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Excess Rainfall Impact on
Agricultural Production & Prices-
A Brief Note



Does good rains bring down inflation of food commodities? Perhaps it is generally believed that bountiful precipitation during monsoon season is helpful in bringing down the food commodities prices due to higher production. How far this presumption is true? This article attempts to explore the empirical relationship between monsoon rains, production and inflation if any.

During last 24 years, India received above normal/excess rainfall only in 4 years. For those 4 years the data of the monsoon rainfall, production and inflation was analysed and a comparison was made with the previous year's data. The analysis reveals some interesting findings.

Review of Monsoon Rainfall during past 27 Years

India is expected to receive above normal monsoon rainfall during 2016. Before that It has seen this phenomenon of receiving above normal/excess rainfall only for 4 times, namely during 1990, 1998, 2007 and 2013 since 1989.

Table 1: Seasonal Rainfall Pattern and Distribution across Meteorological Sub-divisions

Year	Rainfall Category	Rainfall (% of LPA)	Sub meteorological division with normal/excess rainfall as proportion of total divisions
1989	Normal	101	83%
1990	Excess	119	91%
1997	Normal	102	72%
1998	Above Normal	106	92%
2006	Normal	100	75%
2007	Above Normal	106	86%
2012	Below Normal	93	64%
2013	Above Normal	106	83%
2015	Deficient	86	51%
2016	Above Normal	106	?

Source: Various Reports of IMD, New Delhi

As can be seen from Table 1 that rainfall during those four years was higher in the range of 106-119% of the long run average (LPA) rainfall of the season. Out of 36 meteorological subdivisions 83-92% of the divisions received above normal rainfall implying that almost all parts of the country were blessed with good rains in those years.

Apart from that, the Years 1990, 1998 and 2007 were preceded by normal monsoon years. However 2013 was headed by below normal monsoon year i.e. 2012.

Monsoon Status in 2016 in India

Year 2016 is expected to receive above normal rainfall. Quantitatively, monsoon season rainfall for the country as a whole is likely to be 106% of the long period average with a model error of $\pm 4\%$ which means if the model error is $+4\%$ then Indian may also receive Excess rainfall ($106+4=110$).

At region level, the North West India is very near to excess rainfall category which central and south peninsula regions fall under excess rainfall category. Region wise, the season rainfall is likely to be 108% of LPA over North-West India, 113% of LPA over Central India, 113% of LPA over South Peninsula and 94% of LPA over North-East India all with a model error of $\pm 8\%$. Thus country as a whole is likely to receive enough rainfall across majority of meteorological subdivisions.

Forecast for second half (August-September) of 2016 monsoon (As on 01 August 2016, IMD, New Delhi)

- Rainfall over the country as a whole during second half of southwest monsoon season (August to September) is most likely to be above normal (>106% of LPA) with a probability of 55%.
- Quantitatively, the rainfall for the country as a whole during second half of the season is likely to be 107% of LPA with a model error of $\pm 8\%$.
- The rainfall during August is likely to be $104 \pm 9\%$ of LPA as was forecasted in June.
- The season (June to September) rainfall over the country as a whole is likely to be $106\% \pm 4\%$ of LPA as was forecasted in June.

Production and Food commodities Inflation Behaviour during above Normal Monsoon Years

Better monsoon has resulted into increase in production in majority of the agricultural commodities with few exception in one or two years.

A comparative change in monsoon rainfall, crop production and wholesale price inflation over the preceding year is presented in Table 2 for the above normal monsoon years.

Table 2: Comparative Change in Production and Prices during Above Normal Monsoon Years

