

## *South-West Monsoon 2013: A Review (June 1 to September 30, 2013) \**

*The South-West monsoon during June-September 2013 was 6 per cent above the long period average (LPA) of 89 cm (average of 1951-2000) as against 8 per cent below LPA last year. This was 8 per cent higher than the India Meteorological Department (IMD) forecast of 98 per cent LPA for the season, and the highest margin by which the season's precipitation has exceeded the LPA in the last nineteen years. Additionally, the monsoon has been accompanied by other favourable factors, namely, on time arrival, well distribution – spatially and temporally, so much so, that 86 per cent of the geographical areas received normal rainfall during June-September covering 30 meteorological sub-divisions out of the total 36, which in turn replenished the major reservoirs of the country to levels higher than the previous year and the normal. These favourable factors have immensely benefited kharif sowing for 2013 which has surpassed the area sown last year and its normal level, the result being higher estimated production of most kharif crops including foodgrains, pulses and oilseeds by 0.9 per cent, 1.7 per cent and 14.8 per cent, respectively, during 2013-14 as per the first advance estimates which are expected to be revised upward as the season progresses. As regards rabi crops, with the reservoir levels continuing to be above normal and the previous year and the North-East monsoon so far turning out to be much above LPA, the prospect of a good harvest has improved. On the whole, the confluence of these favourable factors are expected to significantly boost agricultural growth prospects during 2013-14 to level higher than the previous year.*

### **Introduction**

The pattern of rainfall in India can be broadly classified into four seasons viz., South-West monsoon or the summer rainfall during June-September, the post monsoon rainfall or the North-East monsoon during October-December, winter rainfall during January-

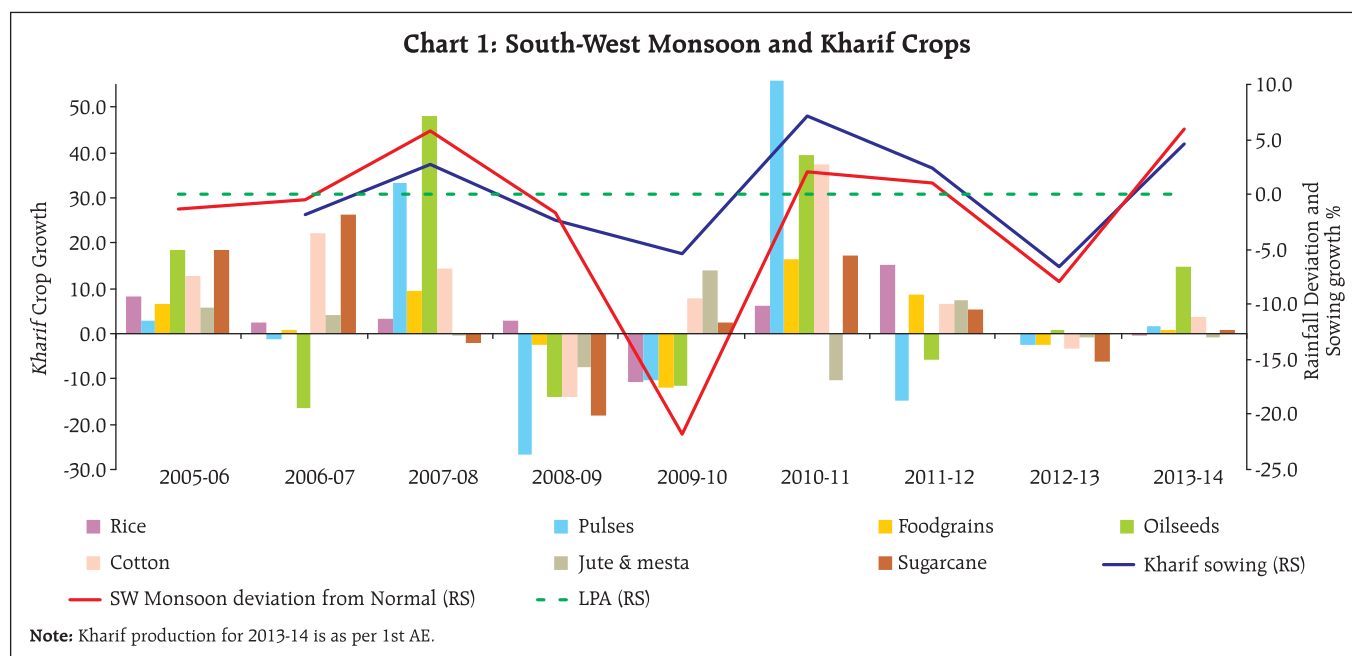
February and pre-monsoon rainfall during March-May. In general, the summer monsoon accounts for around 75-80 per cent of rainfall in the country, post monsoon around 10 per cent, winter rainfall 3 per cent and pre-monsoon 11 per cent.

