

Trends in Growth of Agriculture Sector of the Indian Economy

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Introduction: Growth in the agriculture sector may well be judged by the increase in agricultural production over time. Three factors account for the increase in the total production of agricultural output: (a) increase in the total area under various crops, (b) increase in the yield rate of various crops and (c) substitution of more remunerative crops in place of less remunerative crops. In physical terms, relative changes in yield rates of different crops may effect substitution. However, in economic terms, relative changes in prices of different crops also may effect substitution.

Very many crops are raised in the agriculture sector of India. However, all crops are not equally important. Rice, wheat, maize, millets and pulses are the major food crops. Oilseeds, sugarcane, cotton, jute & mesta, and potatoes are the major cash crops. Tobacco, chillies, ginger, onion, turmeric, tapioca, sweat potatoes, etc. are minor cash crops. Among plantation crops tea, coffee and rubber are important. One may employ the area under a crop as an indicator to judge the importance of a crop, though keeping in mind that it is only a partial indicator of its economic importance. Accordingly, Table-1 is suggestive of the importance of various crops. We observe that cereals and pulses occupy about 3/4th of the gross area under cultivation. A clear trend in an increase in the percentage area under the cash crops is discernible. Plantation crops occupy a very small percentage (less than 1%) of the total area under crops. During 1951-91 the gross area under cultivation increased by about 61 percent. The gross area under cereals and pulses increased by about 52 percent, while the gross area under cash crops increased by 92 percent or so.

Table-1. Gross Area (million hectares) under Cultivation of Major Crops in India

Crop/Year	1951	1961	1971	1981	1991
1. Rice	30.8	34.1	37.6	40.1	42.6
2. Wheat	9.8	12.9	18.2	22.3	24
3. Millets	2.5	3	3	2.8	2.5
4. Maize	3.2	4.4	5.8	6	5.9
5. Pulses	19.1	23.6	22.6	22.5	24.4
<i>Cereals & Pulses (Food Grains)</i>	<i>65.4</i>	<i>78.0</i>	<i>87.2</i>	<i>93.7</i>	<i>99.4</i>
(% to Total)	76.85	75.29	75.11	75.20	72.40
Index 1951=100	100.00	119.27	133.33	143.27	151.99
6. Oilseeds	10.7	13.8	16.6	17.6	24
7. Sugarcane	1.7	2.4	2.6	2.7	3.7
8. Cotton	5.9	7.6	7.6	7.8	7.4
9. Jute/ Mesta	0.8	0.9	1.1	1.3	1
10. Potatoes	0.2	0.4	0.5	0.7	0.9
<i>Seasonal Cash Crops</i>	<i>19.3</i>	<i>25.1</i>	<i>28.4</i>	<i>30.1</i>	<i>37.0</i>
(% to Total)	22.68	24.23	24.46	24.16	26.95
Index 1951=100	100.00	130.05	147.15	155.96	191.71
11. Tea/Coffee/Rubber	0.4	0.5	0.5	0.8	0.9
Total Area	85.1	103.6	116.1	124.6	137.3
Index 1951=100	100.00	121.74	136.43	146.42	161.34

Table-2. Gross Area and Production of Food Grain Crops in India
(Area in million hectares; Production in million tonnes)

Year	Rice		Wheat		Maize		Millets		Pulses	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1951	30.8	20.6	9.8	6.5	3.2	1.7	2.5	0.8	19.1	8.4
1961	34.1	34.6	12.9	11.0	4.4	4.1	3.0	1.3	23.6	12.7
1971	37.6	42.2	18.2	23.8	5.8	7.5	3.0	1.6	22.6	11.8
1981	40.2	53.6	22.3	36.3	6.0	7.0	4.0	1.6	22.5	10.6
1982	40.7	53.2	22.1	37.5	5.9	6.5	3.8	1.6	23.8	11.5
1983	38.3	47.1	23.6	42.8	5.7	7.9	3.5	1.2	22.8	11.9
1984	41.0	59.8	24.4	45.1	5.9	6.9	3.6	1.7	23.4	12.7
1985	41.2	58.3	23.4	44.1	5.8	8.4	3.2	1.2	22.7	12.0
1986	40.9	64.2	23.1	46.9	5.9	6.9	3.2	1.3	23.8	13.0
1987	41.2	60.6	23.1	44.3	5.9	7.6	3.0	1.2	23.2	12.7
1988	38.3	56.4	22.6	45.1	3.5	3.6	2.9	1.2	20.5	11.0
1989	41.7	70.5	24.1	54.1	5.9	8.2	2.7	1.2	23.1	13.8
1990	42.2	73.6	23.5	49.8	5.9	9.7	2.7	1.3	23.4	12.9
1991	42.6	74.6	24.0	54.5	6.0	9.1	2.5	1.2	24.4	14.1
1992	42.6	74.7	23.3	55.7	5.9	8.1	2.1	0.9	22.5	12.0
1993	41.8	72.9	24.6	57.2	6.0	10.0	2.0	0.9	22.4	12.8
1994	42.0	79.0	24.9	59.1	6.0	9.5	2.0	0.9	22.4	13.1
1995	42.8	81.8	25.7	65.8	6.1	8.9	1.8	0.8	23.0	14.0
1996	42.8	77.0	25.0	62.1	6.0	9.5	1.7	0.8	22.3	12.3
1997	43.4	81.7	25.9	69.4	6.3	10.8	1.6	0.7	22.4	14.2
1998	43.4	82.3	26.7	65.9	6.3	10.9	1.6	0.7	22.8	13.1

Table-3. Gross Area and Production of Major Cash Crops in India
(Area in million hectares; Production in million tonnes)

