critically to improve delivery through more efficient governance system. An important aspect of governance encompasses effective review and monitoring mechanism at the field level, backed by appropriate Information and Communication Technology (ICT) as a tool. It is in this context, that the Ministry of Agriculture, Government of India has decided to set up integrated committees at the district and state levels to review and monitor all the activities related to farmers at fixed intervals and make necessary interventions for improvement. Hence, all the States & Union Territories have been advised to set up:

- i) District Level Review and Monitoring Committee under the chairmanship of the Minister in charge of the District.
- ii) State Level Review and Advisory Committee under the chairmanship of the Chief Minister.

The Inter-Ministerial Committee working on the strategy for Doubling Farmers' Income is holding wide consultations with a cross-section of the society including farmers to recommend an appropriate strategy, that will not only double the income of the farmers', but also put the production system on a sustainable basis.

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TRANSFORMING AGRICULTURE FOR FARMERS' PROSPERITY

Prof. Ramesh Chand

If we move the same way as we did in last 15 years in supply of quality seed, fertiliser, irrigation, crop intensity, high value crops, technology, this will raise farmers income by about 52 per cent by 2022. Better prices to farmers and shift of workers to non agriculture at the rate attained in past will add another 23 per cent. All factors sum up to 75 per cent. To reach the target of 100 per cent increase, we need to accelerate our efforts by 33 per cent.

The transformation of some sectors of Indian economy following economic reforms in early 1990s lifted growth rate of total economy from 4.2 per cent during 1971 to 1991 to close to 7 per cent after 1991. This helped in doubling per capita income at constant prices (2004-05) in just 17 years as compared to 37 years before 1991. However, agriculture sector, which comprised over 40 per cent of Indian economy and 59 per cent workforce in year 1991, did not experience any permanent change in its growth rate. GDP of agriculture and allied sectors doubled in about 23 years before 1991 and it took same number of years to double again. Even recent years show that agriculture growth is stuck around long run average of 2.9 per cent whereas non-agriculture growth hovers around 8 per cent. The higher growth rate in non-agriculture sector has been accompanied only by a small shift of farmers to non-farm occupations. Consequently, the income of cultivators (farmers) has remained low and the gap with non-farm workers has enlarged. A cultivator (farmer) earns less than one-third of the income of a non-farm worker. This is major source of agrarian distress as well as also diminishing interest in farming,

which has serious implications for future food security of the country.

Agricultural activities generated net income of Rs. Ten thousand per cultivator per month in year 2015-16 which is less than one-third of the income of non-farm worker. If farmers income continue to rise at same rate as witnessed during the last two decades, it will not reach even Rs. 20 thousand mark in real terms in next 20 years. Therefore, special focus is needed to raise income of farmers at a faster rate like "Doubling Farmers Income by 2022". This requires transformation of agriculture production as well as marketing through a multi pronged strategy that involves increase in productivity, reduction in average cost, better price realization for farm produce, expansion of allied activities and shift of farmers to non-farm occupations.

Use of certified quality seed distributed by various agencies is quite low. Fertiliser use in most of states is sub optimal. More than one crop is grown on less than 50 per cent of area under cultivation. Improved technology has not yet



reached large number of farmers which is evident from the fact that more than 30 per cent area under cereals is under traditional varieties. The main reasons for this are poor extension, missing link with supply chain of quality seed and quality plant propagation material and low availability of institutional credit in many states.

Despite large investments in irrigation, more than half of cultivated area does not have access to irrigation. High value crops like fruits and vegetables, which have much higher productivity as compared to other crops are raised on less than 10 per cent area.

Indian agriculture is missing the state of the art technology and modern method of farming. Advance world is moving towards precision farming using sensors and other scientific tools for exact practices and application of inputs. It saves costs, reduce environmental effect and yield more and better quality produce. We still continue to use flood method of irrigation, broadcasting fertilisers, and indiscriminately spraying chemicals. Application of advance science at farm level requires skill, knowledge, investments and improvement in human capital in farming. This warrants renewed commitment and higher participation of public and private sectors in agriculture.

Increase in production though essential, is not sufficient to bring substantial increase in farmers income. Farmers have to be helped to get higher prices and some of them need to be moved to non-farm occupations. India's economists have underestimated the power of prices in raising farmers income and production. A 10 per cent increase in prices realised by farmers directly raise their income by 13 per cent besides a large favourable effect on production. Agricultural growth during the last 50 years has moved up and down, depending upon the increase or decrease in relative prices of agricultural commodities.

Prices at farm level can be raised in two ways. First, by ensuring MSP and second by creating competitive market. In many states, the farmers get 10-20 per cent lower price than MSP even for paddy and wheat where a large part of marketed surplus is procured by the government. Ensuring MSP in such cases will raise farmer income by 13-26 per cent. It is important to mention that green revolution happened in those states only



where farmers got remunerative prices. Recently, it has been demonstrated in Madhya Pradesh. The recent move by government of Uttar Pradesh to ensure MSP to its farmers is sure to bring green revolution and much higher income to farmers in U.P. in the next 5-7 years. Similar scope exists in Bihar, Jharkhand, Odisha and Assam, where farm harvest prices of cereals often rule lower than MSP. Often demand is made to raise MSP but it is more important to ensure that farmers get whatever MSP is announced by the government. There is no use of a big hike in MSP to the farmers who are deprived of price guarantee.

The second and more subtle mean of ensuring better prices to farmers, without causing pressure on consumer prices, is through Reforms in the system of Marketing. This system and its infrastructure are outdated and exploitative. Rather than evolving, agricultural markets have decayed and serving the interest of intermediaries rather than farmers and consumers. Various political parties have been seeking more doles for the sector rather than competitive and modern markets and other reforms in agriculture sector which can make the sector vibrant, self reliant and economically quite attractive.

The centre came out with a proposal to adopt Model APMC Act in year 2003 which was prepared in consultation with the states. The objective was to dismantle excessive regulation and control over markets, facilitate direct sale purchase, create more options for sellers, dismantle market collusion by local traders, and attract competition and investments in agricultural markets. However, the adoption and implementation of Model APMC law by states remained patchy, diluted and insignificant. Some states did not change the Act. Those which

changed the Act did not notify rules, and where notification was done, it was restricted to tiny fraction of produce. Thus, agricultural markets remained deprived of new commerce, modern infrastructure and formal sector participation, and modern value chains. Consequently, traditional capital, large price spread, price crashes at harvest time and spikes in lean period, with little value addition, remained the order of the day. This is leading to loss of faith in market and demand for MSP for every agricultural commodity.

Renewed efforts have been started by NITI Aayog in year 2016 to bring comprehensive reforms in agriculture marketing. E-NAM is another important initiative of Government of India to use pan-India electronic trading portal for bidding and network the existing APMC mandis to create a unified national market for agricultural commodities. Central Government provide financial assistance of Rs. 75 lakh for each market under E-NAM. Even small reforms in marketing show big return in terms of price realization by farmers.

NITI Aayog has been pleading with the states to remove restrictions on allied activities like felling and transit of trees and setting up wood based industries and bring new law on Land leasing. India meets 40 per cent of its timber demand from import which can be easily met from domestic production on farmers field. Recent survey of NSSO reveals that land lease is on rise but it is oral and not recorded. 59 per cent area in AP, 30 per cent in Bihar, 20 per cent in Odisha is under lease farming. Country average is 11.6 per cent. Such farmers can't avail institutional credit, crop insurance and other govt benefits for agriculture. Recognition of land lease and protecting right of landowners, will help in raising farmers income in a number of ways. A new law on contract farming to attract private sector to agriculture and to promote food processing is also being prepared by Ministry of Agriculture and NITI Aayog.

Along with crops, we need to tap potential of livestock which contribute 25-30 per cent of farmers income. About 1 crore and 10 lakh cows and buffaloes of breedable age never calved. Age at first calving is 34 months. Calving interval is large. Better management of herd and feed and healthcare are needed to raise growth of livestock.



If we move the same way as we did in last 15 years in supply of quality seed, fertiliser, irrigation, crop intensity, high value crops, technology, this will raise farmers income by about 52 per cent by 2022. Better prices to farmers and shift of workers to non agriculture at the rate attained in past will add another 23 per cent. All factors sum up to 75 per cent. To reach the target of 100 per cent increase, we need to accelerate our efforts by 33 per cent.

Producers institutions like FPOs are very important for smallholders agriculture. We have some impressive success stories of significant increase in farmers income in distressed region through FPOs. Efforts of SFAC and NABARD have led to some progress in this. There is a need to involve states to expand the number of FPOs.

Food processing in rural areas has an important role to procure raw material and provide employment. In recent years, the industrial output has grown at a very high rate in rural areas but employment growth has been below 1 per cent. The reason is that, the type of industry which is growing at high rate is not employment intensive, and the industry which is employment intensive (food processing) has a very low growth rate (about 3 per cent per year).

Substantial increase in farmers income will materialise only if states own this goal and extend their support to the reform agenda to ensure that agriculture marches to next stage of development, and it is not left behind, when we move to New Age India as it happened with the first wave of reforms started in 1991.

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CREDIT AS A CONTRIBUTOR TO DOUBLING OF FARMERS' INCOMES

Prof. Charan Singh¹, S Ananth², CL Dadhich³

The Prime Minister's multi-pronged strategy to double farmer's income will lead to creating an eco-system which will increase flow of financial resources to rural sector that would generate and sustain demand. In addition, there is need to increase the flow of resources in the rural sector through the existing channels of network of brick and mortar branches as well as strengthening the model of business correspondents. The recently licensed small and payment banks are also expected to contribute to larger credit flow in the rural sector.

The Prime Minister has set an objective to double farmer's income by 2022. The proposed strategy involved focus on irrigation combining water conservation to have 'per drop, more crop'; quality seeds and efficiency in using of nutrients; reducing post-harvest losses; promoting food processing; creating national agriculture market; ensuring risk mitigation; and encouraging ancillary activities. The Finance Minister, through Union Budgets, of last two years has also been stressing strategies to increase irrigated area under net cultivation; creating a long term irrigation fund in NABARD; ensuring sustainable management of ground water resources; allocating additional resources to MGNREGA for creating ponds and digging wells; and establishing a dairy processing and infrastructure development fund.

The goal of doubling farmers' incomes by 2022 is indeed laudable albeit a Herculean task. The goal attains importance in the context of India's labour market and nature of our agriculture which employs nearly half of total workforce and nearly two-third of rural workforce. Increasing the incomes of farmers without causing a sharp increase in prices to the consumers makes this task even more formidable. The goal has to be contextualised in the nature of income generation for household's wherein, almost 63.7 per cent generated from cultivation is from agriculture while only 3.7 per cent is from livestock.¹

The doubling of farm income requires a fundamental transformation of the way agriculture is undertaken in the country². Should the country try for another green revolution? The socio-economic

impact on Punjab, since the introduction of green revolution has not been very encouraging with soil degradation, greenhouse gases and rapidly falling water table, which has resulted in highly indebted farmers and high incidence of ailments like cancer and kidney failure.

The gigantic task of doubling farmer's income implies that there is a need to pursue a holistic approach towards transforming and modernizing present day agriculture. This new approach will have to concentrate on improving and expanding market access, yields, productivity, quality and reach of inputs, agricultural extension services, expanding commodity production in rural areas while redefining and reworking the present supply of agricultural credit. The empirical studies substantiate that nearly two-third of farmers who did not like to continue in farming ascribed the reasons to the fact that agriculture was not profitable³. To ensure profitability, policy makers need to consider sale price and cost of agriculture produce. In this context, some agriculture economists have propounded the hypothesis of shifting to high value agricultural crops (HVCs) to increase incomes⁴. Smart farming and credit supporting smart farming has also been suggested as another possible strategy of a larger holistic approach to doubling farmers' incomes⁵.

The shift to high value agricultural crops, especially commercial crops is a welcome suggestion. However, a large scale adoption of the strategy implying a complete shift from foodgrains could disrupt the present culture of a staple diet, and

¹ NSS Report No.569: Some Characteristics of Agricultural Households in India, 2012-13, p.23 and p.63.

² NSS Report No.569: Some Characteristics of Agricultural Households in India, 2012-13, p.17-19

³ NSS 59th Round, Jan-Dec 2003, GOI – Situation Assessment Survey of Farmers – Some aspects of Farming.

⁴ Ramesh Chand, "Doubling Farmers' Income: Strategy and Prospects", Presidential Address, Indian Journal of Agricultural Economics, Volume 72, Number 1, January – March 2017.

⁵ CL Dadhich, "Time to Push Credit for Smart Farming", The Hindu Businessline, 25 March 2017.

endanger India's food security. This endangering of India's food security risks a revival of the fears of shortages and the dependence on US Aid under PL-480. Hence, instead of an excessive stress on growing high value crops, there is a need to encourage diversification of agricultural income where income from agricultural activities forms an important but only one component, while shift to food processing and value addition can comprise the rest. A similar emphasis on commodity production like milk or honey could increase incomes of agricultural households. Similarly, adopting ways to enhance value of produce through procedures of simple agro-processing on the farm itself, given that growing mechanization provides ample spare time for farmers. Illustratively, tomato farmer could consider part sale in the market and part conversion to ketchup which can enhance income. Similarly, sugarcane farmer could convert partial produce into jaggery on farm while selling other part to sugar factory. However, such a diversification and changed emphasis will require large scale additional infusion of credit by the formal sector for working capital, financial literacy, and marketing skills. Further, if value addition and agro-processing has to be encouraged, it will require large investments in better post-harvest methods which should also be considered as an essential ingredient of production cycle.

A sustainable way to encourage such a transformation will be to encourage Farmer Producer Organisation, and create forward and backward linkages for agricultural produce. Invariably, these linkages will require new investments, which are already being planned by the Government in the form of better water management techniques including improved irrigation facilities, road network, and technology infrastructure, contributing to a larger and better ecosystem.

Despite urgency, there is scarce discussion amongst policy circles on the role that credit can play in improving incomes. This largely stems from the misconception that credit to agricultural sector has constantly increased with each budget. Credit to the agricultural sector by the formal banking sector encompassing the scheduled commercial banks,



cooperative banks and regional rural banks was budgeted at Rs.10 lakh crore in 2017-18 from was Rs.8.8 lakh crore in 2016-17.