The months of July-August, when the South-West monsoon, the main source of rainfall in the country is at its peak is also a crucial period for *kharif* sowing. Therefore, the on time arrival and even distribution – temporally and spatially, of summer rainfall is essential for a good *kharif* harvest. In the past, it has been observed that whenever the South-West monsoon is deficient *kharif* crops have failed (Chart 1). Since *kharif* season is the main cropping season, its failure often goes uncompensated, the net result being slowdown in the overall growth of agricultural sector. It is in this backdrop that this article provides a detailed review of the performance of South-West monsoon during June-September 2013.

### **South-West Monsoon 2013: Highlights**

- South-West monsoon current advanced over the Andaman Sea 3 days earlier than its normal date of 20<sup>th</sup> May and set in over Kerala on its normal date of 1<sup>st</sup> June. The South-West monsoon covered the entire country by 16<sup>th</sup> June, about 1 month earlier than its normal date of 15<sup>th</sup> July.
- For the country as a whole, the rainfall for the season (June-September) was 106 per cent of its LPA.
- Seasonal rainfall was 109 per cent of its LPA over North-West India, 123 per cent of its LPA over Central India, 115 per cent of its LPA over South Peninsula and 72 per cent of its LPA over North-East India.
- Out of the total 36 meteorological sub-divisions, 14 sub-divisions constituting 48 per cent of the total area of the country received excess rainfall, 16 sub-divisions (38 per cent of the total area of the country) received normal rainfall and the remaining 6 sub-divisions (14 per cent of the total area of the country) received deficient rainfall.

\* Prepared in the Development Studies Division, Department of Economic and Policy Research, Reserve Bank of India.



- Monthly rainfall over the country as a whole was 132 per cent of its LPA in June, 106 per cent of LPA in July, 98 per cent of LPA in August and 86 per cent of LPA in September.
- Out of the total 641 districts, 100 were affected by moderate meteorological drought (seasonal rainfall deficiency of 26 per cent to 50 per cent), while 39 were affected by severe meteorological drought (seasonal rainfall deficiency of 51 per cent to 99 per cent)
- The withdrawal of monsoon from west Rajasthan commenced on 9<sup>th</sup> September compared to its normal date of 1<sup>st</sup> September. After 19<sup>th</sup>, further withdrawal of South-West monsoon was stalled with the successive formation of two low pressure areas and their westward movement across the central parts of the country.

**Forecast: South-West Monsoon 2013**

The IMD forecasted a normal South-West monsoon at 98 per cent of LPA in its first stage long range forecast for the season (June-September) issued on April 26, 2013 and the subsequent update issued on June 14, 2013 with margins of errors placed at  $\pm 5$  per cent and  $\pm 4$  per cent of LPA, respectively. However, the actual rainfall at 106 per cent of LPA for the season turned

out to be even higher than the June update of 102 per cent. The actual rainfall for the second half of the season (August–September) at 94 per cent of LPA was within the forecast limit of 96 per cent with the margin of error of  $\pm 8$  per cent LPA. The actual rainfall for the months of July, August and September were also within the forecast limits (Table 1).