Year	Oilseeds		Sugarcane		Cotton		Jute		Mesta		Potatoes	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1951	10.7	5.2	1.7	57.1	5.9	0.5	0.6	0.6	0.2	0.2	0.2	1.7
1961	13.8	7.0	2.4	110.0	7.6	1.0	0.6	0.7	0.3	0.2	0.4	2.7
1971	16.6	9.6	2.6	126.4	7.6	0.8	0.8	0.9	0.3	0.2	0.5	4.8
1981	17.6	9.4	2.7	154.2	7.8	1.2	0.9	1.2	0.4	0.3	0.7	9.7
1982	19.1	12.2	3.2	186.4	8.1	1.3	0.8	1.2	0.3	0.3	0.8	9.9
1983	17.8	10.0	3.4	189.5	7.9	1.3	0.7	1.1	0.3	0.2	0.7	10.2
1984	18.7	12.8	3.2	177.0	7.8	1.1	0.7	1.1	0.3	0.2	0.8	11.0
1985	16.7	10.3	3.0	170.3	7.4	1.4	0.8	1.2	0.3	0.2	0.8	12.6
1986	14.6	9.2	2.9	171.7	7.6	1.5	1.1	2.0	0.3	0.3	0.8	10.7
1987	14.9	10.2	3.1	186.1	5.9	1.2	0.8	1.3	0.3	0.2	0.8	12.7
1988	21.9	18.0	3.3	196.7	6.5	1.1	0.7	1.0	0.3	0.2	0.9	14.1
1989	22.8	16.9	3.3	203.0	7.3	1.5	0.7	1.2	0.2	0.2	0.9	14.9
1990	24.0	18.5	3.4	225.6	7.7	1.9	0.7	1.3	0.2	0.2	0.9	14.8
1991	24.1	18.6	3.7	240.3	7.4	1.7	0.8	1.4	0.2	0.2	0.9	15.3
1992	25.9	18.6	3.8	254.0	7.7	1.7	0.9	1.6	0.2	0.2	1.0	16.4
1993	25.6	20.3	3.6	230.8	7.5	1.9	0.7	1.3	0.2	0.2	1.1	16.4
1994	26.9	21.5	3.5	233.0	7.3	1.8	0.7	1.3	0.2	0.2	1.0	17.4
1995	25.3	21.3	3.9	275.5	7.9	2.0	0.7	1.4	0.2	0.2	1.1	17.4
1996	26.0	22.1	4.1	281.1	9.0	2.2	0.7	1.4	0.2	0.2	1.1	18.8
1997	26.3	24.4	4.2	277.6	9.1	2.4	0.9	1.8	0.2	0.2	1.2	24.2
1998	26.2	22.0	4.0	276.3	8.9	1.9	0.9	1.8	0.2	0.2	1.2	17.7

Table-3a. Gross Area and Production of Minor Cash Crops in India
(Area in 000 hectares; Production in 000 tonnes)

Year	Sweet Potatoes		Tobacco		Tapioca		Soyabean	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1951	208.5	1501.9						
1961	224.6	1696.1						
1971	314.8	1560.1						
1981	192.2	1627.7	451.5	480.8	320.8	5828.1		
1982	192.2	1627.7	443.5	520.1	323.2	5291.6		
1983	183.4	1508.2	501.3	584.2	322.0	5110.2		
1984	178.3	1490.6	436.6	485.9	305.3	5662.1		
1985	164.0	1346.7	436.6	485.9	305.3	5662.1	1242.7	954.8
1986	157.1	1251.5	400.5	439.4	269.9	4472.4	1301.4	981.9
1987	151.4	1202.3	389.2	461.8	265.3	4814.4	1526.8	891.4
1988	136.5	1130.7	323.9	358.9	269.7	5212.3	1680.9	980.0
1989	139.7	1185.2	377.0	492.8	241.6	4962.0	1734.1	1547.1
1990	141.4	1215.5	413.1	511.6	243.2	5111.2	2253.0	1805.6
1991	143.9	1220.6	410.3	558.4	250.9	5832.5	2365.3	2418.9
1992	144.6	1166.1	158.6	164.7	226.9	5021.9	3184.8	2492.0
1993	140.7	1138.1	155.2	161.4	234.9	5412.8	3788.7	3386.9
1994	129.9	1102.2	133.2	123.8	245.8	6028.9	4247.5	4626.3
1995	120.6	1048.1	120.8	113.4	231.7	5856.8	4317.9	3931.9
1996	208.5	1501.9	125.6	117.7	228.2	5443.2	5035.0	5095.6
1997	224.6	1696.1	149.2	138.2	256.1	5662.8	5446.3	5376.0
1998	314.8	1560.1	181.0	152.4	264.3	6681.9	5800.1	6533.1

Table-3b. Gross Area and Production of Minor Cash Crops in India
(Area in 000 hectares; Production in 000 tonnes)