The direction and nature of rural credit can play an important role in increasing farmers' incomes, especially in the context of generational shift and changing profile of agriculturalists. First, the pattern of land ownership and changing dynamics in rural India. The last two decades witnessed a gradual change in the land ownership pattern. This land ownership pattern is largely due to changing demographics of the country and increased emphasis on education. Together, these have triggered an outmigration from villages to cities. Consequently, there is an increase in tenant farmers in agriculture, particularly pronounced in the segment of population holding more than ten hectares of land⁶. There are no accurate estimates about the number of tenant farmers though they are estimated at around two crore households⁷. Fragmentation of holdings is another bane that has already received a lot of attention and has been stressed in official documents⁸. According to estimates, land holding in India is small, and about 69 per cent of agricultural households in rural India possessed land less than one hectare while another 17 per cent had land between 1.00 hectare and less than 2.00 hectare⁹. According to NSSO, about 36 per cent of the tenant farmers are landless while 56 per cent of the tenant households are marginal landowners having less than one hectare of land¹⁰.

⁶ NSS Report No.569: Some Characteristics of Agricultural Households in India, 2012-13, p.32.

⁷ Tim Hanstad, "India's Land for Rent: The Future of Indian Land Reform", *Foreign Affairs*, April 2016, <https://www.foreignaffairs.com/articles/india/2016-04-29/indias-land-rent>

⁸ Three Year Action Agenda 2017-18 to 2019-20, Niti Aayog, Government of India, New Delhi, April 2017.

⁹ NSS Report No.569: Some Characteristics of Agricultural Households in India, 2012-13, p.19

¹⁰ Cited in Report of the Expert Committee on Land Leasing, Niti Aayog, New Delhi. (http://niti.gov.in/writereaddata/files/document_publication/Final_Report_Expert_Group_on_Land_Leasing.pdf)

The benefits from various government programmes, including subsidised credit, also flows to those land owners, who may not be cultivating land. In contrast, tenants cultivating land are forced to borrow from informal markets at higher interest rates which directly impact cost of agriculture. Additionally, there is lease cost which could vary from 10-25 per cent of agricultural produce. Further, to add to the burden, an agricultural household often borrows for their increasing consumption needs like expenditure on health, education, and even daily needs. Thus, in Indian agriculture, cost, access and availability of institutional credit is an important input on which profitability is dependent. In 2012, institutional sources provided credit to about 7.9 per cent of the bottom 10 per cent of rural households and about 32.6 per cent to the top 10 per cent of the rural households, indicating that informal sector continued to be an important source of credit to rural households. Interestingly, share of credit from institutional sector was 56 per cent in 2012 while non-institutional sector accounted for 44 per cent. The All India average amount of debt for cultivator household was Rs.70,580¹¹.

Increasing access to subsidised credit for those agricultural households who actually cultivate land will increase their bargaining power vis-à-vis the rural informal credit and input providers who generally coerce producers to sell their agricultural produce to them. In many regions, the cost of credit is linked to the sale price of the produce meaning that the small and marginal farmers, along with tenant farmers, have limited or no ability to hold their produce or seek the best price. It is estimated that except for sugarcane, 40 to 60 per cent of agricultural households sell their produce to the local private trader or the input dealer¹². Expanding access to institutional credit to those small, marginal or tenant farmers will increase the margins and incomes of agricultural households substantially.¹³

The Prime Ministers multi-pronged strategy to double farmer's income will lead to creating an eco-system which will increase flow of financial resources to rural sector that would generate and

sustain demand. In addition, there is need to increase the flow of resources in the rural sector through the existing channels of network of brick and mortar branches as well as strengthening the model of business correspondents. The recently licensed small and payment banks are also expected to contribute to larger credit flow in the rural sector. The government could consider strengthening cooperative banks through technological improvements and introduction of core banking which would lead to higher credit flow in the rural sector. The emphasis on agro-processing and ancillary activities would require financial support and higher flow of credit to the rural sector. To address the need for higher flow, policy makers would need to think out of the box. One way to ensure such a flow would be to strengthen mandi merchants in the rural areas. The mandi merchants usually dispense short term credit, generally pertaining to one cropping cycle, and factor in risk and volatility in price and produce. Probably, tailoring a scheme of associating mandi merchants with banks to enhance medium and long term credit in the rural sector can be considered, as a substitute of brick-and-mortar bank branch, mainly to compete out high cost money lender. The proposed scheme involving mandi merchants, refinanced by institutional framework, will have a steady flow of customers throughout the year, wherein mandi merchants will charge nominal rates of interest, as prescribed by norms of institutional banking, for stipulated purposes of dispensing loan, mainly for agriculture equipment and investment purpose. The government could provide subvention support to mandi merchants to further lower the costs. In such a case, mandi merchants will serve like ATMs and cost of inputs to farmer will be contained as compared to resorting to high cost loans from money lenders.

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¹¹ NSSO Report, *Key Indicators of Debt and Investment in India, 70th Round 2013, Ministry of Statistics and Programme Implementation, December 2014, p.16*

¹² NSS Report Number 570 (70th Round), *Some Aspects of Farming in India, January – December 2013, NSS Report Number 570, p.20*

¹³ Sudha Narayanan, "The Productivity of Agricultural Credit in India", IGIDR Working Paper, 2015, <http://www.igidr.ac.in/pdf/publication/WP-2015-01.pdf>

QUALITY SEEDS AND PLANTING MATERIALS IN DOUBLING FARMERS INCOME: ROLE AND WAY FORWARD

Dr. J S Sandhu, Dr. J P Sharma

In the long run, productivity enhancement requires research towards discovery of robust seed varieties and planting materials, other inputs, appropriate crops and input usage for a given soil type. Along with this, availability of all inputs for production in sufficient quantity at affordable prices and effective extension practices are also essential inputs. Ultimately, the quality of seed and planting materials used in the crop production has direct and indirect impact on doubling farmer's income through the reduced seed rate, decreased cost of cultivation by healthy plants on field, enhanced productivity and increased quality of the produce to get remunerable market price for farmers.

According to the latest census data, India has more than 270 million persons employed in the agriculture sector – nearly a fifth of the country's total population, and about half of its workforce. Indian farmers have diversified a lot in agriculture, as compared with the diversity of the climate, languages and tastes prevailing in the nation. Lower level of the compounded growth rate of the farmers' income as compared to the other sectors has been identified as the major reason for the agrarian distress which has been prevailing in the rural India. Along with the policy blindness in the past, many other reasons are adding much intensity to this burning concern like, lack of quality inputs in the farming, huge quantum of fluctuation and instability in price of the agricultural products, lack of awareness and competency in capturing market place by the farmers, intervention of unscrupulous middlemen, reduced producers' share in consumers price (25-30 per cent only), inflation in the post harvest loses percentage etc. Realizing these underlying reasons and understanding the need to give special attention to the farmers' plight, 'doubling farmer's income' is the need of the hour. How to double real incomes of smallholder family farmers and marginal farmers who have less than a hectare of land? In order to meet such an increasingly-challenging goal, the Indian

Government has devised seven main action points and 'Providing quality seeds and planting materials along with nutrients based on specific field soil profiles' to the farmer is one among them.

Substantial increase in yield and quality of crops in turn add increased income to the farmers. To increase productivity, progress is required along the following dimensions: (i) Quality and judicious use of inputs such as water, seeds, fertilizer and pesticides; (ii) Judicious and safe exploitation of modern technology including genetically modified (GM) seeds; and (iii) Shifting orientation of farming to the natural farming and organic farming to increased quality and decreased cost of cultivation. One of the major factors playing a pivotal role in this is the use of high quality seeds and planting materials as these are the critical determinants of agricultural production on which the performance and efficacy of other inputs depends.



Importance of Quality Seeds and Current Status of its Production and Availability:

The old scripture, Manu Smriti says ‘Good seed in good soil yields abundantly’. Seed quality has been treated as sacred, being an important factor in the improvement of agriculture and agrarian societies. The Rigveda, Kautilya Artha Shashtra and Surapalas Vrikshayurveda mentioned importance of seed and mentioned about seed treatments to ensure good germination. Although the importance of seed was recognized in ancient agriculture, the need for organized seed production in India was identified only at the beginning of 20th century when Royal commission of Agriculture (1925) recommended spread of improved varieties and seed distribution. It is estimated that quality seeds contribute to around a quarter of the overall increase in productivity. Availability and use of quality seeds is not a onetime affair.

The Green Revolution of the 1960s-1970s (High Yielding Varieties), the maize productivity and production growth in the 2000s, (Hybrid crops) the cotton production revolution in the 2000s (GM crop) as well as the increased productivity of fruits and vegetables (Insect and Pest tolerant crops), all had seed or planting materials as the primary driver of agricultural growth.

Table 1: Production of Seeds (Metric Tonnes)

Year	Breeder Seed	Foundation Seed	Certified/ Quality seed
2005-06	6823	74800	1405000
2006-07	7382	79654	1481800
2007-08	9196	85254	1943100
2008-09	9441	96274	2503500
2009-10	10683	114638	2797200
2010-11	11921	180640	3213592
2011-12	12338	222681	3536200
2012-13	11020	161700	3285800
2013-14	8229	174307	3473130
2014-15	9849	157616	3517664
2015-16	8621	149542	3435248

(Source: Department of Agriculture, Cooperation & Farmers Welfare, 2016)

Sustained increase in agriculture production and increased farmers income necessarily requires continuous development of new and improved

varieties of crops and efficient system of supply to farmers. The countries seed programme primarily adheres to the limited generation system for seed multiplication. It recognizes three generations like breeder seed, foundation seed and certified seeds.



As per available data, the availability of quality seed is sufficient to meet our requirement due to the contribution of both private and public sectors towards it (Table 2 and Table 3). Availability of seed for majority of the crops is higher than the requirement quoted (Table 2). Estimate of total seed requirement and availability also showed the same trend for the last one decade (Table 3). Research system in the public and private sector is creating seeds with advanced traits to meet the prevailing and emerging challenges in the agricultural scenario.

However, many a times, farmers are getting seeds but the quality seeds of new improved varieties are not available to the farmers on right time and with affordable price and it may lead to the decreased production drift. The seed programme in India tries to provide adequate safeguards for quality assurance in the seed multiplication chain to maintain the purity of different varieties of crops as it flows from the breeder’s field to the farmers. The Indian seed industry entails the participation of public sector (both Central and state governments like National Seeds Corporation (NSC) and state-level organizations, Indian Council of Agricultural Research (ICAR), State Agricultural Universities), co-operative sector and private sector institutions to provide pure seed to the farmers. Even though, the seed sector in India is protected with different legalities like Seeds Act (1966), Seed Rules (1968) and Seeds (Control) Order (1983), New Policy on Seed Development (1988) and National Seed Policy

Table 2: Requirement and Availability of Quality Seeds for major crops ('000 tonnes)

Year	2013-14				2014-15				2015-16			
Crop	Rqmt	Availability			Rqmt	Availability			Rqmt	Availability		
		Pub	Pvt	Total		Pub	Pvt	Total		Pub	Pvt	Total
Wheat	112.53	49.12	59.23	108.35	112.53	44.78	72.07	116.86	113.46	51.25	66.73	117.98
Paddy	82.37	47.99	41.97	89.95	84.8	46.46	46.46	92.92	82.86	47.96	47.14	95.1
Maize	10.42	1.75	8.84	10.59	10.84	1.15	11.1	12.25	10.7	0.73	11.96	12.69
Bajra	2.52	0.82	2.67	3.49	2.42	0.16	2.53	2.69	2.55	0.27	2.57	2.84
Gram	17.07	11.34	8.76	20.1	16.11	12.36	3.36	15.72	18.14	7.3	7.56	14.86
Urd	2.48	2.45	1.36	3.82	2.68	2	1.31	3.31	2.62	1.36	1.36	2.71
Cowpea	0.27	0.15	0.15	0.3	0.36	0.2	0.15	0.35	0.26	0.14	0.15	0.29
Moong	1.93	1.74	0.92	2.65	2.79	1.72	1.58	3.31	2.87	1.63	1.6	3.23
Arhar	2.58	1.2	1.32	2.52	2.64	1.15	1.63	2.78	2.51	1.11	1.6	2.72
R/ Mustard	2.61	1.6	1.15	2.74	2.64	1.45	1.25	2.7	2.52	1.19	1.46	2.65

Rqmt: Requirement, Pub: Public, Pvt: Private

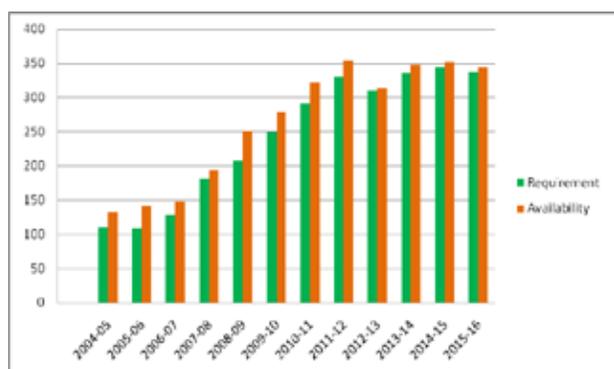
(Source: Directorate of Economics & Statistics, Ministry of Agriculture, GoI, 2016)

(2002), many malpractices and manoeuvring in quality and purity of the seeds used to be present due to different reasons. The main reason for this situation is the over dominance of the unorganized sector, (about 65-70 per cent) comprising mainly farm-saved seeds and dealer provided spurious seeds in the seed industry.

Ensuring Availability of Quality Seed and Planting Materials:

- **Increased Varietal Replacement:** New varieties need to be tested and seeds of these varieties

Table 3: Year-wise requirement and availability of quality seeds (in lakhs quintals)



(Source: Directorate of Economics & Statistics, Ministry of Agriculture, GoI, 2016)

should be made available to the farmers for cultivation in the regions in which it is suitable. After release, the variety is notified under Section 5 of the Seeds Act, 1966 to bring the new varieties under the purview of seed law enforcement.

A total of 1,596 High Yielding Varieties and hybrids of horticultural crops (fruits – 134, vegetables – 485, ornamental plants – 115, plantation and spices – 467, medicinal and aromatic plants – 50 and mushrooms – 5) were developed by Indian Council of Agricultural Science (ICAR).

During the last year (2015-16), 111 new varieties of agricultural and horticultural crops were notified. At the same time, the review of existing list of released and notified varieties do reveal that many old varieties still find place in package of practices. Government should denotify such old varieties that have no demand or relevance in the present context. Continued production of seed of old varieties by many State Corporations is rather counterproductive and has a negative impact on the productivity.