**Table 1: Long Range Forecasts and Actual Rainfall 2013**

Region	Period	Date of Issue	Forecast (per cent of LPA)	Actual (per cent of LPA)
All India	June to September	April 26 <sup>th</sup>	98 $\pm$ 5	106
All India	June to September	June 22 <sup>nd</sup>	98 $\pm$ 4	
North-West India	June to September		94 $\pm$ 8	109
Central India	June to September		98 $\pm$ 8	123
North-East India	June to September		98 $\pm$ 8	72
South Peninsula	June to September		103 $\pm$ 8	115
All India	July		101 $\pm$ 9	106
All India	August		96 $\pm$ 9	98
All India	August to September	August 2 <sup>nd</sup>	96 $\pm$ 8	94
All India	September	September 1 <sup>st</sup>	96 $\pm$ 13	86

**Table 2: Spatial Distribution: Homogeneous Regions 2013**

Regions	Actual (mm)	LPA (mm)	Actual to LPA (per cent)
All India	936.7	886.9	106
North-West India	671.8	615	109
Central India	1195.3	974.2	123
North-East India	1037.9	1437.8	72
South Peninsula	825.6	715.7	115

**Distribution of Rainfall: South-West Monsoon 2013**

As regards the four broad geographical regions of India, the South-West monsoon rainfall was expected to be 94 per cent of its LPA over North-West India, 98 per cent of LPA over Central India and North-East India and 103 per cent of LPA over South Peninsula with a model error of  $\pm 8$  per cent. The actual rainfall over North-West India, Central India and South Peninsula was, however, 9 per cent, 23 per cent and 15 per cent above their respective LPAs. Rainfall over the North-East India fell short by 28 per cent of LPA (Table 2).

**Spatial Distribution**

The cumulative rainfall during June-September 2013 was excess/normal in 30 out of the 36 meteorological sub-divisions accounting for 86 per cent of the

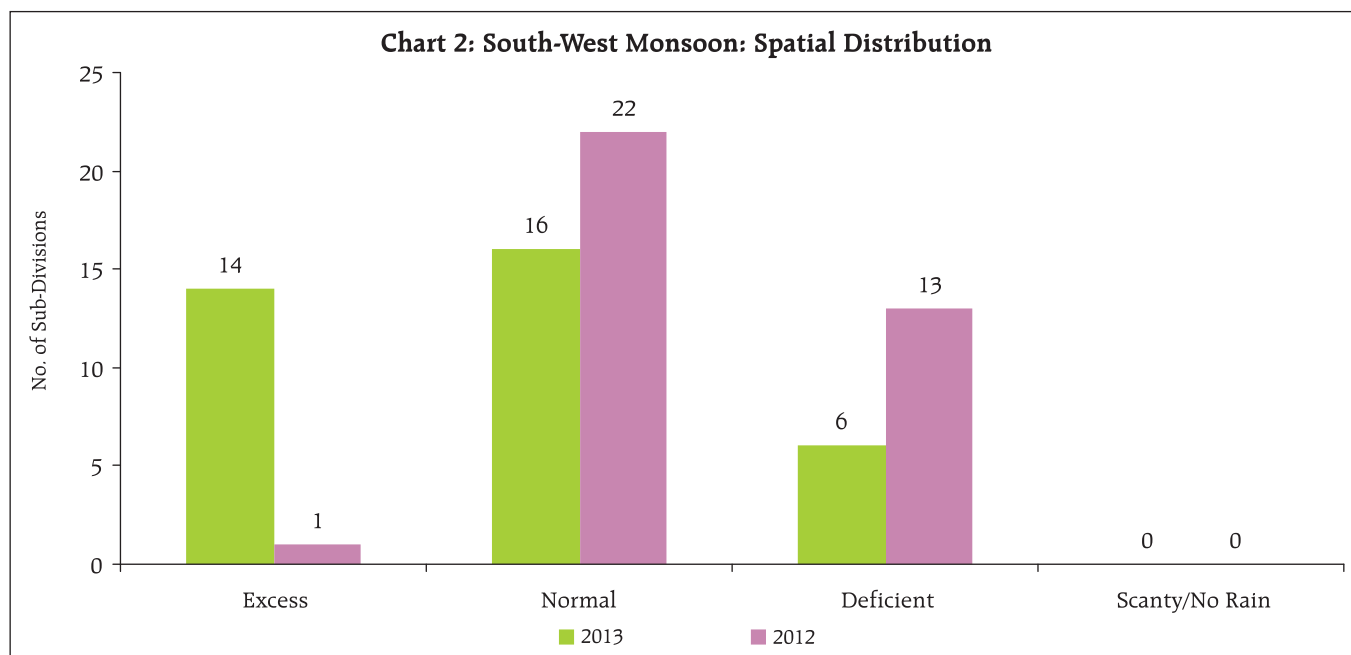
**Table 3: Distribution of Sub-divisions According to Category of Rainfall 2013**