Year	Chillies		Turmeric		Ginger		Onion	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1951								
1961								
1971								
1981	834.8	509.1	101.5	216.9	40.5	82.4		
1982	806.4	514.7	90.7	191.3	41.1	89.7		
1983	791.8	528.0	86.4	167.5	44.7	90.8		
1984	794.8	630.5	102.3	259.2	51.3	133.9		
1985	794.8	630.5	102.3	259.2	51.3	133.9		
1986	877.8	708.9	104.5	323.8	53.3	130.0		
1987	834.6	629.2	109.9	319.9	52.7	136.0		
1988	738.0	574.6	107.7	294.9	53.7	135.5		
1989	907.8	801.5	124.0	459.5	53.6	156.1		
1990	787.2	691.0	117.6	347.8	53.3	148.5	301.2	3065.1
1991	846.3	617.5	120.3	373.2	59.8	182.7	296.9	3148.6
1992	917.3	779.0	128.6	397.4	58.1	189.4	323.3	3584.7
1993	962.1	862.1	130.2	407.3	59.9	201.6	321.5	3590.4
1994	930.0	800.1	148.4	707.4	60.6	186.2	367.5	4006.4
1995	829.1	794.7	149.4	622.0	87.5	171.2	378.6	4036.1
1996	883.7	809.7	139.3	462.9	66.9	219.3	395.5	4080.0
1997	944.2	1066.4	135.2	528.9	70.3	232.5	404.0	4180.7
1998	831.5	821.8	124.6	487.4	67.2	233.9	338.5	3142.8

Table-4. Index Number of Gross Area and Production of Food Grain Crops in India

Year	Rice		Wheat		Maize		Millets		Pulses	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1951	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1961	110.7	168.0	131.6	169.2	137.5	241.2	121.5	161.7	123.6	151.2
1971	122.1	204.9	185.7	366.2	181.3	441.2	123.2	198.8	118.3	140.5
1981	130.4	260.3	227.3	558.7	187.7	409.2	161.6	194.3	117.6	126.5
1982	132.2	258.5	226.0	576.2	185.5	385.2	153.9	202.3	124.8	137.0
1983	124.2	228.7	240.5	658.4	178.8	466.1	142.3	151.7	119.5	141.2
1984	133.1	290.1	248.9	694.6	184.0	405.3	146.8	211.3	122.6	150.6
1985	133.6	283.2	238.4	678.0	181.2	496.6	130.6	147.4	119.0	142.4
1986	132.8	311.4	235.4	721.3	183.7	405.3	128.8	160.1	124.7	154.3
1987	133.7	294.0	236.0	681.9	185.1	446.6	120.9	143.4	121.2	151.5
1988	124.4	274.0	230.7	693.8	110.7	213.5	117.9	144.3	107.5	131.4
1989	135.5	342.2	246.0	832.5	184.3	484.0	111.5	143.6	121.2	164.9
1990	136.9	357.1	239.8	766.9	184.8	567.7	109.9	161.2	122.6	153.1
1991	138.3	362.1	244.7	838.8	186.1	533.7	101.4	151.3	127.7	167.4
1992	138.5	362.5	237.4	856.8	183.1	474.4	84.9	108.9	118.0	143.0
1993	135.6	353.7	250.9	880.2	186.3	587.8	80.6	107.3	117.1	152.6
1994	136.5	383.4	254.2	909.8	187.2	557.6	79.8	115.2	117.5	155.9
1995	139.0	397.2	262.2	1011.8	191.7	522.6	72.8	98.5	120.6	167.1
1996	139.1	373.7	255.2	955.3	186.8	560.8	67.6	96.1	116.7	146.5
1997	141.0	396.8	264.2	1066.9	195.6	633.5	65.1	89.9	117.5	169.6
1998	141.0	399.5	272.3	1013.9	197.0	638.3	63.1	81.4	119.6	155.6

Table-5. Index Number of Gross Area and Production of Major Cash Crops in India

Year	Oilseeds		Sugarcane		Cotton		Jute		Mesta		Potatoes	
	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod	Area	Prod
1951	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1961	129.0	134.6	141.2	192.6	128.8	186.7	100.0	124.2	150.0	110.0	200.0	158.8
1971	155.1	184.6	152.9	221.4	128.8	160.0	133.3	148.5	150.0	130.0	250.0	282.4
1981	164.5	180.2	156.9	270.1	132.6	233.7	156.8	197.2	179.6	165.2	364.6	568.7
1982	178.1	234.5	187.8	326.4	136.6	262.8	137.6	205.7	161.8	158.3	381.1	583.0
1983	165.9	192.2	197.5	331.9	133.4	251.1	122.4	180.2	143.1	122.5	374.9	598.9
1984	174.7	246.4	186.3	310.0	131.6	219.4	123.6	183.5	143.7	135.8	400.0	647.1
1985	156.0	198.9	173.7	298.3	125.1	283.6	138.8	197.9	148.0	125.6	424.5	739.4
1986	136.4	176.4	168.4	300.7	128.5	287.1	191.3	331.9	173.9	177.6	424.1	629.2
1987	139.7	195.4	181.1	325.9	100.8	230.2	133.8	222.8	132.5	127.3	415.8	749.4
1988	204.6	346.8	193.3	344.5	109.7	214.6	116.3	175.8	131.0	98.2	442.7	831.7
1989	213.1	325.5	195.8	355.6	124.5	291.5	115.2	203.3	113.8	114.9	466.4	873.9
1990	224.4	355.1	202.2	395.0	130.4	380.7	112.9	214.3	114.6	121.6	470.0	868.9
1991	225.7	357.9	216.6	420.8	125.3	325.3	129.7	236.2	122.6	131.0	471.0	897.3
1992	241.9	357.7	226.1	444.8	129.9	323.8	145.9	270.8	119.2	135.0	515.2	964.0
1993	239.0	390.0	212.8	404.3	127.8	380.1	121.1	227.1	103.1	109.4	537.6	964.0
1994	251.4	413.4	203.9	408.1	124.4	357.4	116.1	223.7	97.3	109.8	523.6	1023.1
1995	236.5	410.3	227.5	482.6	133.4	396.3	123.1	242.3	94.9	107.9	534.7	1023.6
1996	242.7	425.1	244.0	492.3	153.1	428.7	122.8	232.6	94.5	113.2	554.5	1108.4
1997	246.2	468.9	245.5	486.1	154.6	474.4	149.6	301.8	102.2	116.9	621.9	1424.5
1998	245.0	423.4	233.3	483.8	150.9	371.4	153.3	303.4	97.5	110.4	602.0	1038.4

Growth rate of Area and Production of various Crops: The tables below describe the average annual growth rate of area and production of major food and cash crops in India during 1951-97, a period of t (=46) years. To work out the average annual growth rate (r) we have used the relationship $X_T = X_0 (1 + r)^t = X_0 (1 + R/100)^t$, where X_T is the 3-years' average (area/production) of the years 1996, 1997 and 1998 and X_0 is for the base year 1951. The figures are in percent, i.e. $R=100 r$.