- **Enhanced Seed Replacement Rate:** For achieving the desired level increase in income



of the farmers, Seed Replacement Rates (SRR), should be adequate (It is a measure of how much of the total cropped area was sown with certified seeds in comparison to farm saved seeds). It has been assessed that to achieve food production targets and doubling farmer's income, there is a need to replace the existing seeds (seed replacement ratio) at the rate of 33 per cent for self-pollinated crops, 50 per cent for cross-pollinated crops and 100 per cent for hybrids. In last two decades, the ICAR institutes and SAUs have made a significant progress in meeting fully the breeder seed (BS) requirement. Through the public private partnership and farmers based buy back mechanism, the sufficient quantity of certified seeds are also produced in the country.

- **Maintaining Quality of Seed:** Regulatory measures for quality seed production have to be tightened so as to discourage the sales of spurious seeds to farmers. A large chunk of vegetable seed business is being handled by the unorganized seed sector, wherein seed traders directly purchase from growers and distribute with various trade names. There are only a few



reputed and well established seed companies, which have their own R&D programmes for crop improvement and in-house seed quality assurance. The seed companies should be made responsible for poor performance of seed supplied by them and the penalty system for the companies and compensation strategies from seed companies to the farmers need to be introduced, instead of bearing all the burden of the crop failure by the farmers. Measures need to be taken to display all details of seed traits on seed packages and agency website. At present, 124 Seed Testing Laboratories (STL) are functioning and testing more than 6 lakhs seed samples in the country. In order to strengthen this network, research institutions must develop rapid testing kits for quick seed testing to the detection of spurious seeds at the time of sale itself and extension system need to educate the farmers and registered dealers about the use and need of such technologies for the income enhancement.

- **Use of Tissue Culture Production for Planting Material:** Quality of the planting material can be assured by exploiting the advantage of the tissue culture technique. Conventional planting material may carry pests and diseases present in the mother plant to the next generation. Tissue-culture plantlets, on the other hand, are free from pests fungal and most bacterial pathogens. If they have been properly indexed, they should also be free of viruses. Seed and planting material production is not a simple affair. It needs suitable climatic conditions, fertile land and full time investment. The main advantage that tissue culture technology offers as compared with the conventional seed production, is the ability to produce a significant number of high quality and uniform planting material rapidly, that can be multiplied year-round under sterile conditions anywhere irrespective of the season or weather. Even if the tissue culture is a costly affair, the increased cost and large time span for the production of seeds and planting materials through conventional method can be overcome by tissue-culture plantlets. It will also help for migrating horticultural crops from seed based to sapling based planting.

- **Use of GM seeds and Hybrid Seeds for Enhanced Productivity:** For fetching high prices, quality of produce plays an important role. The open pollinated varieties (OPVs) produced by farmers are usually genetically diverse and not very uniform in quality of produce. In comparison to this, hybrids are very uniform and yield 10 per cent to 25 per cent more than OPVs and hence, improve the crop productivity. Hybridisation can also be very useful in developing seed varieties that are drought and pest tolerant, enabling adaptation to climate change or mitigating and other yield penalising risks. Certain private sector seed companies have contributed tremendously in developing promising F1 hybrids. Majority of the hybrids produced in India are being produced and marketed by private seed sector thus, these sectors should be given an umbrella of government support and policies in order to enhance quality of seed supply.

Recognizing the potential of genetic engineering and biotechnology and its relevance to India, the Ministry of Science and Technology established the Department of Biotechnology (DBT) in 1986, exclusively to develop and apply biotechnological approaches in agriculture, animal science and human health. Currently, transgenic research is being done on several field crops, viz. Cotton, Indian Mustard, Corn, Potato, Tobacco and Rice and in vegetable crops namely Tomato, Brinjal, Cauliflower, Cabbage, Chillies and Bell Pepper. The apprehensions about the health hazards and conflict with the Indian ideology have slowed down the acceptability of GM food crops among our farmers. But it is to be introduced



after resolving the problems. If this happens, transgenic seed will have a major impact on seed business and farmer's plight.

- **Creation of a Sustainable Seed Production and Distribution System:** A sustainable seed system will ensure high quality seeds of a wide range of varieties and crops produced and fully available in time with acceptable and affordable price to farmers. However, farmers are not always able to fully benefit from the advantages of using improved seed by existing seed system of the country.

Many times, the seed may not be available to the farmers in time or not at affordable price. Seed village, wherein trained group of farmers are involved in production of seeds of various crops should be created and facilitated in every village to upgrade the quality of farmer-saved seed which is about 80-85 per cent of the total seed used for crop production. Infrastructure need to be created on this ground to keep the seeds for some time without losing the viability and quality. This will lead to the availability of quality seeds in a cost effective way to the farmers.

Conclusion:

Substantial increase in yield and quality of crops depends upon a number of factors viz., inputs like fertilizers, irrigation and plant protection measures and suitable agronomic practices. In the long run, productivity enhancement requires research towards discovery of robust seed varieties and planting materials, other inputs, appropriate crops and input usage for a given soil type. Along with this, availability of all inputs for production in sufficient quantity at affordable prices and effective extension practices are also essential inputs. Ultimately, the quality of seed and planting materials used in the crop production has direct and indirect impact on doubling farmer's income through the reduced seed rate, decreased cost of cultivation by healthy plans on field, enhanced productivity and increased quality of the the produce to get remunerable market price for farmers.

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NATIONAL AGRICULTURE MARKET: NEW HORIZON FOR AGRI-BUSINESS

Dr. Reema Raghuvanshi

The Government's decision to create National Agriculture Market (NAM) e-platform for farmers will remove inter-state barriers in moving farm produce and can be a game changer provided the prerequisites are fulfilled by states. These two most important prerequisites include amendment of the state Agricultural Produce Marketing Committee Act (APMC) Acts and physical logistic support to farmers which would enable them to move their crops. e-NAM has the potential to transform Indian agriculture from traditional to an entrepreneurial and a profit making venture. But this will only be possible with supplementary additions in infrastructure, easy credit disbursal and vigilant inspection and implementation.

The Government realizes the importance of agricultural sector for the growth and development of the Indian economy. With nearly 58 per cent of its population continuing to depend upon agriculture for their livelihood, the critical role of the sector cannot be repudiated. Agriculture sector is highly vulnerable to the uncertainties of nature that impact the crop enterprise at its production. Further, the sector is also exposed to the current weaknesses of the agriculture marketing system. The annual income of a farmer depends upon both yield and the price that his produce fetches. Government has rolled out a large number of programmes to improve yield levels on sustainable basis, it recognizes the need for creating a competitive market structure in the country that will generate marketing efficiency. Only when the market is integrated over time and space, can market efficiency be realized. This year's Union Budget has increased rural credit to Rs 10 lakhs crores for the next fiscal (2017-18) with the

aim at doubling the income of the farmers in the next five years.

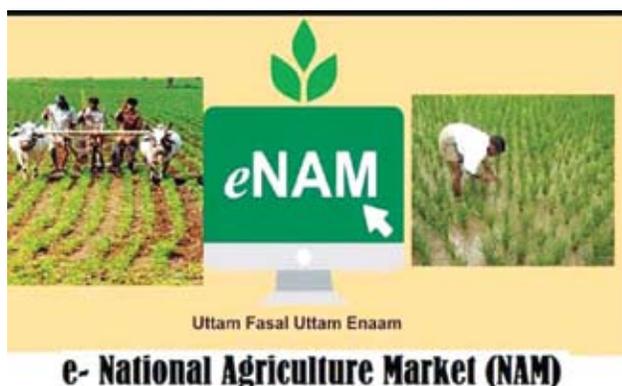
Integration of agriculture markets across the country through the e-platform is seen as an important measure for overcoming the challenges posed by the present agri-marketing system namely - fragmentation of State into multiple market areas, each administered by separate APMC (Agricultural Product Marketing Committee), multiple levy of mandi fees, requirement for multiple license for trading in different APMCs, licensing barriers leading to conditions of monopoly, poor quality of infrastructure and low use of technology, information dissymmetry, confound process for price discovery, high level of market charges, movement controls, etc. The need to unify the markets both at State and National level is, therefore, clearly the requirement of time, in order to provide better price to farmers, improve supply chain, reduce wastages and create a unified national market.



With nearly 58 per cent of the population depending upon agriculture sector for their livelihood, the unification of markets both at State and National level is indispensable. Thus, last year Prime Minister launched National Agriculture Market portal (eNAM) on April 15, 2016, to connect e-mandis in several States. eNAM is an online inter-connectivity of e-mandis, aimed at marshalling the much needed agriculture marketing reforms to enable farmers to get better price of their produce.

National Agriculture Market (NAM) is a pan-India electronic trading portal which networks the existing APMC mandis to create a unified national market for agricultural commodities. NAM Portal provides a single window service for all APMC related information and services. This includes commodity arrivals & prices, buy & sell trade offers, provision to respond to trade offers, among other services. While material flow (agriculture produce) continue to happen through mandis, an online market reduces transaction costs and information asymmetry.

Agriculture marketing is administered by the States as per their agri-marketing regulations, under which, the State is divided into several market areas, each of which is administered by a separate Agricultural Produce Marketing Committee (APMC) which imposes its own marketing regulation (including fees). This fragmentation of markets, even within the State, hinders free flow of agri-commodities from one market area to another and multiple handling of agri-produce and multiple levels of mandi charges ends up escalating the prices for the consumers without commensurate benefit to the farmer. NAM addresses these challenges by creating a unified market through online trading platform, both, at State and National



level and promotes uniformity, streamlining of procedures across the integrated markets, removes information asymmetry between buyers and sellers and promotes real time price discovery, based on actual demand and supply, promotes transparency in auction process, and access to a nationwide market for the farmer, with prices compatible with quality of his produce and online payment and availability of better quality produce at more reasonable prices to the consumer.

Small Farmers' Agribusiness Consortium (SFAC) is the lead promoter of NAM. SFAC is a registered society of Department of Agriculture, Cooperation & Farmers' Welfare (DAC&FW) under Ministry of Agriculture and Farmer Welfare. SFAC through open tender selects a Strategic Partner (SP) to develop, operate and maintain the NAM e-platform. SFAC implements NAM with the technical support of SP and budgetary grant support from DAC&FW. DAC&FW meets the expenses on software and its customization for the States and is providing it for free. DAC&FW is also giving a grant as one time fixed cost up to Rs.30 lakhs per Mandi (other than to the private mandis) for installation of the e-market platform. Around 6500 APMCs operate throughout the country of which 585 district level mandis in States/UTs desirous of joining are planned to be linked by NAM. The Cabinet Committee on Economic Affairs had approved a Central Sector Scheme for Promotion of National Agricultural Market through Agri-Tech Infrastructure Fund (ATIF). The government has allocated Rs. 200 crore to the ATIF. With this fund, SFAC will implement NAM for three years from 2015-16 to 2017-18

Objectives of NAM:

- A national e-market platform for transparent sale transactions and price discovery initially in regulated markets. Willing States to accordingly enact suitable provisions in their APMC Act for promotion of e-trading by their State Agricultural Marketing Board/APMC.
- Liberal licensing of traders/buyers and commission agents by State authorities without any pre-condition of physical presence or possession of shop /premises in the market yard.
- One license for a trader valid across all markets in the State.

- Harmonization of quality standards of agricultural produce and provision for assaying (quality testing) infrastructure in every market to enable informed bidding by buyers. Common tradable parameters have so far been developed for several commodities.
- Single point levy of market fees, i.e on the first wholesale purchase from the farmer.
- Provision of Soil Testing Laboratories in/ or near the selected mandi to facilitate visiting farmers to access this facility in the mandi itself. The broad role of the Strategic Partner is comprehensive and includes writing of the software, customizing it to meet the specific requirements of the mandis in the States willing to integrate with NAM and running the platform
- The Scheme is applicable on All-India basis. There is no State wise allocation under the Scheme. However, desirous States would be required to meet the pre-requisites in terms of carrying out necessary agri-marketing reforms.

Benefits of NAM:

- For the farmers, NAM promises more options for sale. It would increase his access to markets through warehouse based sales and thus obviate the need to transport his produce to the mandi.
- For the local trader in the mandi / market, NAM offers the opportunity to access a larger national market for secondary trading.
- Bulk buyers, processors, exporters etc. benefit from being able to participate directly in trading at the local mandi / market level through the NAM platform, thereby reducing their intermediation costs.
- The gradual integration of all the major mandis in the States into NAM will ensure common procedures for issue of licences, levy of fee and movement of produce. In a period of 5-7 years, Union Cabinet expects significant benefits through higher returns to farmers, lower transaction costs to buyers and stable prices and availability to consumers.
- The NAM will also facilitate the emergence of value chains in major agricultural commodities



across the country and help to promote scientific storage and movement of agri goods.

Current Status of NAM:

It initially aimed at integrating 21 mandis in eight states; Uttar Pradesh, Gujarat, Telangana, Rajasthan, Madhya Pradesh, Haryana, Jharkhand and Himachal Pradesh. Launched with a budget allocation of Rs 200 crore, 25 key commodities, including wheat, paddy, maize, onion, jowar, bajra, groundnut, potato, soyabean and mustard seed, were selected for e-trading.

As per Press Information Bureau, Government of India, Ministry of Agriculture, 07-April-2017, so far, 417 markets from 13 states have been integrated with e-National Agriculture Market (e-NAM) against the set target of 400 markets by March. And as per the approved e-NAM Scheme, 585 regulated mandis across the country are to be integrated with the portal by March, 2018.

Challenges:

- Although the system looks simple, for farmers, it may not be as simple as expected. Most of the farmers have the habit of selling their yield to a local produce aggregator than taking their crops to the mandis.
- Even if some farmers take them to mandis, their yield would be very small to excite distant buyers bidding online. In this context, the possibility for better price discovery is quite limited.
- Quality variations in commodities at both the state and national level pose a challenge. For example, wheat in Punjab and Haryana is of medium quality whereas those from Madhya Pradesh and Gujarat are of superior quality.

- Electronic platforms like NAM would be a right platform only for trade standardized commodities and for the rest it may not be.

The Farmers can still resolve the above problems and reap benefits if they can find ways to aggregate their produce on their own bypassing local produce aggregator. In this, the cooperatives and farmer produce organizations can play a facilitating role to aggregate commodities. Reforms are also needed covering all facets of agricultural sector such as soil health, traditional farming, irrigation, extension services, fertilizers among others to make the sector attractive. This will create a large number of employment opportunities; ensure surplus production of all commodities and effective functioning of NAM. Reforming agricultural markets requires sincere efforts and effective participation of all the stakeholders.