Category of Rainfall	Sub-divisions
Excess	Jammu & Kashmir, West Rajasthan, East Rajasthan, West Madhya Pradesh, East Madhya Pradesh, Gujarat Region, Saurashtra & Kutch, Konkan and Goa, Madhya Maharashtra, Vidarbha, A & N Islands, Telangana, South Interior Karnataka and Kerala.
Normal	Sub-Himalayan West Bengal and Sikkim, Gangetic West Bengal, East UP, West UP, Uttarakhand, Punjab, Himachal Pradesh, Odisha, Marathwada, Chhattisgarh, Coastal Andhra Pradesh, Rayalaseema, Tamil Nadu & Puducherry, Coastal Karnataka, North Interior Karnataka, Lakshadweep
Deficient	Arunachal Pradesh, Assam & Meghalaya, Nagaland, Manipur, Mizoram & Tripura, Jharkhand, Bihar, Haryana, Chandigarh & Delhi.

**Note:** Excess: + 20 per cent or more; Normal: + 19 per cent to - 19 per cent; Deficient: - 20 per cent to - 59 per cent; Scanty: - 60 per cent to - 99 per cent; No Rain: -100 per cent (All with respect to the Long Period Average).

**Source:** India Meteorological Department.

geographical area of the country. The corresponding positions for the previous year were 23 sub-divisions and 67 per cent, respectively (Chart 2, Table 3 & Statement I).



## Temporal Distribution

The monthly rainfall during the last two months (August and September) of the monsoon season was less than their respective LPA values. June and July, however, received above normal rainfall. During most part of the season, 3 sub-divisions in North-East received deficient rainfall. On the other hand, most of the sub-divisions in Central India and neighbouring North-West India and South Peninsula received excess rainfall during the first 3 months of the season. No sub-division experienced scanty rainfall during the first 3 months of the season though 4 sub-divisions received scanty rainfall during September (Table 4).

## Production Weighted Rainfall Index

The foodgrains production weighted rainfall index (PRN) is constructed by the Reserve Bank, based on the weighted average of actual rainfall received by the States where weights are taken as the average share of foodgrains production of a particular State in the overall foodgrains production<sup>1</sup>. As per this index, the rainfall during South-West monsoon 2013 was 2 per cent above