Table-6 .Average Annual Growth Rate (R) of Area, Production and Yield rate of Food Crops in India (1951-98)

Crop	Rice	Wheat	Maize	Milletes	Pulses
Area	0.73987	2.13197	1.44118	-0.92330	0.35923
Production	3.00285	5.16036	4.01256	-0.24977	0.98868
Yield rate	2.24755	2.96545	2.52905	0.73675	0.62845

Table-7 .Average Annual Growth Rate (R) of Area and Production of Major Cash Crops in India (1951-98)

Crop	Oilseed	Sugarcane	Cotton	Jute	Mesta	Potatoes
Area	1.96380	1.93002	0.92687	0.76367	-0.04243	3.94470
Production	3.26888	3.50326	3.19459	2.25771	0.27567	5.53218
Yield rate	1.28020	1.54222	2.29393	1.51825	0.00000	1.56142

Table-8 .Average Annual Growth Rate (R) of Area, Production and Yield rate of Minor Cash Crops in India (1981-98)

Crop	Sweat Potatoes	Tobacco	Tapioca	Chillies	Turmeric	Ginger	Soyabean*
Area	1.63904	-6.58057	-1.55790	0.37603	1.70526	3.30445	13.07077
Production	-0.16194	-7.58481	0.10765	3.62006	5.26655	6.58421	16.67229
Yield rate	0.05191 **	-1.03369	1.68845	3.21190	3.51769	3.17603	2.57017

*= For Soya bean base year = 1985; ** based on average of terminal 5 years

Among the food crops, area under wheat has the highest growth rate followed by maize, rice and pulses in that order. The growth rate of area under millets is negative. Among the major cash crops, area under potatoes has grown fastest, followed by oilseeds, sugarcane, cotton and jute in that order. The area under mesta has shown a negative growth rate. Growth rate of production is consistent with the growth rate of area, except oilseeds and sugarcane that exchange their order.

Among the minor cash crops, soya bean, ginger, turmeric and chillies (in that order) show substantial growth in area as well as production. These (minor) cash crops are fast gaining importance. Tobacco has lost area as well as the quantum of production. Sweet potatoes have covered more area but lost the quantum of production while tapioca has lost area and yet has not shown a decline in production. It is likely that sweat potatoes have been pushed to cover inferior land.

Changes in the Yield Rate: Among the food crops, wheat exhibited the highest growth rate of yield per hectare. Maize followed wheat. These two crops experienced over three fold increase in the yield rate. Rice experienced a little less than three fold increase in the yield rate.

Table-9 . Yield Rate (YR) of Food Grain Crops in India
(Yield rate in Quintals./Hectare)

Year	Rice		Wheat		Maize		Millets		Pulses	
	YR	Index	YR	Index	YR	Index	YR	Index	YR	Index
1951	6.69	100.00	6.63	100.00	5.31	100.00	3.20	100.00	4.40	100.00
1961	10.15	151.71	8.53	128.56	9.32	175.40	4.33	135.42	5.38	122.36
1971	11.22	167.81	13.08	197.16	12.93	243.41	5.33	166.67	5.22	118.72
1981	13.33	199.35	16.28	245.42	11.67	219.61	4.00	125.00	4.71	107.12
1982	13.07	195.43	16.97	255.83	11.02	207.38	4.21	131.58	4.83	109.87
1983	12.30	183.87	18.14	273.43	13.86	260.89	3.43	107.14	5.22	118.68
1984	14.59	218.07	18.48	278.68	11.69	220.14	4.72	147.57	5.43	123.41
1985	14.15	211.57	18.85	284.14	14.48	272.62	3.75	117.19	5.29	120.20
1986	15.70	234.69	20.30	306.11	11.69	220.14	4.06	126.95	5.46	124.20
1987	14.71	219.92	19.18	289.14	12.88	242.47	4.00	125.00	5.47	124.47
1988	14.73	220.17	19.96	300.87	10.29	193.61	4.14	129.31	5.37	122.01
1989	16.91	252.78	22.45	338.45	13.90	261.62	4.44	138.89	5.97	135.84
1990	17.44	260.76	21.19	319.50	16.44	309.47	4.81	150.46	5.51	125.35
1991	17.51	261.83	22.71	342.37	15.17	285.49	4.80	150.00	5.78	131.40
1992	17.54	262.18	23.91	360.42	13.73	258.42	4.29	133.93	5.33	121.27
1993	17.44	260.76	23.25	350.57	16.67	313.73	4.50	140.63	5.71	129.93
1994	18.81	281.23	23.73	357.85	15.83	298.04	4.50	140.63	5.85	132.98
1995	19.11	285.75	25.60	386.02	14.59	274.64	4.44	138.89	6.09	138.41
1996	17.99	268.99	24.84	374.51	15.83	298.04	4.71	147.06	5.52	125.42
1997	18.82	281.46	26.80	403.99	17.14	322.69	4.38	136.72	6.34	144.14
1998	18.96	283.53	24.68	372.12	17.30	325.68	4.38	136.72	5.75	130.64