Obligation of States for Successful Implementation: The states must ensure that reforms in their APMCs are carried out both in letter and spirit. To make the initiative successful, the states must undertake the following reforms:

- Provision for electronic auction for price discovery.

- Provide a single license to be valid across the state.
- Provision for a single point levy of market fee.

It should also be noted that only those states/ UTs which fulfill the above three prerequisites will be eligible for assistance under this scheme. The Government's decision to create National Agriculture Market (NAM) e-platform for farmers will remove inter-state barriers in moving farm produce and can be a game changer provided the prerequisites are fulfilled by states. These two most important prerequisites include amendment of the state Agricultural Produce Marketing Committee Act (APMC) Acts and physical logistic support to farmers which would enable them to move their crops. e-NAM has the potential to transform Indian agriculture from traditional to an entrepreneurial and a profit making venture. But this will only be possible with supplementary additions in infrastructure, easy credit disbursal and vigilant inspection and implementation.

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New Central Sector Scheme SAMPADA approved

The Cabinet Committee on Economic Affairs, has approved a new Central Sector Scheme – SAMPADA (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters) for the period 2016-20 coterminous with the 14th Finance Commission cycle, for re-structuring the schemes of the Ministry of Food Processing Industries (MoFPI).

With an allocation of Rs. 6,000 crore, the scheme is expected to leverage investment of Rs. 31,400 crore, handling of 334 lakh MT agro-produce valuing Rs. 1,04,125 crore, benefit 20 lakh farmers and generate 5,30,500 direct/ indirect employment in the country by the year 2019-20.

SAMPADA is an umbrella scheme incorporating ongoing schemes of the Ministry like Mega Food Parks, Integrated Cold Chain and Value Addition Infrastructure, Food Safety and Quality Assurance Infrastructure, etc. and also new schemes like Infrastructure for Agro-processing Clusters, Creation of Backward and Forward Linkages, Creation / Expansion of Food Processing & Preservation Capacities. The objective of SAMPADA is to supplement agriculture, modernize processing and decrease agri-waste. It also aims to develop modern infrastructure to encourage entrepreneurs to set up food processing units based on cluster approach, provide effective and seamless backward and forward integration for processed food industry by plugging gaps in supply chain and creation of processing and preservation capacities and modernization/ expansion of existing food processing units.

The implementation of SAMPADA will help in providing better prices to farmers and is a big step towards doubling of farmers' income. It will create huge employment opportunities especially in the rural areas. It will also help in reducing wastage of agricultural produce, increasing the processing level, availability of safe and convenient processed foods at affordable price to consumers and enhancing the export of the processed foods.

Prime Minister's 7 Point Action Plan: Doubling Farmers' Income

- Enhanced focus on irrigation with large scale investments, with the aim of 'per drop, more crop'.
- Availability of Quality Seeds and Nutrients.
- Large scale investments in Warehousing, cold chains and storage facilities.
- Value- addition through food processing.
- Risk Management through introduction of crop insurance schemes.
- Setting up a National Farm Market and;
- Promoting ancillary activities like poultry, fisheries etc.



Initiatives for Farmers' Welfare:

□ Agricultural Growth

	During 2012-13	During 2016-17
Agricultural Growth	1.2 per cent	2.2 Per cent

□ Record production: (2016-17 Estimates)

- Record Production of Foodgrains: Estimated at 271.98 MT
- Record production of Rice Estimated at 108.86 MT
- Record Production of Wheat Estimated at 96.64 MT
- Record Production of Coarse Cereals Estimated at 44.34 MT
- Record Production of Pulses Estimated at 22.14 MT
- Record Production of Oilseeds Estimated at 33.60 MT

□ Pradhan Mantri Fasal Bima Yojana:

- To provide insurance at lowest premium rate to farmers with added benefits.
- Highest financial support till date by the Central Government in crop insurance.
- Plan to increase crop insurance coverage from 20 per cent to 50 per cent by 2018-19.
- During Kharif 2016, 3.90 crore farmers insured over the sum insured of Rs.1,41,883.30 crores.
- During Rabi 2016-17, 1.67 crore farmers insured over the sum insured of Rs. 71,728.59 crores.

□ Relief to Farmers In Distress:

- If 33 per cent or more crop damaged, a farmer would get relief. Earlier relief was given only when crop damage was 50 per cent or more.

- Amount of relief under various heads increased by 1.5 times.
- For food grains damaged due to excessive rainfall, full minimum support price to be paid.
- Families of the deceased persons to be given an assistance of Rs.4 lakhs, up from Rs.2.5 lakhs.

□ **Pradhan Mantri Krishi Sinchayee Yojana (PMKSY):**

- Water to Every Field / Har Khet Ko Paani’.
- Pradhan Mantri Krishi Sinchayee Yojana is targeting speedy completion of irrigation projects which are pending for long-time.
- PMKSY to cover 28.5 Lakh hectare area under irrigation.
- Rs. 50,000 crores to be invested in five years to achieve ‘Water to Every Field / Har Khet Ko Paani’.
- Budget of Pradhan Mantri Krishi Sinchai Yojna increased to Rs.7377 crore.
- Long Term Irrigation Fund Augmented by 100 per cent to Rs 40,000 Crore (Budget 2017-18).
- Dedicated Micro Irrigation fund with a sum of Rs. 5000 crores to be set up for the achievement of the goal of More crop per drop.
- Under ‘Per Drop More Crop’ for micro irrigation 15.86 lakh hectares brought under micro irrigation from 2014-17.

□ **Soil health Cards:**

- Soil Health Cards carry crop wise recommendations of nutrients and fertilizers required for individual farms to help farmers to improve productivity through judicious use of inputs.
- Scheme launched to reduce fertilizers usage and expenses.
- Soil Health Cards to be issued to all farmers by 2018
- 6.04 crore soil Health Cards distributed.
- 2.78 crore soil samples collected till 15.4.2017.

□ **Credit facility for Farming and Agriculture:**

- Has been raised to Rs.10 lakh crore.

□ **National Agriculture Market (e-Nam):**

- This is an initiative where all agricultural mandis are linked electronically.
- Farmers will be able to get better price of their crop through e-Nam.
- 415 Mandis across 13 states are live on e-NAM.
- More than 39.75 lakh farmers and 88,474 traders are registered on this platform.
- Agriculture produce worth Rs. 15,009 crores has been transacted on e-NAM platform (As on 23.03.2017).
- Rs 75 lakhs allotted for every mandi to set up e-NAM infrastructure.

❑ **Neem Coated Urea - Now no queues for Urea**

Comparison of	2013-14	2016
Neem Coated Urea	27.96 per cent	100 per cent

- Government makes Neem coating of Urea mandatory.
- 100 per cent of Neem Coating of Indigenous and Imported Urea achieved.
- New Urea Policy 2015-Assured availability of Urea.
- Diversion of highly subsidized urea towards non-agricultural purposes reduced to negligible.
- 5 to 17 per cent increase in crop yield seen in various crops.
- Earlier, subsidised urea used to be diverted to non-agricultural use. This diversion also created shortage of urea. The launch of Neem Coated Urea has made non-agricultural use impossible and hence, urea is available to farmers in adequate quantity.

❑ **Abolition of Levy System:**

In a major pro-farmer move, the government has abolished procurement of paddy under the levy system thereby enabling the farmers to sell their paddy directly to the centres opened by the Government agencies at a more beneficial price.

❑ **Direct Subsidy to Sugarcane Farmers:**

- Direct subsidy to sugarcane farmers- Amount released directly to farmers' Account.

❑ **Payment of Sugarcane Arrears:**

- For years, sugarcane farmers in north India have been suffering under sugarcane arrears.
- So, the Government extended financial assistance.
- Cane farmers' due payments cleared upto 99.33 per cent (2014-15 sugar season) and 98.21 per cent (2015-16 sugar season).

❑ **Stabilization of prices of Pulses:**

- For the first time, a buffer stock of up to 20 lakh MT of pulses is being created to manage price volatility of pulses.
- Buffer of around 17.14 lakh tonnes of pulses already built.
- Big hike in the minimum support price (MSP) of kharif pulses for 2016-17 viz. Arhar increased from Rs. 4,625 to Rs. 5,050 per quintal, Urad increased from Rs. 4,625 to Rs. 5,000 per quintal and Moong increased from Rs 4,850 to Rs. 5,250 per quintal.
- Substantial increase in MSP of Rabi Pulses, price of gram increased from Rs. 3500 to Rs. 4000 per quintal and the price of lentil (Masoor) increased from Rs. 3400 to Rs. 3950 per quintal.

❑ **Agro-Meteorological Services for Farmers:**

- Farmers are directly benefitted by the Agro-Meteorological Services provided through SMS and other modes for their day to day farming operations.
- About 7 million farmers were receiving information in Indian languages in 2014. About 21 million farmers are currently receiving AAS in vernacular languages.

❑ **Paramparagat Krishi Vikas Yojana:**

- Promoting organic farming.

- 10,000 clusters covering 2 lakhs hectare area under Organic Farming being covered during 2015-18.
- Organic value chain for North Eastern States.

□ 'Blue Revolution': A Revolution in the Fisheries Sector:

Comparison of	2013-14	2015-16	2016-17 (Estimated)
Fish Production	9.57 MT	10.79 MT	11.46 MT

- Merged all the ongoing fisheries schemes under the umbrella of Blue Revolution.
- Fish production increased from 186.12 lakh tonnes during 2012-14 to 209.59 tonnes during 2014-16.
- Insurance cover increased to Rs. 2 lakh from Rs. 1 lakh for accidental death and permanent disability.
- Average 4.90 lakh fishermen benefited annually under Saving-cum-Relief.
- Average Rs. 48.65 lakh fishermen insured annually.

□ National Gokul Mission:

- It aims at improving the breeds of indigenous cattle population. It aims at improving the Genetic stock of the Cattle and also at Milk Production and Dairy development.
- 14 Gokul Grams are being established and 41 Bull Mother Farms modernized.
- 3629 Bulls have been inducted for natural service.
- Milk Production reached 155 MT.
- Per capita availability of milk increased from 307 gram per day in 2013-14 to 340 grams per day in 2015-16.
- Number of Veterinary Colleges increased from 36 to 52.

□ Performance of Dairy sector:

	2013-14	2015-16	2016-17 (Estimated)
Total Milk Production	137.7 MT	155.5 MT	163.74 MT

- 24x7 Kisan Channel
- A 24X7 dedicated Kisan TV Channel for farmers.

□ Development of New Technologies:

Technology	During 2011-2014	During 2014-2017
New varieties of different field crops	295	571
Climate resilient new technologies developed	38	52
Integrated farming system (IFS) models developed by ICAR	27	45
New Technologies for livestock & poultry	78 technologies, 7 vaccines 29 diagnostic kits	145 technologies, 9 vaccines 32 diagnostic kits
New livestock breeds registered	9	17
Farm machinery	195 new prototypes	219 new prototypes
Agro-processing centers established	24	51
Food-testing laboratories supported	15	34



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Central Plan Outlay by Sectors in BE 2015-16 (in per cent)
Source: Budget documents and CGA.

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REVAMPED CROP INSURANCE SCHEME: PMFBY HELPS FARMERS

Sandip Das

PMFBY if implemented properly across the country would mitigate farm distress to a large extent especially when the erratic climates have become a norm rather than exception. Several new features have been introduced in the scheme to make it more attractive to farmers such as application of one nominal premium rate for a season across the country, provision of features such as localised calamities, prevented sowing, post harvest losses and going to village or panchayat level to assess crop losses or damages.

Within a year of its launch by Prime Minister, the revamped crop insurance scheme titled Pradhan Mantri Fasal Bima Yojana (PMFBY) has managed to provide millions of the farmers with coverage in case of crop failure. The government needs to address the issue of uneven expansion of the scheme, so that target for covering around 50 per cent of the farmers by 2019 could be achieved.

The crop insurance schemes have been in operations in the country close to last two decades or so. Because of reports of crop losses due to erratic climate incidents and insufficient rainfall, the farmers have been facing an uncertain future. There have been reports about farmers' suicides because of crop failures. So far, the coverage of crop insurance had been inadequate. Prior to launch of Pradhan Mantri Fasal Bima Yojana (PMFBY), only 20 million of an estimated 140 million farmers in the country, earning for a population four to five times as many, had crop insurance cover in 2014-15, even as the facility was just against the cost of cultivation and barely provided any income protection. According to Agriculture Ministry data, most of the farmers who took crop insurance were in Rajasthan, Bihar, Uttar Pradesh, Maharashtra, Karnataka and Andhra Pradesh. In terms of the value of the farm output, the current schemes — the Modified National Agricultural Insurance Scheme and the Weather-based Crop Insurance Scheme — fare even more dismally, with a coverage of just 5.5 per cent.

In January 2016, in a move aimed at reducing the recurrence of agricultural distress without having to resort to hefty hikes in the Minimum Support Prices (MSP), the government had announced a crop insurance scheme named Pradhan Mantri Fasal Bima Yojana (PMFBY).

About the Scheme:

Under the new scheme which was implemented from Kharif season of 2016, the premium paid by farmers had been reduced to 2 per cent of the insured value for the more rain-dependent kharif crop and 1.5 per cent for the rabi season, compared with 3.5-8 per cent charged for the two earlier schemes - National Agricultural Insurance Scheme (NAIS) and Modified National Agricultural Insurance Scheme (MNAIS). In the case of horticultural crops, farmers' premium burden had been fixed at 5 per cent of the sum assured or 50 per cent of the total premium.

NAIS and MNAIS have been discontinued from Kharif 2016, but the ongoing Weather Based Crop Insurance Scheme (WBCIS) and Coconut Palm Insurance Scheme would continue to operate



while premium to be paid under WBCIS has been brought on a par with PMFBY.

While unveiling the operational guidelines for the PMFBY at a massive farmers' rally in Sehore in Madhya Pradesh in February last year, Prime Minister had noted that new crop insurance scheme would provide a solution for the farmers problems in times of difficulty. He said that care had been taken to eliminate the shortcomings of previous crop insurance schemes, and create trust among farmers with regard to crop insurance. He said technology would be used extensively with this scheme to ensure early settlement of claims, and exhorted farmers to take benefit of this scheme.

Under the PMFBY, there would be no upper limit on government subsidy provided by centre and state governments. "Even if the balance premium (after farmers' contribution) is 90 per cent, it will be borne by the government," according to an Agriculture Ministry statement.