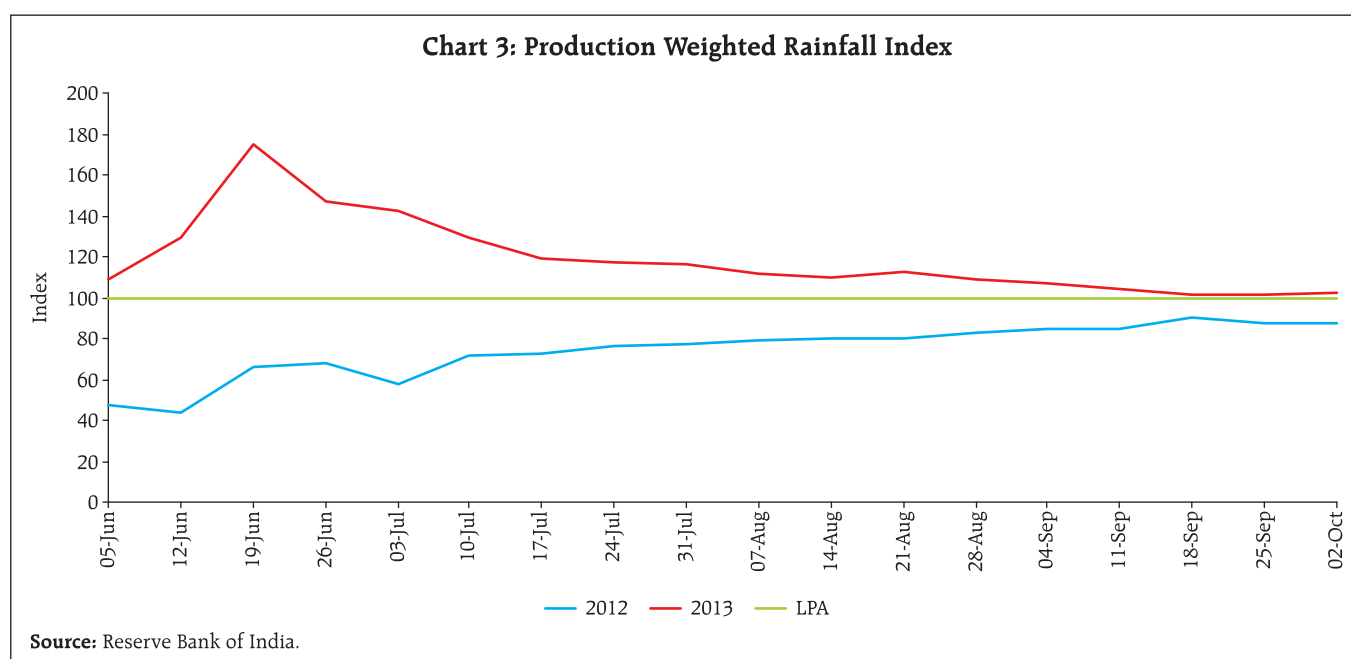
**Table 4: Monthly Rainfall Over the Country – 2013**

Months	LPA (mm)	Actual Rainfall (mm)	% Deviation from LPA	Sub-divisions with Deficient/ Scanty Rainfall
June	163.5	216.3	32	3
July	288.9	307.5	6	11
August	261	257	-2	10
September	173.5	149.5	-14	17

normal as against 13 per cent below normal the previous year (Chart 3).

## Reservoir Status

In India, the Central Water Commission monitors the total live water storage in 85 major reservoirs with a full reservoir level (FRL) of 154.87 billion cubic meters (BCM). As on October 3, 2013 the level of water (total storage to live capacity) in these reservoirs was 86 per cent as against 74 per cent during the corresponding period last year and the average of last ten years at 73 per cent (Table 5).



<sup>1</sup> A Production Weighted Rainfall Index of 100 indicates normal rainfall, where normal represents average of last 10 years' production weighted rainfall.