Table-10 . Yield Rate (YR) of Major Cash Crops in India
(Yield rate in Quintals./Hectare)

Year	Oilseeds		Sugarcane		Cotton		Jute		Potatoes	
	YR	Index	YR	Index	YR	Index	YR	Index	YR	Index
1951	4.86	100.00	335.88	100.00	0.85	100.00	10.00	100.00	85.00	100.00
1961	5.07	104.38	458.33	136.46	1.32	155.26	11.67	116.67	67.50	79.41
1971	5.78	119.00	486.15	144.74	1.05	124.21	11.25	112.50	96.00	112.94
1981	5.34	109.90	571.11	170.03	1.54	181.54	13.33	133.33	138.57	163.03
1982	6.39	131.43	582.50	173.42	1.60	189.38	15.00	150.00	123.75	145.59
1983	5.62	115.60	557.35	165.94	1.65	194.18	15.71	157.14	145.71	171.43
1984	6.84	140.85	553.13	164.68	1.41	166.41	15.71	157.14	137.50	161.76
1985	6.17	126.91	567.67	169.01	1.89	223.24	15.00	150.00	157.50	185.29
1986	6.30	129.66	592.07	176.27	1.97	232.89	18.18	181.82	133.75	157.35
1987	6.85	140.86	600.32	178.73	2.03	240.00	16.25	162.50	158.75	186.76
1988	8.22	169.13	596.06	177.46	1.69	199.69	14.29	142.86	156.67	184.31
1989	7.41	152.52	615.15	183.14	2.05	242.47	17.14	171.43	165.56	194.77
1990	7.71	158.61	663.53	197.55	2.47	291.17	18.57	185.71	164.44	193.46
1991	7.72	158.81	649.46	193.36	2.30	271.08	17.50	175.00	170.00	200.00
1992	7.18	147.77	668.42	199.00	2.21	260.52	17.78	177.78	164.00	192.94
1993	7.93	163.17	641.11	190.87	2.53	298.93	18.57	185.71	149.09	175.40
1994	7.99	164.46	665.71	198.20	2.47	290.96	18.57	185.71	174.00	204.71
1995	8.42	173.24	706.41	210.31	2.53	298.73	20.00	200.00	158.18	186.10
1996	8.50	174.90	685.61	204.12	2.44	288.44	20.00	200.00	170.91	201.07
1997	9.28	190.90	660.95	196.78	2.64	311.21	20.00	200.00	201.67	237.25
1998	8.40	172.78	690.75	205.65	2.13	251.91	20.00	200.00	147.50	173.53

**Table-11 . Yield Rate (YR) of Minor Cash Crops in India
(Yield rate in Quintals./Hectare)**

Year	Sweet Potatoes		Tobacco		Tapioca		Chillies		Turmeric		Ginger		Soyabean	
	YR	Index	YR	Index	YR	Index	YR	Index	YR	Index	YR	Index	YR	Index
1951	72.03	100.00												
1961	75.52	104.84												
1971	49.56	68.80												
1981	84.69	117.57	10.65	100.00	181.67	100.00	6.10	100.00	21.37	100.00	20.35	100.00		
1982	84.69	117.57	11.73	110.13	163.73	90.12	6.38	104.66	21.09	98.70	21.82	107.27		
1983	82.24	114.16	11.65	109.44	158.70	87.36	6.67	109.34	19.39	90.72	20.31	99.84		
1984	83.60	116.06	11.13	104.51	185.46	102.08	7.93	130.08	25.34	118.57	26.10	128.29		
1985	82.12	114.00	11.13	104.51	185.46	102.08	7.93	130.08	25.34	118.57	26.10	128.29	7.68	100.00
1986	79.66	110.59	10.97	103.03	165.71	91.21	8.08	132.42	30.99	145.00	24.39	119.88	7.54	98.20
1987	79.41	110.24	11.87	111.42	181.47	99.89	7.54	123.62	29.11	136.21	25.81	126.84	5.84	75.99
1988	82.84	115.00	11.08	104.05	193.26	106.38	7.79	127.67	27.38	128.13	25.23	124.02	5.83	75.88
1989	84.84	117.78	13.07	122.75	205.38	113.05	8.83	144.77	37.06	173.41	29.12	143.14	8.92	116.12
1990	85.96	119.34	12.38	116.30	210.16	115.68	8.78	143.94	29.57	138.40	27.86	136.94	8.01	104.31
1991	84.82	117.75	13.61	127.80	232.46	127.96	7.30	119.64	31.02	145.17	30.55	150.16	10.23	133.10
1992	80.64	111.95	10.38	97.52	221.33	121.83	8.49	139.25	30.90	144.61	32.60	160.23	7.82	101.84
1993	80.89	112.29	10.40	97.66	230.43	126.84	8.96	146.93	31.28	146.39	33.66	165.42	8.94	116.35
1994	84.85	117.79	9.29	87.28	245.28	135.01	8.60	141.07	47.67	223.07	30.73	151.02	10.89	141.76
1995	86.91	120.65	9.39	88.15	252.78	139.14	9.59	157.17	41.63	194.83	19.57	96.17	9.11	118.52
1996	72.03	100.00	9.37	88.00	238.53	131.29	9.16	150.24	33.23	155.50	32.78	161.12	10.12	131.72
1997	75.52	104.84	9.26	86.98	221.12	121.71	11.29	185.20	39.12	183.06	33.07	162.55	9.87	128.47
1998	49.56	68.80	8.42	79.07	252.81	139.16	9.88	162.06	39.12	183.05	34.81	171.08	11.26	146.60

Millets and pulses also showed about 30-35 percent increase in the yield rate. Introduction of high yielding varieties in wheat, maize and rice coupled with an improved irrigation facilities led to the said spectacular increase in the yield rates of these crops. Millets and pulses are mostly cultivated on un-irrigated (rain-fed) land.