In the earlier schemes, there was a provision of capping the premium rate which resulted in low claims being paid to farmers. Officials said that this capping on premium was done to limit the government outgo on the premium subsidy. "This capping has now been removed and farmers will get claim against full sum insured without any reduction. This would ensure that farmers get the full sum insured without any reduction or hassles from the 11 designated insurance companies if natural calamities ravage their crops. Following the roll out of PMFBY, the crop insurance coverage is set to rise to 50 per cent of the crop area by 2018-19.

Another benefit to farmers under the new crop insurance scheme was that losses incurred by them at any stage of the farming activity — from the sowing to the post-harvest season — would be covered. Earlier, only post-harvest losses could be offset by the insurance facility under the two existing schemes. Also, even those farmers who hadn't taken bank loans, would be eligible for insurance cover under PMFBY.

The Agriculture Ministry had empanelled state-owned Agriculture Insurance Company of

India (AIC) and 10 private companies including ICICI-Lombard General Insurance, HDFC-ERGO General Insurance, IFFCO-Tokio General Insurance and SBI General Insurance, for implementation of the mega scheme.

The biggest thrust of PMFBY has been the use of technology which would be encouraged to a great extent. "Smart phones are being used to capture and upload data of crop cutting to reduce the delays in claim payment to farmers. Remote sensing will be used to reduce the number of crop cutting experiments," an official said.

Performance or Coverage amongst Farmers:

More than 3.66 crore farmers of the estimated 14 crore in the country were enrolled under PMFBY in kharif, 2016 against 3.09 crore farmers enrolled with the crop insurance scheme in kharif, 2015. However in states including Bihar, Odisha, Telangana, Rajasthan and Tamil Nadu, a lower number of farmers have been covered under PMFBY in Kharif 2016 compared with previous year.

The scheme has provided coverage to 3.66 crore farmers (26.50 per cent) and at this rate, it is likely to exceed the target of 30 per cent coverage for both kharif and rabi seasons in 2016-17. However, the key element of coverage amongst farmers is that about one crore non-loanee farmers enrolled themselves for PMFBY.



The performance in the kharif season last year was better despite the fact that there were teething issues to begin with. For instance, many states did the bidding process for selection of the insurance companies for concerned clusters for the first time and consequently, the notification of the scheme was delayed in a number of states.

In the 2016 Rabi season, more than 1.67 crore farmers enrolled themselves with PMFBY which was marginally lower than 1.75 crore farmers who took up crop insurance in the previous year. While there was 5 per cent decline in number of farmers enrolled for rabi season in 2016-17, while sum insured has jumped by 57 per cent to Rs 71, 728 crore compared to previous year. Agriculture Ministry officials said that rabi crops - wheat, oilseeds and pulses are mostly stable and good monsoon last year had ensured less coverage under PMFBY.

In kharif 2016, PMFBY and WBCIS were notified in 23 states and during rabi in 24 states and three union territories. Both the seasons combined, coverage of farmers was 5.65 crore against 4.95 crore in 2015-16, area covered was 51.1 million hectare against 52.4 mh in the previous year. The sum insured was at Rs 2.10 lakh crore against 1.14 lakh crore in 2015-16.

Towards PMFBY, Finance Minister had allocated Rs 5,501 crore in the Budget 2016-17 against Rs 2,995 crore allocated for various crop insurance schemes in the last financial year. However, under the revised Budget estimate, the centre would provide Rs 13, 396 crore for the implementation of PMFBY in the current financial year. Finance Minister, in his 2017-18 Budget speech, had announced that the government planned to increase coverage under the scheme from 30 per cent of the cropped area in 2016-17 to 40 per cent in 2017-18 and to 50 per cent in 2018-19. He allocated a sum of Rs 9,000 crore for the scheme as against the budget estimate of Rs 5,500 in 2016-17.

Experts say that PMFBY if implemented properly across the country would mitigate farm distress to a large extent especially when the erratic climates have become a norm rather than exception. Several new features have been introduced in the scheme to make it more

attractive to farmers such as application of one nominal premium rate for a season across the country, provision of features such as localised calamities, prevented sowing, post harvest losses and going to village or panchayat level to assess crop losses or damages.

Expansion of PMFBY: Challenges

Agriculture Ministry officials acknowledge that there has been an uneven progress in adoption of innovative technologies such as carrying out crop cutting experimentation through APP and usage of smartphone for capturing and transmitting data. Much ground has already been covered from digitisation of notification, premium calculator, web-based forms, e-payment gateways etc.

“Some of the states like Tamil Nadu, Chhattisgarh and Odisha have taken a lead in this direction. Unless these technologies are used widely across states, issues relating to discrepancy in area sown and insured will remain thus impacting farmers.

For 2017-18, the target for insured areas under PMFBY is set at 40 per cent of gross cropped area, which translates to 77.6 million hectare of total cropped areas. This is a quantum jump from 51.1 million hectare achieved in 2016-17. The Agriculture Ministry has asked chief secretaries of all states, banks and insurance companies to adopt strategies including notification of more number of crops and larger focus on non-loanees. “Banks must also ensure compulsory coverage of all eligible loanees and electronic transmission of premium on time,” an official said.

The banks will be squarely responsible. “In case there is crop loss to a loanee farmer who is not insured, the bank will have to make good the losses. The onus is now on banks and insurance companies to deliver”. The government is trying to bring non-loanee farmers such as share-croppers too within the PMFBY fold. “There is a separate committee of the government looking into the land leasing policy and we should be able to address the aspect of sharecropper also getting the benefit of crop insurance.

(The Author is a Delhi based journalist in a leading financial daily. Email: sandipdas2005@gmail.com)

TEN NEW SWACHH ICONIC PLACES FOR PHASE II UNDER SWACHH BHARAT MISSION

The Ministry of Drinking Water and Sanitation has undertaken a special clean-up initiative called 'Swachh Iconic Places' with an aim to give focus on 100 iconic heritage, spiritual and cultural places in the country which are to be brought to a higher standard of swachhta and visitors' amenities, under the Swachh Bharat Mission. This initiative has been undertaken under the guidance of Prime Minister. The Ministry of Drinking Water and Sanitation is the coordinating Ministry for this initiative.

The Union Minister for Rural Development, Panchayati Raj, Drinking Water and Sanitation, Shri Narendra Singh Tomar announced the list of ten new places for the Phase II of the Swachh Iconic Places (SIP) in its second quarterly review meeting, held at Mata Vaishno Devi Shrine, in Katra, Jammu and Kashmir. These new ten places have been identified as 1. Gangotri, 2. Yamunotri, 3. Mahakaleshwar Temple, Ujjain, 4. Char Minar, Hyderabad, 5. Church and Convent of St. Francis of Assisi, Goa, 6. Adi Shankaracharya's abode Kalady in Ernakulam, 7. Gomateshwar in Shravanbelgola, 8. Baijnath Dham, Devghar, 9. Gaya Tirth in Bihar and 10. Somnath temple in Gujarat. These 10 new places will be taken up for the SIP Implementation in Phase II. The action plans will be developed for each place in consultation with all the concerned stakeholders and necessary CSR support will be mobilized. Implementation of action plans will start at these places at the earliest possible.

The ten Iconic places that were taken up in Phase I were: 1. Ajmer Sharif Dargah 2. CST Mumbai 3. Golden Temple, Amritsar 4. Kamakhya Temple, Assam 5. Maikarnika Ghat, Varanasi 6. Meenakshi Temple, Madurai 7. Shri Mata Vaishno Devi, Katra, J&K 8. Shree Jagannath Temple, Puri 9. The Taj Mahal, Agra 10. Tirupati Temple, Tirumala. These ten Swachh Iconic Places are already implementing action plans in Phase I.

The Minister said that under Swachh Bharat Mission, the country has made fast and remarkable progress with sanitation coverage increasing to 64 per cent with 1.92 lakh villages becoming ODF. Secretary, MDWS presented the SIP status report of first two quarters, highlighting the key initiatives launched by Phase I sites towards improving the cleanliness, sanitation and accessibility facilities at these sites. The State government of J&K also declared Reasi block Open Defecation Free (ODF). Two Water ATMs in Katra town were also inaugurated by the Union Minister.



Union Minister for Rural Development, Panchayati Raj and Drinking Water and Sanitation, Shri Narendra Singh Tomar addressing the Second Quarterly Review meeting.

PHASE II SWACHH ICONIC PLACES



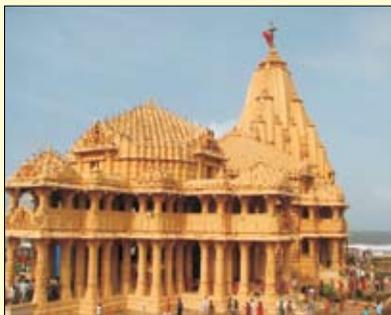
Gangotri in Uttarakhand



Yamunotri in Uttarakhand



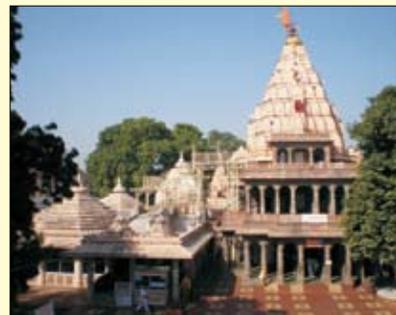
Char Minar in Telangana



Somnath Temple in Gujarat



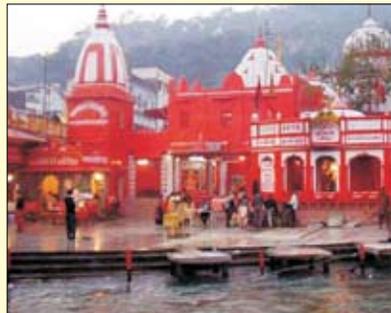
Kalady in Kerala



Mahakaleshwar Temple in M.P.



Baidyanath Dham in Jharkhand



Gaya Teerth in Bihar



Convent and Church of St. Francis of Assisi at Goa



Gomateshwara Temple in Karnataka

BOOSTING FARMERS INCOME THROUGH EFFICIENT COLD-CHAIN NETWORK

Dr. Rekha Dhanai

The government has provided various incentives in tax and duties to encourage cold chain in the country. In addition, cold chain and container-handling facilities should also need to be augmented near to the area of production which benefits the producers. To develop a world-class cold chain infrastructure, government and industry bodies need to work in collaboration to encourage the adoption of better and more efficient refrigeration technologies that can prolong the shelf life of food products and bring commensurate economic returns to the farmers in order to improve their economic benefits and ultimately their incomes.

India is one of the world's largest producers as well as consumer of food products. This sector plays an important role in contributing to the development of the rural economy. Domestically, the spending on food and food products amounts to nearly 21 per cent of the gross domestic product of the country and constitutes the largest portion of the consumer spending more than a 31 per cent share of wallet. Food processing industry in India is seen as a potential source for driving the rural economy as it brings about synergy between the consumer, industry and agriculture. A well developed food processing industry is expected to increase farm prices, reduce wastages, ensure value addition, promote crop diversification, generate employment opportunities as well as export earnings and thereby helping farmers to increase their incomes.

The most important problem facing the Indian agricultural industry is the highly inefficient supply chain. Because of lack of cold chain infrastructure and also food processing industry, about 50 per cent of all foods produced in India are wasted. In order to facilitate and exploit the growth potential of the food processing sector, the government has announced several policy measures for the cold chain infrastructure. To promote the private sector activity and invite foreign investments in the sector, the Government allows 100 per cent FDI in the food processing & cold chain infrastructure. However, despite of continual efforts and initiatives of the Government to provide the required stimulus to the sector, processing activity is still at a nascent stage in the country. The inadequate support infrastructure which is the biggest bottleneck in

expanding the food processing sector includes: long and fragmented supply chain, inadequate cold storage and warehousing facilities with road, rail and port infrastructure. The extent of cold chain capacity and utilization is greater for exported food products in the country as compared to food destined for domestic markets. The gap is illustrated by the dominance of smallholder farmers, who mainly market their production through traditional food chains and get low returns on their investments. The food products handled through traditional channels are usually exposed to a broken cold chain or none at all which not only contribute to the huge food losses but also a low farmer's income.

Cold-chain for Enhancing Farmer's Income:

A cold chain for perishable foods is the uninterrupted handling of the product within a low temperature environment during the post harvest steps of the value chain including harvest, collection, packing, processing, storage, transport



and marketing until it reaches the final consumer. An integrated cold chain encompasses the management of the movement of perishable food products from the field, ranch or body of water through the entire post harvest chain to the final consumer. There are many technical, logistical and investment challenges as well as economic opportunities related to the use of the cold chain, which support the farmers to enhance their income through utilization of cold chain technologies. The major segments of an integrated cold chain include:

- Packing and cooling of fresh food products.
- Food processing (i.e. freezing of certain processed foods).
- Cold storage (short or long term warehousing of chilled or frozen foods).
- Distribution (cold transport and temporary warehousing under temperature controlled conditions) and ;
- Marketing (refrigerated or freezer storage and displays at wholesale markets, retail markets and food service operations).

Cold chain logistics is the planning and management of the interactions and transitions between these five segments, in order to keep foods at their optimum temperature for maintenance of quality, food safety and prevention of waste and economic losses. The cold chain is a well-known method for reducing food losses and food waste, and has long been promoted by established industry focused organizations such as The International Institute of Refrigeration, The World Food Logistics Organization and the Global Cold Chain Alliance. Policy makers in the agriculture logistics, maintenance, services, infrastructure,



education and management skills, and energy, education and food sectors must work together to promote the use of cold chain technology and funding of cold chains for reducing perishable food losses. The existing food distribution suffers from food losses due to lack of integrated cold-chains. In the absence of a cold storage and related cold chain facilities, the farmers are being forced to sell their produce immediately after harvest which results in glut situations and low price realization. Sometimes, the farmers do not even get their harvesting and transportation costs what to talk of the cost of production or profit. Establishment of modern supply chains for perishable food items, not only minimizes the food losses, but also empowers the farmers to reach across to more distant markets. Availability of cold storage facility to the farmer's removes the risk of distress sale to ensure better returns.