**Table 5: Reservoir Status**

Status	01.10.2008	01.10.2009	30.9.2010	29.9.2011	27.9.2012	03.10.2013
	(81 Reservoirs)	(81 Reservoirs)	(76 Reservoirs)	(81 Reservoirs)	(84 Reservoirs)	(85 Reservoirs)
Total Live Storage (BCM)	111.96	90.48	114.45	131.49	115.8	133.48
Percentage to Live Capacity at FRL (Per cent)	74	60	75	87	75	86

Source: Central Water Commission

### Progress of Sowing and Kharif Production Estimates

A normal and evenly distributed South-West monsoon, devoid of extreme climatic events facilitated the coverage of area sown to levels higher than the season's normal and the coverage last year. The higher area coverage along with a low base effect is reflected in an improvement in *kharif* crop 2013. The First Advance Estimates 2013-14 of production of foodgrains have placed *Kharif* foodgrains at 129.3 million tonnes, up by 0.9 per cent over the previous year's Fourth Advance Estimates (Table 6). The final figure of *kharif*

production in 2013-14 is expected to be higher as estimates get revised upward with the progress of cropping season and availability of more information from the States.

### Conclusion

The South-West monsoon during June-September 2013 was 6 per cent above LPA, the highest in 19 years, as against 8 per cent below LPA in the previous year. The timely arrival and uninterrupted distribution of rainfall, temporally and spatially, barring parts of East

**Table 6: Kharif Production and Sowing 2013-14**

(Area in million hectares and production in million tonnes)

Crops	Sowing October 25			Production		Percentage Change	
	Normal as on Date	2013	2012	2013-14*	2012-13@	Sowing 2013 (col 3/col 4)	Production 2013-14 (col 5/col 6)
1	2	3	4	5	6	7	8
<b>Foodgrains</b>	<b>67.6</b>	<b>68.7</b>	<b>65.6</b>	<b>129.3</b>	<b>128.2</b>	<b>4.7</b>	<b>0.9</b>
Rice	36.6	38.4	37.5	92.3	92.8	2.4	-0.5
Coarse Cereals	20.1	19.6	17.8	31.0	29.5	10.1	5.1
Maize	7.3	8.2	7.5	17.8	16.0	9.3	11.3
Pulses	10.9	10.7	10.3	6.0	5.9	3.9	1.7
Tur	3.8	4	3.7	3.0	3.1	8.1	-3.2
Urad	2.4	2.6	2.5	1.3	1.4	4.0	-7.1
Oilseeds	17.8	19.5	17.7	24.0	20.9	10.2	14.8
Groundnut	4.6	4.3	3.9	5.6	3.1	10.3	80.6
Soyabean	9.5	12.2	10.7	15.7	14.7	14.0	6.8
Sugarcane	4.7	4.9	5	341.8	339.0	-2.0	0.8
Cotton#	11.6	11.5	11.7	35.3	34.0	-1.7	3.8
Jute&Mesta##	0.9	0.9	0.9	11.2	11.3	0.0	-0.9
<b>All Crops</b>	<b>102.5</b>	<b>105.5</b>	<b>100.9</b>	<b>-</b>	<b>-</b>	<b>4.6</b>	<b>-</b>

#: Million bales of 170 kgs each. ##: Million bales of 180 kgs each. -: Not Available.

\*: First Advance Estimates. @: Fourth Advance Estimates

Source: Ministry of Agriculture, GoI.

and North-East region, through June-August contributed to the attainment of higher area coverage during the current *kharif* sowing season. Consequently, the First Advance Estimates for most *kharif* crops in 2013-14 have shown an improvement over last year. With the reservoir position being comfortable, and

the North-East monsoon also turning out to be much better than the previous year, the prospect of *rabi* crops have also improved. On the whole, based on these favourable factors, agricultural growth during 2013-14 is expected to record a significant improvement over the previous year.