Among the major cash crops, cotton, sugarcane and jute exhibited two-fold increase in their yield rates. Oilseeds and potatoes exhibited a little over 70 percent increase in their yield rates. Among the minor cash crops, tapioca showed the highest increase in the yield rate, followed by turmeric, ginger and chillies. Soyabean is picking up an appreciable increase in the yield rate.

Changes in the Cropping Pattern: Percentage areas under different crops exhibit changes over time. Crops that are more remunerative often replace less remunerative ones. As a result, less remunerative crops are pushed to claim less fertile land and this process leads to an increase in the total area under cultivation. Pressure of population further accelerates this process.

During 1951-98, percentage areas under rice, millets, pulses, and mesta have noticeably declined, while percentage areas under wheat, maize, oilseeds, sugarcane and potatoes have appreciably increased. Percentage areas under cotton and jute also have a tendency to decline. Growth of food processing industries and changes in consumption pattern have attributed to an ever-increasing demand for crops like wheat, maize, oilseeds, sugarcane and potatoes. On the other hand, growth of textiles industries using man made fibers and substitution of jute products by synthetic products have affected demand for cotton, jute and mesta as raw materials.

Table-12 (A) . Cropping Pattern in Indian Agriculture
(Percentage of Total* Cultivated Area Under different Major Crops 1951-98)

Year	Rice	Wheat	Maize	Millets	Pulses	Oil-seeds	Sugar-cane	Cotton	Jute	Mesta	Pota-toes	Major Crops
1951	36.38	11.58	3.78	2.91	22.56	12.64	2.01	6.97	0.71	0.24	0.24	100.0
1961	33.08	12.51	4.27	2.90	22.89	13.39	2.33	7.37	0.58	0.29	0.39	100.0
1971	32.52	15.74	5.02	2.62	19.55	14.36	2.25	6.57	0.69	0.26	0.43	100.0
1981	32.12	17.82	4.80	3.18	17.97	14.08	2.13	6.26	0.75	0.29	0.58	100.0
1982	31.65	17.22	4.61	2.94	18.54	14.81	2.48	6.26	0.64	0.25	0.59	100.0
1983	30.70	18.91	4.59	2.81	18.32	14.25	2.69	6.32	0.59	0.23	0.60	100.0
1984	31.59	18.80	4.54	2.78	18.04	14.41	2.44	5.98	0.57	0.22	0.62	100.0
1985	32.85	18.65	4.63	2.57	18.15	13.33	2.36	5.89	0.66	0.24	0.68	100.0
1986	32.93	18.57	4.73	2.55	19.17	11.75	2.30	6.10	0.92	0.28	0.68	100.0
1987	33.68	18.93	4.85	2.43	18.95	12.23	2.52	4.87	0.66	0.22	0.68	100.0
1988	31.56	18.62	2.92	2.39	16.92	18.04	2.71	5.33	0.57	0.22	0.73	100.0
1989	31.39	18.13	4.44	2.06	17.41	17.15	2.50	5.52	0.52	0.17	0.70	100.0
1990	31.31	17.45	4.39	2.01	17.38	17.83	2.55	5.71	0.50	0.17	0.70	100.0
1991	31.18	17.55	4.36	1.83	17.86	17.68	2.69	5.41	0.57	0.18	0.69	100.0
1992	31.37	17.11	4.31	1.54	16.58	19.04	2.83	5.64	0.64	0.18	0.76	100.0
1993	30.85	18.16	4.40	1.46	16.51	18.89	2.67	5.57	0.54	0.15	0.79	100.0
1994	30.69	18.19	4.37	1.43	16.38	19.64	2.53	5.36	0.51	0.14	0.76	100.0
1995	30.91	18.55	4.43	1.29	16.63	18.27	2.79	5.68	0.53	0.14	0.77	100.0
1996	30.83	18.00	4.30	1.20	16.04	18.69	2.98	6.50	0.53	0.14	0.80	100.0
1997	30.67	18.28	4.42	1.13	15.85	18.60	2.95	6.44	0.63	0.14	0.88	100.0
1998	30.53	18.76	4.43	1.09	16.07	18.43	2.79	6.26	0.65	0.14	0.85	100.0

*= Includes 11 major crops.

Table-12 (B) . Cropping Pattern in Indian Agriculture
(Percentage of Total* Cultivated Area Under different Major Crops 1951-98)