Cold stores form the heart of the cold chain. A cold storage is a temperature-controlled storage space and caters to industries such as agriculture, horticulture, fisheries and aquaculture, dairy and processed food. The highly fragmented cold storage market has 5,386 cold storage units with the total capacity of nearly 23.7 million MT, out of which, more than 56 per cent of the capacity is utilised only for potato storage, while the rest is used for other commodities. Fresh foods continue to metabolize and consume their nutrients throughout their shelf life, from harvest or slaughter through packing, distribution, marketing and sale. Carbohydrates, proteins and other nutrients are broken down into simpler compounds often resulting in reduced quality or quantity of the foods, through respiration, enzymatic breakdown and microbial degradation. All of these processes are highly dependent upon temperature. As the higher is temperature, the faster these natural degradation processes will occur, leading to loss of color, flavour, nutrients and texture changes. Cooling or cold chain facilities provide the following benefits for perishable horticultural and other foods:

- Reduces respiration: lessens perishability.
- Reduces transpiration: lessens water loss, less shriveling.
- Reduces ethylene production: slows ripening.
- Increases resistance to Ethylene action.

- Decreases activity of micro-organisms.
- Reduces browning and loss of texture, flavour and nutrients.
- Delays ripening and natural senescence.

Cold chain intrinsically serves as a marketing supply link for agricultural produce and hence directly impacts the sustainability of the producers/farmers. Global food losses have been documented 25 per cent to 50 per cent of total production volumes. The use of cold handling and storage systems as an investment to prevent perishable food losses is widely used and can be highly cost effective compared to continually increasing production to meet increasing demands for these foods. Cold chains are essential for extending the shelf life, period of marketing, avoiding over capacity, reducing transport bottlenecks during peak period or glut situation of production and maintenance of quality of the produce. The development of cold chain industry has played an important role in reducing the wastages of the perishable commodities and thus, providing remunerative prices to the farmers/growers. With the growth on the domestic manufacturing and retail segments, the demand for efficient warehouse management services has improved. Despite of the growing demand, warehousing continues to see little investment. Current spending on organized warehousing in India constitutes 9 per cent of total logistics spending, as against 25 per cent in the US. According to the World Bank's 2014 Logistics Performance Indicator, India is ranked 54th and is behind countries such as Japan, the United States, Germany and China. Logistics costs account for around 6-10 per cent of average

retail prices in India as against the global average of 4-5 per cent. Therefore, there is a clear scope to improve margins by 3-5 per cent by improving the efficiency of the supply chain. Development of an integrated supply chain, including cold chain can save up to 300 billion annually and at the same time, reduce the wastage of perishable horticulture produce which directly benefit the farmers as well as consumers.

It is worth noting that the price of vegetables, fruits, milks and eggs, meat and fish have been rising faster in spite of the fact that India is the second highest producer of fruits and vegetables. This is led by inadequate supply chain and logistics infrastructure and management. Though, the use of cold technologies in the development of agricultural supply chains for meat, dairy, fish and horticultural products provide benefits to the farmers/producers as well as consumers. The USA and EU countries began the use of cold technologies in early 1950s along with the growth of the mechanical refrigeration industry, but cold chains are still limited in most of the developing countries like India.

The UN FAO recently launched the 'Save Food' Initiative which includes many partner organizations working on various means for reducing food losses and waste. Integrated cold-chain, enables the farmer groups proactively connect to various demand centres and take advantage of the recently launched National Agriculture Market. This empowering aspect of cold-chain, allows for a greater geographical spread of markets by countering produce perishability, and is key to gainful and improved value realization for farmers.



Increasing post-harvest losses have forced the development of cold storages and cold chains to enable the storage of agricultural produce almost throughout the year. Presently, the concepts of cold chains, container freight stations (CFS) and inland container depots (ICD) have been gaining importance. The growing international trade and manufacturing activity has led to growing container trade for easy maintenance of the produce. These depots equipped with warehousing space, adequate handling equipment and IT infrastructure. A well developed cold chain provides following benefits:

- Reducing post harvest losses.
- Generate additional income for the farmers.
- Shifting the farmers to more market driven and profitable farming activities.
- Improving quality and hygiene of food products.
- Reducing supply chain costs.
- Reduce wastage of perishables, add value to the agricultural produce and create huge employment opportunities especially in rural areas.
- This will also help in stabilizing prices of food products and contain inflation in the country.

Conclusion:

Integrated cold storage warehousing has a huge potential in India. The cold storage system, when supplemented with temperature-controlled transportation connecting farm-level storage facilities, processing units and distribution outlets will not only improve efficiency, but will also solve the problem of wastage of agricultural products. The cold chains market is dominated by private companies despite the presence of state-owned companies. The government has provided various incentives in tax and duties to encourage cold chain in the country. In addition, cold chain and container-handling facilities should also need to be augmented near to the area of production which benefits the producers. To develop a world-class cold chain infrastructure, government and industry bodies need to work in collaboration to encourage the adoption of better and more efficient refrigeration technologies that can prolong the shelf life of food products and bring commensurate economic returns to the farmers in order to improve their economic benefits and ultimately their incomes.

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Centre approves construction of 10 Million MT capacity Silos by the end of year 2019-20

Government has approved an action plan of FCI for construction of steel silos of capacity 10 Million MT by FCI as well as State Governments in Public Private Partnership (PPP) mode in a phase-wise manner (3 phases) by the end of year 2019-20.

Food Corporation of India (FCI) has awarded contracts for creation of 1.6 Million MT silos and State Governments have completed/awarded contracts for 2.15 Million MT silos. Thus, contracts for silos of 3.75 Million MT have been awarded.

The Silos are being constructed through Private Sector participation in Public Private Partnership (PPP) mode. FCI will be benefited as it will not incur any capital investment for any of the projects. The responsibility of designing, building, financing and operating the silos will be of private parties. Further, there will be benefits from creation of silos as it is a safer and modern means of storage. Food grains can be stored for a longer period, with reduced losses and less handling and labour costs. FCI handles about 60 Million MT of wheat and rice annually.



Silo Bags

Pradhan Mantri Krishi Sinchayee Yojana

- 'Pradhan Mantri Krishi Sinchayee Yojana' scheme launched with the vision to extend coverage of irrigation under 'Har Khet ko Pani' and improving water use efficiency 'More crop per drop' in a focused manner with end to end solution on source creation, distribution, management, field application and extension activities.
- Formulated by integrating ongoing schemes viz. Accelerated Irrigation Benefit Programme (AIBP) of the Ministry of Water Resources, River Development & Ganga Rejuvenation (MoWR, RD&GR), Integrated Watershed Management Programme (IWMP) of Department of Land Resources (DoLR) and the On Farm Water Management (OFWM) of Department of Agriculture and Cooperation (DAC).
- The scheme will be implemented by Ministries of Agriculture, Water Resources and Rural Development.
- Ministry of Rural Development is to mainly undertake rain water conservation, construction of farm pond, water harvesting structures, small check dams and contour bunding etc.
- MoWR, RD & GR, is to undertake various measures for creation of assured irrigation source, construction of diversion canals, field channels, water diversion/lift irrigation, including development of water distribution systems.
- Ministry of Agriculture will promote efficient water conveyance and precision water application devices like drips, sprinklers, pivots, rain-guns in the farm "(Jal Sinchan)", construction of micro-irrigation structures to supplement source creation activities, extension activities for promotion of scientific moisture conservation and agronomic measures
- PMKSY to adopt a 'decentralized State level planning and projectised execution' structure to allow States to draw up their own irrigation development plans based on District Irrigation Plan (DIP) and State Irrigation Plan (SIP).
- A National Executive Committee (NEC) will be constituted under the Chairmanship of Vice Chairman, NITI Aayog to oversee programme implementation, allocation of resources, inter ministerial coordination, monitoring & performance assessment, addressing administrative issues etc.
- A National Executive Committee (NEC), NITI Aayog to oversee programme implementation, allocation of resources, inter ministerial coordination, monitoring & performance assessment, addressing administrative issues etc.
- An outlay of Rs. 50,000 crore approved for implementation across the country in five years.
- For 2015-16, an outlay of Rs.5300 crore has been made which includes Rs. 1800 crore for DAC; Rs. 1500 crore for DoLR; Rs. 2000 crore for MoWR (Rs. 1000 crore for AIBP; Rs. 1000 crores for PMKSY).
- Water security and its management to be given high priority by the Government
- Long pending irrigation projects to be completed on priority.



- Need for considering linking of rivers, where feasible, to ensure optimal use of water resources to prevent the recurrence of flood and drought.
- Rain water to be harnessed through 'Jal Sanchay' and 'Jal Sinchan', to nurture water conservation and ground water recharge.
- Micro irrigation will be popularized to ensure 'Per drop-More crop' “.

Watershed Development: Neeranchal National Watershed Project:

- Loan agreement signed with World Bank and the Government of India for Neeranchal National Watershed Project.
- The project to be implemented by the Ministry of Rural Development over a six-year period (2016-21)
- To support the Pradhan Mantri Krishi Sinchayi Yojana in hydrology and water management, agricultural production systems, capacity building and monitoring and evaluation.
- The Neeranchal project has total budget outlay of Rs.2142 crore with the Government share of Rs.1071 crore and the rest 50 per cent by the World Bank.
- All 28 states implementing the watershed projects will benefit from Neeranchal.
- 12 per cent of the area of wasteland to be targeted through this project to make about 336 lakh hectares of land arable.
- Scheme expected to strengthen the economic conditions of the farming community if implemented properly.

Per Drop More Crop :

- Under “Per Drop More Crop,” Drip and sprinkler irrigation systems are promoted
- 15 per cent additional assistance is provided to small and marginal farmers for installation of micro irrigation systems compared to other farmers for area covered under Drought Prone Area Programme (DPAP), Desert Development Programme (DDP) and North Eastern and Himalayan States and 10 per cent for other areas.
- During 2013-14 to 2015-16, 14.3 lakh hectare area covered under drip and sprinkler irrigation systems (Drip Irrigation- 9.04 lakh hectare, Sprinkler Irrigation- 5.26 lakh hectare including Punjab and Haryana.

Micro Irrigation:

- It is a Centrally Sponsored Scheme launched by the Department of Agriculture & Cooperation, Ministry of Agriculture in January, 2006 as Centrally Sponsored Scheme on Micro Irrigation (CSS). In June, 2010, it was up-scaled to National Mission on Micro Irrigation (NMMI), which continued till the year 2013-14.
- From April 2015, subsumed under subsumed under Pradhan Mantri Krishi Sinchayee Yojana.
- Objective is to enhance water use efficiency in the agriculture sector.
- Promotes drip & sprinkler irrigation technologies
- Encourages the farmers to use water saving and conservation technologies.

WOMEN IN AGRICULTURE: MARCHING TOWARDS SUCCESS

Dr Nandini Sahay

The aim of SDG goals is to undertake reforms so that women gain equal rights to economic resources. They also deserve equal access to ownership and control over land, financial services, and natural resources. The Government of India is committed to achieve these goals for which women will have to be fully recognized as farmers in the agriculture and allied sectors and related value chain. Women must be helped by statute to secure their right over resources and their entitlements over agricultural services. We owe to them adequate social protection cover to ensure that they are empowered and they become equal partners in development of nation and its citizens.

Agriculture is the backbone of Indian economy. It defines the traditions of the family, relationships in society and gender roles in the country. With the advent of 21st century, there is a gradual realisation of the significant role of women in agricultural development.

Women Farmers in India:

Women play a central role in all agricultural activities from planting-to-harvesting-to-post-harvest operations. As per Census 2011, nearly 98 million Indian women have agricultural jobs, but around 63 per cent of them (61.6 million) are dependent on the farm of others¹ as agricultural labourer. Women's participation rate in the agricultural sectors is about 44 per cent. It is 47 per cent in cotton cultivation, 47 per cent in tea plantations, 45 per cent in growing oil seeds and 39 per cent in vegetable production². These crops require intensive work of unskilled nature. Women also participate in ancillary agricultural activities. According to the Food and Agriculture Organization, Indian women's contribution has a share of 22 per cent in fisheries sector. Women's work starts from basic level of farm related activities to unskilled jobs like sowing, transplantation, weeding, harvesting and post harvesting activities like winnowing, processing, storage etc. Women's

¹ Press Information Bureau, Government of India, Ministry of Agriculture, <http://pib.nic.in/newsite/PrintRelease.aspx?relid=148196>

² Singh, Roopam; Sengupta, Ranja (2009). "EU FTA and the Likely Impact on Indian Women Executive Summary." Centre for Trade and Development and Heinrich Boell Foundation.

role in the domain of agriculture is multidimensional, such as unpaid subsistence labourers, farmers, co-farmers, managers and entrepreneurs. They are also involved in allied sectors like food security, horticulture, livestock production, sericulture and collection of non-timber forest produce. As regards the domestic activities, it includes cooking, water collection, fuel wood gathering, household upkeep and child rearing. Even allied activities like cattle management, fodder collection, milk and poultry farming awaits them. Despite their substantial contribution, the women have to face disparities in terms of compensation, share in property and in local representation that affects their family in terms of poor health of children and low educational attainments

Challenges for Women in Agricultural Sector:

There has been a major change in the cropping pattern in recent times. With the introduction of new modes of agriculture such



as export crops, floriculture and horticulture, rural women feel out of the place. With diversion of agricultural and non-agricultural activities, uneducated women fail to match the need of the hour which costs their livelihood.

Diversifications in the agriculture sector to meet the problem of overpopulation, has led to a decline in crop production and in per capita availability of food. This crisis in family is often balanced by women leading to nutritional and health problems. The decline in calorie consumption has also widened the gender gap in malnutrition.

Even though belonging to an agrarian country, the Indian farmers bear the high input cost of agricultural production and therefore, often run into debt trap. This coupled with factors like decreased yield due to inadequate rainfall, low produce price and absence of suitable counselling services, sometimes drive the farmers to suicide leaving their wives in debt.

Critical natural resources like land, water and crops are not equally available to women. Women hardly enjoy property ownership rights. In the process, they are deprived of decision making in important matters like purchase, mortgage, sale of land, cropping patterns and household affairs.

Due to ignorance of women's immense contribution in India's agriculture, they get overlooked in the research and study. It is necessary to recognise their role and contribution in the agriculture, so that there could be proper recognition of their efforts in research done by various institutes of the country. A positive lead



has been taken by the Government of India through its recent announcement that more women scientists should be employed in the agricultural research institutes. Agricultural research should be made more female oriented to lessen the wide gap of gender discrimination.

To empower women farmers, the government has formulated "The National Policy on Farmers". This policy recognises women's role in agriculture and gives importance to gender issues in agriculture. Department of Agriculture, Cooperation & Farmers Welfare, Ministry of Agriculture & Farmers Welfare is incorporating 'pro-women initiatives' in all its Schemes / Programmes / Missions and is earmarking at least 30 per cent of resources for women under all such programmes.