Year		1990-91	1998-99	2007-08	2013-14	2016-17
Commodities	Rainfall (% of LPA)	119	104	106	106	106
	Rainfall Category	Excess	Above Normal	Above Normal	Above Normal	Above Normal
Cereals	Production	2%	5%	6%	3%	?
	Inflation	8%	9%	10%	13%	?
Rice	Production	1%	4%	4%	1%	?
	Inflation	6%	9%	11%	17%	?
Pulses	Production	11%	8%	4%	5%	?
	Inflation	11%	10%	-3%	-6%	?
Tur (Arhar)	Production	-14%	46%	33%	5%	?
	Inflation	27%	37%	16%	6%	?
Moong	Production	11%	22%	36%	35%	?
	Inflation	1%	10%	-12%	14%	?
Urad	Production	6%	-2%	1%	-11%	?
	Inflation	6%	13%	-16%	3%	?
Oilseeds	Production	10%	16%	23%	6%	?
	Inflation	29%	16%	20%	2%	?
Groundnut	Production	-7%	22%	89%	107%	?
	Inflation	34%	13%	28%	-11%	?
Soybean	Production	44%	11%	24%	-19%	?
	Inflation	14%	-10%	27%	7%	?
Sugar	Production	10%	21%	-7%	-3%	?
	Inflation	0%	1%	-15%	-2%	?
Cotton	Production	-14%	13%	14%	5%	?
	Inflation	-1%	7%	16%	15%	?

Note: Inflation figures are for Financial Years

It can be observed from the above Table that production of commodities groups like Cereals, Pulses, and Oilseeds has seen increment without exception in a single year. However it varied from commodity to commodity.

- ❑ Cereals and specially Rice production has increased during above normal monsoon rainfall years. Despite better production, the inflation of cereals as well as rice has seen considerable rise in those years.
- ❑ In Pulse group, Moong has always seen production increment however Tur (Arhar) production fell one time i.e. in 1990-91 while Urad production fell during 1998-99 and 2013-14. The inflation of Pulse as a group and individual pulses has seen increment most of the time barring one-two instances.
- ❑ Oilseeds production increased in all the above normal monsoon years, but inflation also followed the same suit and remained substantially high.
- ❑ Sugar has seen production increment during 1990-91 and 1998-99 however, production fell during 2007-08 and 2013-14. Production is forecast to fall in 2016-17 too. Interestingly sugar inflation either remained stable or even came down despite fall in production during 2007-08 and 2013-14. It is to be seen what happens in 2016-17.
- ❑ Cotton production most of the time has seen increment however the inflation also remained higher in better production years.

Detailed Tables presenting the monsoon rainfall, production and inflation figures during the above normal monsoon rainfall years for Cereals, Pulses, Oilseeds and Other commercial crops are presented below.

Note: Annual Inflation index is Wholesale Price Index (WPI) number and corresponds to whole financial year. Index numbers from 2005-16 are for WPI Series of Base Year 2004-05, for 1997-99 are for WPI Series of Base Year 1993-94 and for 1989-91 are for WPI Series of Base Year 1981-82. The data is sourced from Ministry of Commerce and Industry. Production data is sourced from Ministry of Agriculture and Farmers Welfare while Rainfall Statistics are sourced from various editions of Indian Meteorological Department.

Table 3: Comparative Production and Price Movement in Cereals

Financial Year	Rainfall (% of LPA)	Rainfall Category	Cereals		Rice	
			Production (MMT)	Inflation Index	Production (MMT)	Inflation Index
1989-90	101	Normal	158.18	158.99	73.57	168.75
1990-91	119	Excess	162.13	171.45	74.29	178.33
	Change		2%	8%	1%	6%
1997-98	102	Normal	179.29	138.40	82.54	134.30
1998-99	106	Above Normal	188.70	150.90	86.08	146.20
	Change		5%	9%	4%	9%
2006-07	100	Normal	203.08	116.74	93.36	110.03
2007-08	106	Above Normal	216.02	127.86	96.69	122.46
	Change		6%	10%	4%	11%
2012-13	93	Below Normal	238.79	199.87	105.24	194.16
2013-14	106	Above Normal	245.79	225.53	106.65	226.22
	Change		3%	13%	1%	17%
2015-16	86	Deficient	235.17	235.23	104.32	237.36
2016-17	106	Above Normal	?	?	?	?
	Change		?	?	?	?