Year	Rice	Wheat	Maize	Millets	Pulses	Oil-seeds	Sugar-cane	Cotton	Jute	Mesta	Pota-toes	Major Crops
1951	35.54	11.31	3.69	2.84	22.04	12.35	1.96	6.81	0.69	0.23	0.23	97.69
1961	32.45	12.28	4.19	2.85	22.46	13.13	2.28	7.23	0.57	0.29	0.38	98.10
1971	31.96	15.47	4.93	2.58	19.21	14.11	2.21	6.46	0.68	0.26	0.43	98.30
1981	31.63	17.55	4.73	3.13	17.69	13.87	2.10	6.16	0.74	0.28	0.57	98.46
1982	31.18	16.96	4.55	2.90	18.26	14.59	2.45	6.17	0.63	0.25	0.58	98.52
1983	30.20	18.60	4.52	2.76	18.02	14.01	2.65	6.21	0.58	0.23	0.59	98.37
1984	31.14	18.53	4.47	2.74	17.79	14.20	2.41	5.90	0.56	0.22	0.61	98.57
1985	32.37	18.37	4.56	2.53	17.88	13.13	2.32	5.81	0.66	0.23	0.67	98.52
1986	32.44	18.29	4.66	2.51	18.88	11.57	2.27	6.01	0.91	0.28	0.67	98.50
1987	33.19	18.65	4.77	2.40	18.67	12.05	2.48	4.79	0.65	0.21	0.67	98.52
1988	31.14	18.37	2.88	2.36	16.69	17.79	2.67	5.26	0.57	0.21	0.72	98.65
1989	30.96	17.88	4.37	2.03	17.17	16.91	2.47	5.45	0.51	0.17	0.69	98.62
1990	30.90	17.22	4.33	1.98	17.16	17.60	2.52	5.64	0.50	0.17	0.69	98.71
1991	30.77	17.32	4.30	1.80	17.62	17.44	2.66	5.34	0.56	0.18	0.68	98.68
1992	31.00	16.91	4.26	1.52	16.39	18.82	2.79	5.57	0.64	0.17	0.75	98.82
1993	30.47	17.94	4.35	1.45	16.31	18.65	2.64	5.50	0.53	0.15	0.78	98.77
1994	30.32	17.97	4.32	1.42	16.18	19.40	2.50	5.29	0.50	0.14	0.76	98.80
1995	30.57	18.35	4.38	1.28	16.44	18.07	2.76	5.62	0.53	0.14	0.76	98.88
1996	30.48	17.80	4.25	1.18	15.86	18.47	2.95	6.43	0.52	0.13	0.79	98.87
1997	30.31	18.07	4.37	1.12	15.67	18.38	2.91	6.36	0.63	0.14	0.87	98.82
1998	30.19	18.56	4.38	1.08	15.89	18.23	2.76	6.19	0.64	0.14	0.84	98.89

*= Includes 11 major and 6 minor crops (Tobacco, chillies, turmeric, ginger, tapioca and sweet potatoes).

Components of Agricultural growth: We use Minhas-Vaidyanathan decomposition scheme with 1991-92 prices (W_i) of major crops for decomposition analysis of agricultural growth.

$$\begin{aligned}
 P_t - P_0 &= (A_t - A_0) \sum_{i=1}^n Y_{i0} C_{i0} W_i + A_0 \sum_{i=1}^n (Y_{it} - Y_{i0}) C_{i0} W_i + A_0 \sum_{i=1}^n Y_{i0} (C_{it} - C_{i0}) W_i \\
 &+ (A_t - A_0) \sum_{i=1}^n (Y_{it} - Y_{i0}) C_{i0} W_i + A_0 \sum_{i=1}^n (Y_{it} - Y_{i0}) (C_{it} - C_{i0}) W_i \\
 &+ (A_t - A_0) \sum_{i=1}^n Y_{i0} (C_{it} - C_{i0}) W_i + (A_t - A_0) \sum_{i=1}^n (Y_{it} - Y_{i0}) (C_{it} - C_{i0}) W_i
 \end{aligned}$$

or,

$$\delta P = \delta A + \delta Y + \delta C + \delta A \delta Y + \delta Y \delta C + \delta A \delta C + \delta A \delta Y \delta C$$

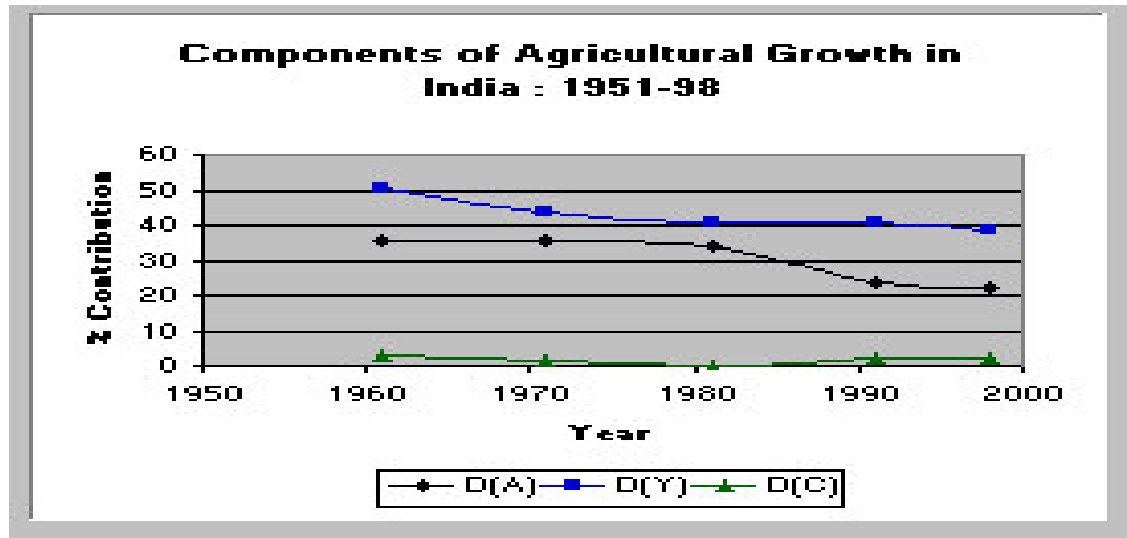
Prices of Major Crops (Rs/Quintal) in 1991-92