Other programmes and policies introduced to empower farm women are:

- **National Horticulture Mission:** This mission recommends organising women in Self Help Groups and assisting them with farm inputs and technological & extension support to make them self-reliant.
- **Rural Go-down Scheme:** The aim of this scheme is to provide assistance in the form of subsidy to women farmers to promote grading, standardization and quality control of agricultural produce to improve their marketability.
- **National Mission on Agriculture Extension & Technology (NMAET):** The aim of the mission is to set up kitchen garden, and to promote farm activities such as piggery, goat-rearing, bee keeping for Women Food Security Groups. Mandatory representation of women farmers in state, districts, and Block Farmers Advisory Committee is also an objective of the Mission.
- **Agri-Clinics and Agri-Business Centres (ACABC):** Under this scheme, 44 per cent composite subsidy is provided towards the cost of project to women, as compared to 36 per cent to men. Also, one day is specially allocated to cover areas of core competence for women farmers in programmes of *Akashvani* and *Doordarshan*.

- **Mission for Integrated Development of Horticulture (MIDH):** Assistance is provided for agriculture mechanization, procurement of agricultural machinery and equipment on subsidy.
- **National Mission on Oil seeds and Oil Palm (NMOOP):** The aim is to support women group SHGs/FIG/Co-operative, who would be involved by the state in distribution of certified seeds.
- **Integrated Scheme for Agricultural Marketing (ISAM):** Under this scheme, 33.33 per cent subsidy (on capital cost) is provided to women as compared to 25 per cent to men.
- **National Food Security Mission (NFSM):** There is a provision in this scheme to provide marketing support for value chain integration to SHGs of women, for local marketing of pulses and millets.
- **National Mission for Sustainable Agriculture (NMSA):** Under this scheme, 50 per cent of the fund is to be utilised for assistance to small and marginal farmers, of which, at least 30 per cent should be women farmers.
- **Sub Mission on Agriculture Mechanization (SMAM):** Training programmes are conducted under this programme on use of gender friendly equipment, by women farmers.
- **Agricultural Insurance:** This scheme ensures maximum coverage of SC/ST/women farmers with budget allocation and utilisation in proportion to their population in the respective states.
- **Central Institute for Women in Agriculture (ICAR-CIWA):** This institute tests the suitability of different technologies in agriculture sector, suited to women. It focuses on participatory action research. For empowering women farmers, the institute implements various projects to assist women in integrated agriculture, horticulture and fishery projects. The institute also works towards designing women friendly tools and implements.
- **Mahila Kisan Sashaktikaran Pariyojna (MKSP):** The purpose of this scheme is



empowerment of women working in agriculture sector. The scheme strives to increase participation and productivity of women in agriculture. It also explores the new market demands and helps in identification of new areas for women to work.

New initiatives announced by Central Government³:

- 30 per cent of the allocated fund would be invested on women farmers to empower them.
- October 15th to be observed as “Female Farmers Day” to recognize their contribution.
- Setting up more women cooperatives.
- Training women cooperatives to manage funds and to run their cooperative in a professional way.
- Mandatory deployment of one female scientist in each of 668 Krishi Vigyan Kendras (farm science centres).

There have been many achievements in recent times in enhancing the status of women farmers. Despite these programmes and policies, women farmers still face hardships. Our patriarchal society regards men as farmers, overlooking the gift of their mother, sisters and wife. At all the stages of agricultural production, work is taken from the women as help in household.

³ <http://economictimes.indiatimes.com/news/economy/agriculture/spend-30-of-agri-fund-on-women-farmers-centre-to-states/articleshow/57540247.cms>



Way Forward:

The government schemes in the last few decades have done a lot in improving the status of women. It is helping women to get ownership and control over natural resources, in credit schemes and in income generating activities. However, closer monitoring of the schemes is required to ensure the rightful position of women in the field of agriculture. More facilities should be provided to women working in various sectors of agriculture and allied activities to transform their traditional skill into ethical and sustainable products, which could appeal to the conscious consumers. These include handicrafts, art-works and production of eatables. Women friendly tools and equipments such as improved sickle, direct paddy-seeder, fruit harvester, grain cleaner, fertilizer broadcaster etc., should be provided to them. Equal and adequate opportunities in irrigation, credit, insurance, technology extension, information and training will improve the situation of women farmers. Separate markets for women would also help them.

Proper implementation of laws like Recognition of Forest Rights Act, 2007, the Food Safety Act and the Bio-diversity Act, will increase awareness and improve the general status of women farmers. Programmes training women in various sub sectors of agriculture should be introduced for women farmers. Women collectives like self-help groups need encouragement for sustainable agriculture practices.

By registration of migrant domestic workers under the Unorganized Sector Social Security Act

2008, the interest of migrating tribal women will be protected. Sufficient representation of women in government land redistribution schemes should be ensured. New land purchase and land lease schemes should be evolved to enable women to own and control land through issue of individual or joint land holding certificates. Government has done a lot of work in this area in some states.

Wives of the farmers ending their lives, inherit the burden of their husband's debt and are compelled to work as bonded labour to clear the debt. The government response and relief packages are very effective in this direction. However, loan waiver and credit mostly benefits the banks and the money lenders. Such unfortunate women should be compensated by taxing the rich farmers and the business houses owning & managing agricultural farming.

Conclusion:

For sustainable agricultural development, gender equity is a must. The objective of SDG goals⁴ (2.3 and 5a) is to double the productivity and income of small scale farmers, in particular women, by providing equal access to land, inputs, knowledge, financial support, markets and opportunities. Also, the aim of SDG goals is to undertake reforms so that women gain equal rights to economic resources. They also deserve equal access to ownership and control over land, financial services, and natural resources. The Government of India is committed to achieve these goals for which women will have to be fully recognized as farmers in the agriculture and allied sectors and related value chain. Women must be helped by statute to secure their right over resources and their entitlements over agricultural services. We owe to them adequate social protection cover to ensure that they are empowered and they become equal partners in development of nation and its citizens.

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⁴ *Transforming our world: the 2030 Agenda for Sustainable Development, October 2015, United Nations A/RES/70/1 General Assembly*, <https://sustainabledevelopment.un.org/post2015/transformingourworld>



SWACHHTA SOLDIERS

INDIVIDUALS HELP CHANGE THE SANITATION STORY OF GANGA BORDERING VILLAGES

When the Swachh Bharat Mission- Gramin (SBM-G) campaign was started in the villages located along the banks of River Ganga in the District of Khagaria in Bihar, several individuals took a bold stand to convince people that they interacted with on a daily basis. Their courageous stand, together with activities of the district administration successfully made the villages open defecation free (ODF).

Take the example of tea vendor Anil Saha who operated from the Rampur Gram Panchayat (GP) in Gogri Block. He put up a board outside his stall that said, 'People defecating in the open can not have tea in my stall. "The tea vendor was actually compromising his daily earning for the sake of making his village ODF," said CEO, Zila Panchayat. His act was definitely an inspiration for others in the village.

"There were many such seemingly insignificant incidents that helped take forward the campaign,". As per the baseline survey, these villages along the Ganga comprising of 31,397 households had no more than 7604 toilets, the toilet coverage a mere 24.21 per cent. However, as the campaign progressed, as many as 23,793 toilets were built in the 23 villages and 21 GPs located along the Ganga to make them ODF. Implementation of the campaign began with a survey to identify homes without toilets at panchayat and ward level and an ODF plan was prepared with approval of the Gram Sabha.

As far as the challenges were concerned, changing the mindset of the communities that were used to defecating in the open was, by far, the biggest challenge. In addition, for the down trodden or BPL (below poverty line) families, generating resources – both financial and material for construction of toilets, and availability of land were other obstacles.

In this regard, the District Administration conveyed their message in an affectionate and peaceful manner and Community Led Total Sanitation (CLTS), which got the community involved and ready for construction, even as they bid goodbye to the practice of open defecation.

During the awareness programmes, considerable focus was given to crimes committed against women who went out to defecate in the open, and the adverse effects open defecation had on health of children and all people – young and old. "This led to a gradual behavior change as it inspired people to construct toilets and use them. Further, the most economically backward families were identified and provided loan by adding them to the Jeevika Group. Astonishingly, public representatives, using their own credit helped such families to secure the required material from the suppliers for toilet construction. As for families that had no land for toilets, they were provided space while a few were persuaded to build toilets within the available area.

The District Administration also nominated nodal officers for evaluation and monitoring of work at GP, block and district level. Also, to ensure that each GP achieved ODF status, 4 trained CLTS motivators, an expert motivator and block coordinators were deputed. IEC materials used in the process were pamphlets, videos, wall writing and painting, hoardings. To boost community morale, 'Toilet Completion Certificates' were awarded to households having toilets.

Rashtriya Swachhata Kendra to come up at Rajghat

“Rashtriya Swachhata Kendra” will be set up by “Swachh Bharat Mission” Ministry of Drinking Water and Sanitation at Gandhi Smriti and Darshan Samiti (GSDS), Rajghat by “Swachh Bharat Mission” Ministry of Drinking Water and Sanitation under the vision of Prime Minister during the centenary year of Champaran Satyagraha, and the Ministry of Culture is considering to provide space for the purpose. This was announced by Dr. Mahesh Sharma, Minister of State (I/C) for Culture and Tourism while addressing media persons on the culmination of “Swachhata Pakhwada” of Ministry of Culture. Also present were Shri Narendra Singh Tomar, Minister for Rural Development, Pachayati Raj and Drinking Water & Sanitation.

Ministry of Culture dedicated a total of 275 effort hours for cleanliness and awareness during Swachhata Pakhwada. A total of 82 activities/events were organised by the Ministry and its organizations during the Swachhata Pakhwada. To create awareness on “Swachhata”, Ministry of Culture has developed “e-guide (Audio-Visual) App e3.eguide.net.in” to create awareness for the tourists visiting National Museum.

The Minister for Rural Development said that Swachh Bharat Mission (SBM) is not only the top priority of the Government, but it has also become a national mission for the people of India and positive results are pouring in from every nook and corner of the country. He said that since the launch of SBM on 2nd October, 2014, till date, more than 4 crore individual household latrines have been built and one lakh, 94,000 villages and 135 districts have become Open Defecation Free, ODF. Apart from Sikkim, Kerala and Himachal Pradesh which are ODF States, 6 to 7 more States will soon declare them ODF as the work is going on a rapid scale. The total budget for Swachh Bharat Mission is now Rs 19,300 crore with a Central share of Rs 14,000 crore, and Rs 5,300 crore is the budgetary provision declared by all government departments as they had been asked to make a special mention of Swachh Bharat Abhiyan in their budget proposals, besides finalising their ‘Swachhata Action Plan’.



The Union Minister for Rural Development, Panchayati Raj, Drinking Water and Sanitation, Shri Narendra Singh Tomar and the Minister of State for Culture and Tourism (Independent Charge), Dr. Mahesh Sharma at the Joint Press Conference on the culmination of ‘Swachhata Pakhwada’ of the Ministry of Culture and Tourism, in New Delhi on May 03, 2017.

Training of young professionals to work on Swachh Bharat

During his “Mann Ki Baat” address on September 25th, 2016, the Prime Minister had made an appeal to the corporate world, to sponsor young professionals who would support district administrations across the country in the implementation of Swachh Bharat Mission. Responding to the Prime Minister’s appeal, the Tata Trusts, one of the country’s leading philanthropic organizations, in collaboration with the Ministry of Drinking Water and Sanitation had offered to provide 600 Zila Swachh Bharat Preraks (ZSBPs), one in each district of the country, for a period of one year. The initiative was announced on December 15th, 2016, by the Union Minister, Ministry of Drinking Water and Sanitation.

ZSBP initiative is expected to be a game changer in achieving the goals of Swachh Bharat Mission in rural India. It will empower the District Collector/CEO to be able to drive the Mission with more vigor and speed. Zilapreraks will lead the way to a Swachh Bharat by 2019, and to contribute their bit to help realize the vision of the Hon’ble Prime Minister. The first batch of zilapreraks being trained had a strong representation of women. The rigorous 3-day training programme that the zilapreraks will undergo includes special modules on Swachh Bharat Mission Guidelines, fund flow in SBM, MIS-based monitoring of SBM progress, Centre-State coordination, Technical Training in Sanitation, leadership and management training modules. The remaining zilapreraks will be brought on board over the course of the next 8 weeks.

MINISTRY OF TOURISM OBSERVES SWACHHTA PAKHWADA

The Ministry of Tourism had undertaken *Swachhta Pakhwada* from 16th-30th April, 2017, to synchronize with the World Heritage Day celebrations by the Ministry of Culture, as per the consolidated guidelines issued by the Ministry of Drinking Water and Sanitation. The Ministry is striving to take all actions making a Swachh Bharat, in respect of all the tourist destinations in the country and realise Mahatma Gandhi Ji's dream of a clean India by his sesquicentennial (150th year) birth anniversary celebrations in 2019. During this Pakhwada period, an intensive cleaning operation was undertaken In-house in Transport Bhawan and C-1, Hutments by all the staff members, which yielded good results. Below are the major initiatives undertaken by the Ministry under this pakhwada:

The Ministry of Tourism, with the aim and objectives of promoting places of attraction, has adopted the motto "Incredible India" and considers the visitors as guests and regards them as "*Atithi devo Bhava*" and works towards the maintenance of cleanliness in the tourist destinations through various schemes/programmes, such as Campaign Clean India, undertaking awareness campaigns, Swachhta Runs, conferring National Awards etc. One such programme is the observance of a campaign on cleanliness and undertaking a fortnightly intensive cleanliness drive called "*Swachhta Pakhwada*".

Ministry of Tourism has joined the celebrations of World Heritage Day by the ASI at the historic Humayun's Tomb, a world heritage monument in Delhi. An intensive cleanliness drive was undertaken jointly by the officials of MoT and ASI yielded good results and made the monument, its approach, its garden area, its drinking water units and toilet area neat and clean and kept the monument in a presentable condition. As a tribute to the Father of the Nation, who dreamt of a clean India, the MoT officials have undertaken an intensive cleanliness activity at the Martyrdom Place in Tees January Marg, New Delhi.

The consolidated guidelines received from MoDW&S were sent to all State and UTs Govts., requesting them to undertake a fortnightly intensive campaign on cleanliness at the tourist destinations in their State and UTs, during the same period.

