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Food Security in North-East Region of India — A State-wise Analysis

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Abstract

With the adoption of high-yielding varieties of paddy, the foodgrains production has increased in North-East region of India. To estimate the growth performance of agriculture, time series data on area, production and productivity of foodgrains have been analysed for the period 1972-73 to 2011-12, which was divided into three decades, viz. 1982-83 to 1991-92 (I decade), 1992-93 to 2001-02 (II decade), 2002-03 to 2011-12 (III decade) and overall period 1972-73 to 2011-12. During the overall period, among the states, Nagaland registered the highest significant growth in area, production and yield, followed by Arunachal Pradesh and Mizoram. All the NE states have shown positive growth rates in area, production and yield increase. The decomposition analysis of growth has suggested that sources of output growth were almost same in all the periods. During the first decade, the major contribution in the change of foodgrain production in the region was of area effect (74.8%), followed by yield effect (22.8%), whereas in all-India, the yield effect was 71 per cent. During the second period, the region had almost half sharer (50.3%) of area effect in food security, followed by yield effect (42.7%). In the third decade, yield effect was the major contributing factor to food security of the region (98.6%), except of Nagaland and Sikkim where major contribution has been found of area effect.

Key words: Foodgrains, adoption, growth rate, decomposition analysis

JEL Classification: Q18

Introduction

The North-East India has eight states — Assam, Arunachal Pradesh, Meghalaya, Manipur, Mizoram, Nagaland, Sikkim and Tripura with a total geographical area of 262180 km^2 which is about 8 per cent of the country's total area. The region has a population of about 47.9 million (2014). The net sown area is highest in Assam (34.1 %) where plains account for 84.4 per cent of its total geographical area, followed by Tripura (23.5%), while Arunachal Pradesh has lowest net sown area (2.1%). The cropping intensity is around 135 per cent, highest in Tripura (185%), followed by Manipur (145 %). About 1.67 Mha area is under shifting cultivation (*jhum* cultivation). Out of 4 Mha net sown area of the region, about 1.3 Mha area suffers serious soil degradation problems.

The region receives an average annual rainfall of 2000 mm accounting for about 10 per cent (42.5 mhm) of the country's total precipitation of 420 mhm. The soil of the region is acidic to strongly acidic in reaction accounting for 70 per cent of the total geographical area. Low soil pH is basically due to leaching of the bases under the influence of high rainfall. The aluminium toxicity in upland and iron toxicity in the valley are prevalent. Soils are rich in organic matter. Forest cover in the region is 14.2 Mha which is about 54 per cent of total geographical area and is higher than the national average (19.4 %). By and large, the region is characterized by fragility, marginality,

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inaccessibility, cultural heterogeneity, ethnicity and rich in biodiversity. Most rural population (82 %) depends on agriculture and allied sector for livelihood in the absence of industries, except in the state of Assam. Around 56 per cent area is under low altitude, 33 per cent mid altitude and 11 per cent is under high altitude. The agricultural production system is characterized largely by CDR (Complex diverse risk-prone) type, low cropping intensity, subsistence farming, undulating topography and faulty land-use pattern with annual loss of soil of 46 t/ha. In the region fertilizer consumption is only about 12 kg/ha and chemical pesticides-use is also meager (0.14 g/ha). Under the scenario the present paper has studied the food security status in the region at state level.

Data and Methodology

The secondary data on area, production and productivity of different crops were compiled from Ministry of Agriculture, Government of India. The methods used in the study included estimation of growth rate with its test of significance, decomposition of growth components, confirmation of acceleration, deceleration or stagnation of growth and instability analysis.

The growth rate was measured following the procedure adopted by various authors (Mahir *et al*., 2010; Sonnad *et al*., 2011; Kenamu *et al*., 2014). By taking time as independent variable and area, production and productivity of the crops as dependent variables, the compound growth rates were estimated.

Results and Discussion

Dynamics of Foodgrains Production and Food Security Status

The dynamics of total production of foodgains in North-East region is presented in Table 1 state-wise. A perusal of Table 1 reveals that the region required a total of 8.45 Mt of foodgrains for its population of 47.9 millions in 2014. During the past two years (2012-13 and 2013-14), there has been a substantial increase in production and productivity of foodgrains which has been achieved reducing the deficiency of foodgrains from 8.3 per cent in TE 2012 to 2.5 per cent in TE 2014 (Table 1). During the past twelve years, rice production of this region has increased by 26 per cent (from 5396 thousand tonnes in TE 2003 to 6805 thousand tonnes in TE 2014) at the compounded growth rate of 3.78 per cent. The increase in production and productivity of foodgrains is being achieved because of adoption of high-yielding varieties, quality seed materials and timely supply of improved seeds.