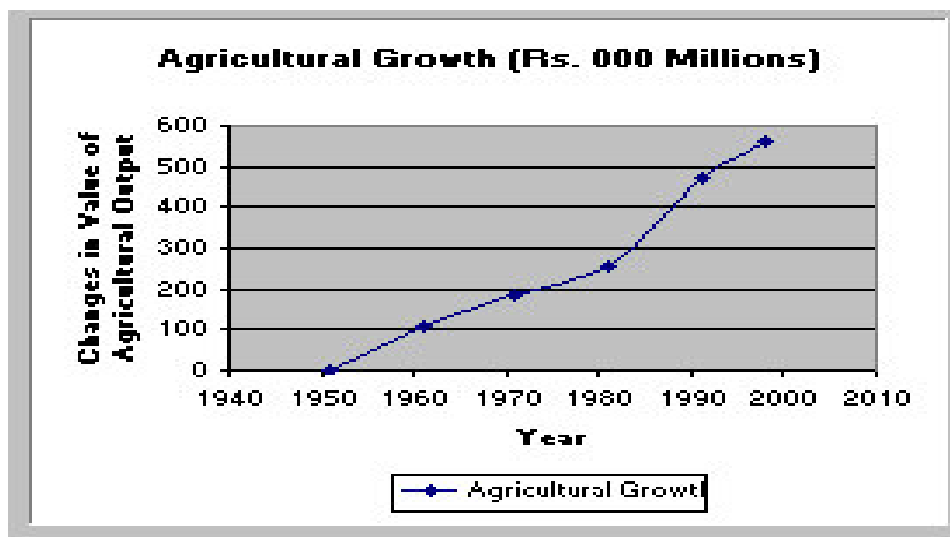
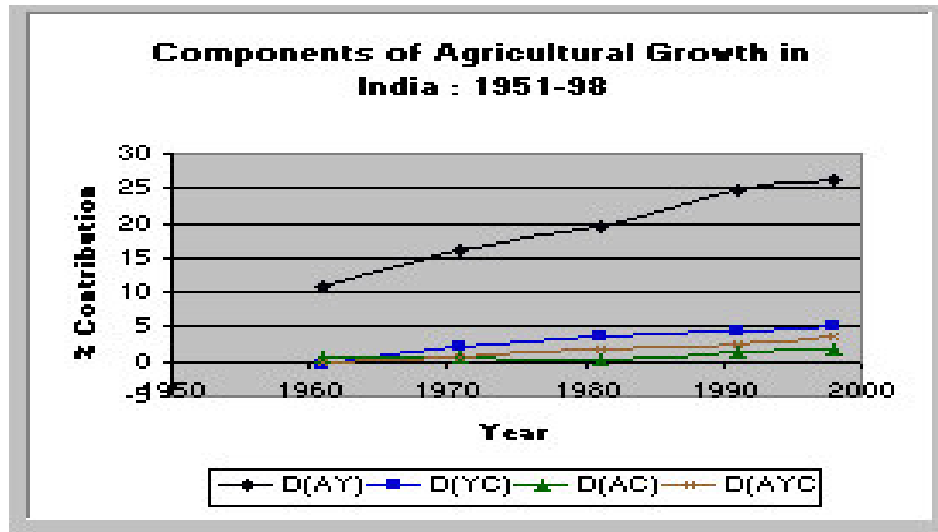
Crop	Rice	Wheat	Maize	Millets	Pulses	Oilseeds	Sugarcane	Cotton	Jute	Mesta	Potatoes
Price	253	247	230	220	594	660	29	770	410	290	110

Components of Agricultural Growth in India : 1951-98

(At 1991-92 Prices; Values in Rs. Million)

Compo- nents	1951-1961		1951-1971		1951-1981		1951-1991		1951-1998	
	Value	Percent	Value	Percent	Value	Percent	Value	Percent	Value	Percent
δA	39594	35.73	66681.23	35.44	86769.62	33.99	112173.30	23.59	124330.80	22.26
δY	55793.65	50.34	82164.64	43.67	103645.50	40.60	192584.3	40.51	215779.30	38.62
δC	3416.70	3.08	2542.20	1.35	940.74	0.37	11859.55	2.49	13149.76	2.35
$\delta A \delta Y$	12108.66	10.93	30031.05	15.96	49294.66	19.31	118411.10	24.90	147051.80	26.32
$\delta Y \delta C$	-678.62	-0.61	4242.53	2.25	9600.54	3.76	20516.73	4.32	29366.18	5.26
$\delta A \delta C$	741.51	0.67	929.17	0.49	447.43	0.18	7291.88	1.53	8961.46	1.60
$\delta A \delta Y \delta C$	-147.28	-0.13	1550.64	0.82	4566.10	1.79	12614.78	2.65	20012.81	3.58
SUM = δP	110828.60	100.00	188141.50	100.00	25264.50	100.00	475451.60	100.00	558652.00	100.00





Conclusion: In the analysis above we observe that: (1) the percentage contribution of change (increase) in yield rate (δY) is the most dominant component of agricultural growth. In 1951-61 it contributed a little over 50% to the total growth. It continues to be the most potent single contributor to growth since then. (2) The percentage contribution of change (increase) in the gross area under cultivation was the second most potent factor of agricultural growth. However, during 1981-91 and afterwards, the interaction component between area and yield rate ($\delta A\delta Y$) overtook its dominance. Change in cropping pattern (δC) on its own has been only a marginal component of agricultural growth. However, interacting with changes in gross area and yield rate ($\delta Y\delta C$ and $\delta A\delta Y\delta C$), it has significantly contributed to agricultural growth.