Statement I: Basic Rainfall Data (Cumulative)									
S. No.	Meteorological Subdivisions	June 1, 2012 to September 30, 2012				June 1, 2013 to September 30, 2013			
		Actual	Normal	% DEP.	CAT.	Actual	Normal	% DEP.	CAT.
<b>East &amp; North East India</b>		<b>1275.3</b>	<b>1437.8</b>	<b>-11%</b>		<b>1037.9</b>	<b>1437.8</b>	<b>-28%</b>	
1	Arunachal Pradesh	1752.3	1768	-1%	N	1123.7	1768.0	-36%	D
2	Assam & Meghalaya	1723.7	1792.8	-4%	N	1185.7	1792.8	-34%	D
3	Nagaland, Manipur, Mizoram & Tripura	1030.4	1496.9	-31%	D	973.8	1496.9	-35%	D
4	Sub-Himalayan West B Sikkim	2092.3	2006.2	4%	N	1710.3	2006.2	-15%	N
5	Gangetic West Bengal	956.8	1167.9	-18%	N	1159.9	1167.9	-1%	N
6	Jharkhand	936.3	1091.9	-14%	N	843.5	1091.9	-23%	D
7	Bihar	814	1027.6	-21%	D	723.4	1027.6	-30%	D
<b>North West India</b>		<b>569.3</b>	<b>615</b>	<b>-7%</b>		<b>671.8</b>	<b>615.0</b>	<b>9%</b>	
1	East U.P.	804.6	897.6	-10%	N	864.5	897.6	-4%	N
2	West U.P.	549	769.4	-29%	D	758.6	769.4	-1%	N
3	Uttarakhand	1122.2	1229.1	-9%	N	1374.2	1229.1	12%	N
4	Haryana, Chandigarh & Delhi	283	466.3	-39%	D	363.2	466.3	-22%	D
5	Punjab	266	491.9	-46%	D	480.0	491.9	-2%	N
6	Himachal Pradesh	698	825.3	-15%	N	775.2	825.3	-6%	N
7	Jammu & Kashmir	558.8	534.6	5%	N	651.1	534.6	22%	E
8	West Rajasthan	296.4	263.2	13%	N	335.8	263.2	28%	E
9	East Rajasthan	678.1	615.8	10%	N	778.4	615.8	26%	E
<b>Central India</b>		<b>934.6</b>	<b>974.2</b>	<b>-4%</b>		<b>1195.3</b>	<b>974.2</b>	<b>23%</b>	
1	Orissa	1148	1149.9	0%	N	1120.6	1149.9	-3%	N
2	West Madhya Pradesh	996.4	876.1	14%	N	1277.9	876.1	46%	E
3	East Madhya Pradesh	1021.8	1051.2	-3%	N	1340.7	1051.2	28%	E
4	Gujarat Region	648.3	901	-28%	D	1183.8	901.0	31%	E
5	Saurashtra & Kutch	311.5	473.5	-34%	D	777.3	473.5	64%	E
6	Konkan & Goa	2822.6	2914.3	-3%	N	3502.6	2914.3	20%	E
7	Madhya Maharashtra	543.5	729.3	-25%	D	880.1	729.3	21%	E
8	Marathwada	456.6	682.9	-33%	D	747.3	682.9	9%	N
9	Vidarbha	1031.5	954.6	8%	N	1360.4	954.6	43%	E
10	Chhattisgarh	1228.7	1147.3	7%	N	1160.1	1147.3	1%	N
<b>South Peninsula</b>		<b>644</b>	<b>715.7</b>	<b>-10%</b>		<b>825.6</b>	<b>715.7</b>	<b>15%</b>	
1	Andaman & Nicobar Islands	2052.9	1682.5	22%	E	2152.1	1682.5	28%	E
2	Coastal Andhra Pradesh	655.9	581.1	13%	N	524.1	581.1	-10%	N
3	Telangana	787.3	755.2	4%	N	949.7	755.2	26%	E
4	Rayalaseema	357.3	398.3	-10%	N	420.3	398.3	6%	N
5	Tamil Nadu & Pondicherry	243	317.2	-23%	D	321.6	317.2	1%	N
6	Coastal Karnataka	3088.5	3083.8	0%	N	3620.8	3083.8	17%	N
7	North Interior Karnataka	326.1	506	-36%	D	533.1	506.0	5%	N
8	South Interior Karnataka	508.6	660	-23%	D	826.6	660.0	25%	E
9	Kerala	1547.8	2039.6	-24%	D	2562.5	2039.6	26%	E
10	Lakshadweep	1147.1	998.5	15%	N	1057.2	998.5	6%	N
<b>Country as a whole</b>		<b>819.5</b>	<b>886.9</b>	<b>-8%</b>		<b>936.7</b>	<b>886.9</b>	<b>6%</b>	
<b>Category</b>		<b>% Area of Country</b>		<b>Sub-Divisions</b>		<b>% Area of Country</b>		<b>Sub-Divisions</b>	
E : Excess, <i>i.e.</i> , +20% or more		0.30%		1		48%		14	
N : Normal, <i>i.e.</i> , +19% to -19%		67%		22		38%		16	
D : Deficient, <i>i.e.</i> , -20% to -59%		33%		13		14%		6	
S : Scanty, <i>i.e.</i> , -60% to -99%		0%		0		0%		0	
NR: No Rain, <i>i.e.</i> -100%		0%		0		0%		0	
<b>TOTAL</b>				<b>36</b>				<b>36</b>	