Ministry of Tourism in collaboration with the PSUs is implementing Swachhta activities at tourist destinations under the CSR scheme. A review meeting of the status of the Corporate Social Responsibility initiatives by the Public Sector Undertakings (PSU) at the Archaeological monuments already adopted by them and further adoption of more number of monuments by the PSUs was held under the chairmanship of Secretary (Tourism), in which, the progress achieved by various PSUs was reviewed and modalities worked out for adoption of more number of Adarsh monuments and the other ASI monuments, which are in dire need of priority action on cleanliness, based on the study conducted by the Ministry.

The cleanliness work by Ministry of Tourism was also undertaken at Feroz Shah Kotla place, New Delhi. As per schedule, Cleaning of Feroz shah Kotla place, officers and staff from Ministry of Tourism involved in intensive cleaning work in and around the monument area near Ashoka pillar etc, which resulted in achieving the desired level of cleanliness. A team from Ministry of I&B's Song & Drama Division, also created cleanliness awareness among general public's and tourists in the form of "Nukkad Natak".



YOGA: NOT JUST FOR HEALTH BUT FOR HAPPINESS!

Dr. Dharmendra Sharma

Modern scientific experiments have proven that practicing yoga on a regular basis stimulate different parts of the brain, improve neuro-endocrine coordination and muscle control, decreases neurotransmitter responsible for anxiety and depression, improves lung function, and facilitate digestion etc. A healthy body and mind resulting from the practices of yoga is just one aspect of seamless benefits of yoga. The physical and mental benefits of practicing yoga have been the reason for its resurgence in India and its tremendous popularity in western countries.

What is Yoga? There are many definitions of Yoga. Different preachers and practitioners of yoga have defined it as per their own understanding. But a common thread in each of these definitions is that yoga is a method of bonding with oneself and our surroundings, it is a way of inner engineering. The Sanskrit word “yoga” comes from the word “*yuj*” which means, “to unite.” Hence, yoga is the union of the individual with the whole of existence, which is more commonly referred to as ‘self-realization’, ‘*nirvana*’, ‘*mukti*’, or ‘enlightenment’. The modern day yoga has evolved over thousands of years of practice by *sadhus* and *yogis*. Around 200 BC, ancient Indian sage ‘Patanjali’ consolidated practices of yoga into *Yoga Sutras*. As per *yoga sutra*, there are eight components of yoga: ethical behavior, self-discipline, body postures, breathing regulation, sensory withdrawal, and three progressively deeper meditative practices meant to cultivate union with one’s spiritual essence. Modern scientific experiments have proven that practicing yoga on a regular basis stimulate different parts of the brain, improve neuro-endocrine coordination and muscle control, decreases neurotransmitter responsible for anxiety and depression, improves lung function, and facilitate digestion etc. A healthy body and mind resulting from the practices of yoga is just one aspect of seamless benefits of yoga. The physical and mental benefits of practicing yoga have been the reason for its resurgence in India and its tremendous popularity in

western countries. The best thing about yoga is that its benefits are not limited to any single age group or social class, but it has something for every individual from all walks of life viz. rural-urban, rich-poor, children-elderly, pregnant, non-pregnant women etc.

Rural Health and the Need for Awareness about Yoga: Recently conducted National Family Health Survey (NFHS) and National Mental Health Survey has concluded that rural population is also passing through the epidemiological transition. It means that burden of non-communicable (lifestyle and psychological) diseases have significantly increased in rural population too. Because of the ongoing epidemiological transition, yoga has a larger role to play in shaping the health of rural Indians. In addition to mental illness, the psychological stress associated with financial burden among farmers and their families has also grown tremendously during last three decades. A person with different psychiatric disorders like suicidal thoughts, severe depression, anxiety, and



post-traumatic stress disorder can benefit from the regular practice of yoga. There should be no doubt about the fact that practicing yoga alone will alleviate all the psychological stress among farmers and their families, but it can definitely complement other efforts like financial support, teaching about better farming technique etc. to support families cope with the situation.

Yoga and Rising Burden of Non-Communicable Diseases: As per NFHS-4, the proportion of men and women with high level of blood sugar in rural India was 7.4 per cent and 5.2 4 per cent respectively. As per the same survey, the proportion of men and women having high blood pressure was 9.84 per cent and 6.54 per cent respectively. These findings prove that considerable proportion of rural population is at risk of developing diabetes and hypertension. According to the scientific evidence, most non-communicable diseases have a common set of risk factors associated with individual's lifestyle viz. low physical activities, inappropriate diet, obesity, tobacco consumption, stress anxiety, disturbance of appetite, disturbance of sleep etc. Since hypertension, diabetes, and many other non-communicable diseases are not curable, but can only be controlled with medications, complementary and alternative medicine including yoga have started receiving the favor of patients of these diseases. While conventional exercise, stress management, and diet can effectively improve symptoms of a range of non-communicable diseases, but not all patients with lifestyle diseases are motivated enough to adopt these changes in their daily life. Yoga does not require any costly equipment, large space, complicated technique, and strict diet, also because of its perceived wellness character, relative ease of performance, and strong reliance on relaxation, yoga is becoming a favourite choice among people who find rigid conventional diet-exercise lifestyle interventions difficult to adopt.

In contrast to medicines which can only be used by patients, practicing yoga is appropriate for patient and individual who have a high risk of developing the non-communicable disease(s). This is because yoga has been shown to improve physical fitness and reduce central obesity,



psychological stress, blood pressure & other markers of non-communicable diseases in healthy participants as well as in patients. Nowadays, yoga is even advised for cancer survivors, it has been proven that practicing yoga helps in coping with the adverse effects associated with cancer treatment (radiotherapy and chemotherapy). Researchers have found that yoga is effective in improving the quality of life, reducing fatigue, sleep disturbances, reducing depression, and anxiety among men and women undergoing cancer treatment. Although yoga is not a proven stand-alone curative treatment for any given medical condition, but its role as an effective adjunct supportive therapy is beyond doubt.

Yoga and Mental Health: Several scientific experiments have proved that practicing yoga has a positive impact on brain function. Studies have proven that regular practice of yoga activates certain 'areas' of the brain associated with a feeling of happiness. Also, practicing yoga increases certain brain waves (alpha and theta) associated with unconscious memory, dreams, feeling of relaxation, and positive emotions. These experiments hint that the brain is in a relaxed state after a session of yoga and that participants have a better awareness of their subconscious and emotions. This and other mechanisms are responsible for the anti-depressant effects of yoga practices. Moreover, the decision to learn yoga facilitates behavioral changes which disrupt depressive routines and lead to increased well being, thereby mediating additional adaptive behavioral change with further mood benefit. Mental stress makes individual age at a rapid rate and decreases work efficiency, thus many multinational companies now have compulsory yoga sessions for their employees.

Obesity Epidemic and Yoga: As per NFHS-4, about 15.04 per cent of all men and women in rural areas were overweight. Obesity is an independent risk factor for a range of non-communicable diseases including hypertension, diabetes, and osteoarthritis. Many studies have validated the effectiveness of yoga in creating a positive outlook, enhancing well being and reducing depression among obese individuals. Yoga also helps in coping with dietary restrictions in obese individuals. Practicing yoga is associated with desired eating behaviors, like a reduction in dietary fat intake and increments in that of fresh vegetables, whole grains, and soy-based products, which in turn helps in controlling weight and reducing the risk of cardiovascular diseases among obese individuals.

Yoga and Senior Citizens: Although, at present, India is a young nation but the population projections indicate that proportion of individual greater than sixty years of age is rapidly increasing in India. For an individual in geriatrics age group, yoga can help in coping with the physical and mental changes accompanied by aging. The regular practice of yoga confers benefit in osteoarthritis, memory loss, weakening muscles, depression, fatigue and other disorders. In addition practice of yoga by the senior member of the family can motivate other members especially children to adopt this healthy practice.

Yoga as a Lifelong Companion for Children: Yoga has so much to offer to a young child. Yoga teaches self-discipline, increases concentration and creates a positive outlook towards life. Given its ability to reduce stress and fatigue, yoga can contribute immensely for handling the stress, depression, anxiety associated with studies and competitive exams. Many studies have shown that yoga influence visual and cognitive skills in children. Children who practice yoga regularly have improved verbal and spatial memory and better visual perception and executive functions. Schools located in rural areas of the country can become the epicenter for perpetuating wave of yoga in corners of the country. Yoga should be included among sports-related activities of school. This will facilitate yoga in becoming an integral part of child's life at an early age. In this way, yoga will transform from a simple exercise taught



at school to a lifelong habit for many. In schools, separate sessions can be arranged for individuals in different age group.

Till now, we have discussed the benefits of practicing yoga in various diseases, but it must not be forgotten that even healthy persons (and they should) practice yoga and will still achieve same benefits. This is one feature which differentiates yoga from therapeutics drugs, vitamin & minerals capsule, physiotherapy and other complementary medicines. Yoga is more than a treatment modality. Rather, it is a healthy habit which should be adopted and practiced by each and every one of us.

Why Yoga?: Yoga does not depend on any equipment other than a simple mat. Thus, it can also be practiced by all sections of the society. Secondly, yoga does not require considerable mental inputs in terms of counting calories and remembering complex diet. Thus, it can be practiced by less educated person of society. Yoga has literally no limitations; there isn't any age or gender group, any disease, or any other condition which prevent an individual from practicing yoga. Even person with physical and mental disabilities can practice one or other kind of yoga. Lastly, India being the place of origin of yoga, has higher acceptability in all sections of society as compared to other methods. In conclusion, yoga should be promoted and adopted for achieving only health but to achieve inner happiness.

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Deen Dayal Upadhyaya Antyodaya Yojana

Deen Dayal Upadhyaya Antyodaya Yojana is an overarching scheme to uplift the urban poor folks by enhancing their sustainable livelihood opportunities through skill development. It was launched under the Ministry of Housing and Urban Poverty Alleviation (HUPA).. The scheme is an integration of the National Urban Livelihoods Mission (NULM) and National Rural Livelihoods Mission (NRLM). National Urban Livelihoods Mission (NULM) is renamed as Deen Dayal Antyodaya Yojana-(DAY-NULM) and in Hindi as - Rashtriya Shahri Aajeevika Mission. Under the scheme, urban areas extends the coverage to all the 4041 statutory cities and towns, there by covering almost the entire urban population. Government of India has provisioned Rs.500 crore for the scheme. The main highlights of the scheme are:

- **Employment through Skill Training and Placement :** An expenditure of Rs.15, 000 per person is allowed on training of urban poor which is Rs.18, 000 in North-East and J&K. Moreover, Training urban poor to meet the enormous demand from urban citizens by imparting market-oriented skills through City Livelihood Centers.
- **Social Mobilization and Institution Development:** It will be done through formation of Self-Help Groups (SHG) for training members and hand holding, an initial support of 10, 000 is given for each group. Assistance of Rs.50, 000 is provided to Registered Area Level Federations.
- **Subsidy to Urban Poor:** An interest subsidy of 5per cent to 7 per cent for setting up individual micro-enterprises with a loan of up to 2 lakh and for group enterprises with a loan limit of up to Rs.10 lakhs.
- **Shelters for urban homeless :** Cost of construction of shelters for urban homeless is fully funded under the Scheme.
- **Other means :** Development of vendor markets and also the promotion of skills for the vendors through setting up infrastructure and special projects for the rag picker and differently abled etc.

Success Story :

Tangirala Padmavati, Andhra Pradesh:

Tangirala Padmavati, aged 55 years, is one of 12 children who was born in a poor family. She was one of eight boys and four girls. Because of family's poverty, Tangirala remained deprived of education and other necessities. It was with great difficulty that she managed to attend school until class 6. At age 12, Tangirala found herself married to a 28 year old man. Soon after, she had two daughters. Upon the birth of girl children, her husband distanced himself from her and began forming alliances with other women. To survive, Padmavati went from house to house, selling vegetables. Thoughts of suicide came to her mind, but for the sake of her two daughters, she kept brushing them aside.

Joining SHG :

It was around this time that self-help groups were formed in her village. She joined one of the SHGs in 1990 and attended their trainings. The camps gave her a lot of strength. Interaction with fellow-women taught her what life meant and how she wasn't the sole person with problems. She build camaraderie with fellow women and took inspiration from their struggles and stories. As a group leader, she ensured that that every woman in the village was literate enough to write her name. She shared with them why it was important to save and gave them tips to gain better financial as well as physical health.

Social and Civil Rights:

Tangirala used her leadership position to undertake a range of activities: She motivated women to contribute their share for **construction of toilets** for which her SHG received money under a low-cost sanitation programme. She worked with the group to **secure housing for 300 families** in the village with the help of the District Collector and local MLA. In the year 2004, Tangirala's activism resulted in the **opening of a primary school** by the government of Paritala village. Tangirala has undertaken numerous charity activities as well: she encouraged her SHG to provide **new clothes to 40 elderly persons** in the village, an act that earned her the reputation of a leader in her village.

Other activities include **agitating against liquor shops** in the village and forcing owners to shut down liquor business. She took up the case of 135 scheduled caste families, representing their case in front of the district collector and got them the **right to work on their lands**. She secured **electricity connection for over 200** scheduled caste families in the village, with her efforts leading to better street lighting and roads across the village.

Tangirala has received a Merit Certificate from the District Collector for taking up family disputes and providing counselling to more than 350 individuals. When villagers were harassed by microfinance institutions, she agitated against them that made the government introduce **a law against microfinance institutions to protect SHG women**. This action helped several families come out of the debt trap.

Other services to the village:

"I have secured two Anganwadi buildings for my village and one hall for conducting public functions such as marriage ceremonies. I rescued 30 children from the oppression of child labour and arranged for them to be sent to school. I was able to get school uniforms, bags, benches in schools by arranging donations. My other work for children includes organising health camps at schools. Through counselling services I was able to solve 37 family disputes. I settled 40 alcohol cases and two sexual harassment cases. In all cases the resolution came in different forms."

Our District:

"**Tangirala's** district has been developed as a gender resource district. We started our gender work in 2003 and experimented with several strategies to reduce violence among SHG families. I worked to enhance participation of poor women in project implementation process. Finally we have a dedicated focus on our social agenda. The social action committee works to implement it; and we use CNFCCS for convergence with line departments, holding victim meetings for monitoring and learning. Our CRP strategy is used to scale up the programme across the stage. Hon'ble chief minister recognised our hard work. He has sanctioned a big training and shelter building for our Social Action Committees in the district. He even talked to me once over the phone. I was so happy with the respect and interest he showed in our work for gender justice and women empowerment."

Kurukshetra

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D. G. TENDULKAR

8 of 1 to 8

**Romain Rolland
And Gandhi
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