Table 4: Comparative Production and Price Movement in Pulses

Financial Year	Rainfall (% of LPA)	Rainfall Category	Pulses		Tur (Arhar)		Moong		Urad	
			Production (MMT)	Inflation Index	Production (MMT)	Inflation Index	Production (MMT)	Inflation Index	Production (MMT)	Inflation Index
1989-90	101	Normal	12.86	205.73	2.79	196.77	0.88	201.69	1.56	253.58
1990-91	119	Excess	14.26	227.52	2.41	249.80	0.98	204.60	1.65	269.28
Change			11%	11%	-14%	27%	11%	1%	6%	6%
1997-98	102	Normal	13.83	145.90	1.85	136.20	0.95	164.70	1.38	175.30
1998-99	106	Above Normal	14.91	160.10	2.71	186.20	1.16	181.20	1.35	197.30
Change			8%	10%	46%	37%	22%	10%	-2%	13%
2006-07	100	Normal	14.20	149.18	2.31	108.31	1.12	160.3	1.44	191.33
2007-08	106	Above Normal	14.76	144.93	3.08	126.08	1.52	141.18	1.46	159.77
Change			4%	-3%	33%	16%	36%	-12%	1%	-16%
2012-13	93	Below Normal	18.34	241.32	3.02	199.35	1.19	259.47	1.90	227.67
2013-14	106	Above Normal	19.25	228	3.17	212.28	1.61	295.88	1.70	234.32
Change			5%	-6%	5%	6%	35%	14%	-11%	3%
2015-16	86	Deficient	16.47	336.68	2.60	357.93	1.59	404.5	1.88	438.03
2016-17	106	Above Normal	?	?	?	?	?	?	?	?
Change			?	?	?	?	?	?	?	?

Table 5: Comparative Production and Price Movement in Oilseeds

Financial Year	Rainfall (% of LPA)	Rainfall Category	Oilseeds		Groundnut		Soybean	
			Production (MMT)	Inflation	Production (MMT)	Inflation	Production (MMT)	Inflation
1989-90	101	Normal	16.92	151.43	8.10	155.58	0.18	188.69
1990-91	119	Excess	18.61	194.93	7.51	208.48	0.26	215.35
Change			10%	29%	-7%	34%	44%	14%
1997-98	102	Normal	21.32	128.30	7.37	133.90	0.65	138.80
1998-99	106	Above Normal	24.75	148.50	8.98	150.80	0.71	124.30
Change			16%	16%	22%	13%	11%	-10%
2006-07	100	Normal	24.29	94.49	4.86	109.53	0.89	79.47
2007-08	106	Above Normal	29.76	113.22	9.18	140.33	1.10	100.65
Change			23%	20%	89%	28%	24%	27%
2012-13	93	Below Normal	30.94	198.02	4.70	246.92	1.47	211.86
2013-14	106	Above Normal	32.75	202.59	9.74	219.13	1.19	226.33
Change			6%	2%	107%	-11%	-19%	7%
2015-16	86	Deficient	25.30	214.9	6.88	246.17	8.92	210
2016-17	106	Above Normal	?	?	?	?	?	?
Change			?	?	?	?	?	?

Table 6: Comparative Production and Price Movement in other Commercial Crops

Financial Year	Rainfall (% of LPA)	Rainfall Category	Sugar		Cotton	
			Production (MMT)	Inflation	Production (Million bales)	Inflation
1989-90	101	Normal	11.00	141.89	11.42	146.94
1990-91	119	Excess	12.05	141.89	9.84	145.53
Change			10%	0%	-14%	-1%
1997-98	102	Normal	12.85	133.80	10.85	155.40
1998-99	106	Above Normal	15.54	135.40	12.29	166.90
Change			21%	1%	13%	7%
2006-07	100	Normal	28.36	109.57	22.62	96.63
2007-08	106	Above Normal	26.36	93.4	25.88	111.8
Change			-7%	-15%	14%	16%
2012-13	93	Below Normal	25.14	193.1	34.22	206.04
2013-14	106	Above Normal	24.40	188.42	35.90	236.53
Change			-3%	-2%	5%	15%
2015-16	86	Deficient	25.10	171.05	30.17	189.88
2016-17	106	Above Normal	?	?	?	?
Change			?	?	?	?

Summary:

It can be observed from the above empirical analysis that better monsoon undoubtedly resulted in to higher production. However, this higher production has not translated in to fall in food commodities prices most of the times.

To find the reasons of higher inflation despite better production is again an issue of further discussion. A most common argument is given that higher production directly results in to increased income of the rural India that boost the consumption demand of the food items along with increase in demand of the other non-farm commodities. There may be other reasons too that need further investigations.

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