<b>Statement II: State-wise Distribution of No. of Districts with Excess, Normal, Deficient, Scanty and No Rainfall</b>								
Sr. No.	States	Period from: 01.06.2013 to 30.09.2013						Total
		E	N	D	S	NR	ND	
1	2	3	4	5	6	7	8	9
1	A & N Island (UT)	2	1	0	0	0	0	3
2	Arunachal Pradesh	1	1	11	1	0	2	16
3	Assam	0	10	16	0	0	1	27
4	Meghalaya	0	1	2	3	0	1	7
5	Nagaland	0	2	1	3	0	5	11
6	Manipur	0	2	2	1	0	4	9
7	Mizoram	1	3	2	1	0	2	9
8	Tripura	0	1	3	0	0	0	4
9	Sikkim	0	1	3	0	0	0	4
10	West Bengal	2	12	5	0	0	0	19
11	Orissa	1	22	7	0	0	0	30
12	Jharkhand	0	9	15	0	0	0	24
13	Bihar	1	7	28	2	0	0	38
14	Uttar Pradesh	12	38	20	1	0	0	71
15	Uttarakhand	6	6	1	0	0	0	13
16	Haryana	0	7	13	1	0	0	21
17	Chandigarh (UT)	0	1	0	0	0	0	1
18	Delhi	1	4	3	1	0	0	9
19	Punjab	6	9	5	0	0	0	20
20	Himachal Pradesh	4	6	1	1	0	0	12
21	Jammu & Kashmir	8	7	4	1	0	2	22
22	Rajasthan	20	13	0	0	0	0	33
23	Madhya Pradesh	41	9	0	0	0	0	50
24	Gujarat	20	6	0	0	0	0	26
25	DNH & Daman(UTs)	1	1	0	0	0	0	2
26	Diu(UT)	1	0	0	0	0	0	1
27	Goa	0	2	0	0	0	0	2
28	Maharashtra	22	13	0	0	0	0	35
29	Chhattisgarh	4	10	4	0	0	0	18
30	Andhra Pradesh	5	14	4	0	0	0	23
31	Tamil Nadu	6	18	6	2	0	0	32
32	Pondicherry (UT)	2	0	0	0	0	2	4
33	Karnataka	7	23	0	0	0	0	30
34	Kerala	10	4	0	0	0	0	14
35	Lakshadweep(UT)	0	1	0	0	0	0	1
<b>Total</b>		<b>184</b>	<b>264</b>	<b>156</b>	<b>18</b>	<b>0</b>	<b>19</b>	<b>641</b>

E: Excess; N: Normal; D: Deficient; S: Scanty; NR: No Rain; ND: No Data  
**Source:** India Meteorological Department.