The North-East region produces only 3.10 per cent of national foodgrains production and continues to be a net importer of foodgrains even for its own consumption. The productivity of land as compared to its potential is low. This region has only 29 soil testing laboratories. The NPK consumption is low, viz. NPK (kg/ha) is 130.5 (Manipur), 46.6 (Assam), 29.4 (Tripura), 17.0 (Meghalaya) and very low in other states. The indigenous plough is the main farms implement (95.7%); irrigation covers only 11 per cent of net sown area. Area under high-yielding variety (HYV) paddy is 9.50 lakh ha (35%). The HYV seed replacement rate is extremely low and 4.31 lakh farmers possess Kisan Credit Cards (KCCs). Nearly five lakh families practise shifting cultivation (*jhuming*) covering about 1.67 Mha of which 17 per cent is jhumed at any point of time.

State-wise Scenario

A perusal of Table 1 revealed that between 2003 and 2014, all states, except Mizoram, achieved considerable increase in foodgrains production. This increase was highest in Manipur (66%), followed by Arunachal Pradesh (60%), Nagaland (52%) and Tripura (26%). Assam and Meghalaya despite achieving considerable increase in production during the period, remained deficit states. The supply-demand analysis has revealed that Nagaland, Arunachal Pradesh, Manipur and Tripura had come under surplus category states, whereas Meghalaya, Mizoram, Assam and Sikkim will have to do much work to become self-reliant in foodgrains production.

Among North-East states, Tripura had achieved the highest productivity of paddy (2.82 t/ha) and highest cropping intensity (185%). In organic farming, Sikkim was leading among all other states, especially in spice crops. The package and practices of organic farming for different crops provided by ICAR, SAUs, CAU and State Agricultural Research Stations has helped in organic food production.

Table 1. Production and requirement of foodgrains in North-East region, 2014

State (human population in 2014)	Production		Increase 2003 to 2014 (%)	Requirement as per 2014 population ('000 tonnes)	Deficit/ Surplus (%)
	TE 2001-2003 ('000 tonnes)	TE 2012-2014 ('000 tonnes)			
Arunachal Pradesh (14,53,124)	234.7	376.4	60.37	256.1	46.97
Assam (3,27,58,905)	3984.0	5409.0	35.77	5773.8	-6.32
Manipur (28,60,566)	378.7	628.5	65.96	504.2	24.66
Meghalaya (31,15,171)	228.5	278.8	22.04	549.0	-49.21
Mizoram (11,46,656)	131.6	80.6	-38.72	202.1	-60.09
Nagaland (20,81,613)	384.4	582.7	51.59	366.9	58.83
Sikkim (6,38,680)	98.4	102.7	4.41	112.6	-8.73
Tripura (38,58,255)	579.5	730.4	26.05	680.0	7.42
NE Region (4,79,12,969)	6019.8	8232.8	36.76	8444.7	-2.51

Note: TE = Triennium average

Table 2. Production and requirement of rice in North-East region in 2014

State	Production		Increase 2003 to 2014 (%)	Requirement as per 2014 population ('000 tonnes)	Deficit/ Surplus (%)
	TE 2001-2003 ('000 tonnes)	TE 2012-2014 ('000 tonnes)			
Arunachal Pradesh	134.0	265.6	98.20	228.1	16.41
Assam	3905.0	4519.1	15.73	5143.1	-12.13
Manipur	378.0	594.3	57.23	449.1	32.34
Meghalaya	184.0	248.5	35.06	489.0	-49.19
Mizoram	99.3	67.3	-32.25	180.0	-62.63
Nagaland	199.0	381.9	91.89	326.8	16.85
Sikkim	22.4	20.6	-8.17	100.3	-79.49
Tripura	535.5	718.7	34.20	605.8	18.64
Total NE	5396.2	6805.3	26.11	7522.3	-9.53

Food Security Analysis — Crop-wise

Rice is the staple food crop of NE region. In rice production, Arunachal Pradesh, Manipur, Nagaland and Tripura have been found as surplus states, whereas Assam, Meghalaya, Mizoram and Sikkim are lagging behind and have made this region almost 10 per cent deficient in rice production (Table 2). To make this region food and pulse secure pulse production should be increased as it was found that all the states were deficient in pulses production. The deficiency ranged from 6.4 per cent in Nagaland to 91.5 per cent in Tripura (Table 3). The NE region is one of the potential areas where pulses production can be increased horizontally by utilizing a part of 1.67 Mha area under *Jhum* cultivation. Considering that pulses could be grown mixed with other crops, the area and production of pulses could be increased vertically. As the soil of this region is acidic in nature, integrated nutrient management (INM) is necessary for increasing pulse production in this region.

Fruits and Vegetables

The National Horticultural Mission/ Technology Mission in horticulture have played an important role in increasing production of fruits and vegetables in NE region. Introduction of superior varieties and hybrids of different fruits and vegetable crops with package of practices in the hill agriculture, all the states in this region have increased their fruits production significantly, from 2402 thousand tonnes in TE 2003 to 4458 thousand tonnes in TE 2014 at an annual compound growth rate (CGR) of 4.3 per cent. In the

Table 3. Production and requirement of pulses in North-East region in 2014

State	Production		Increase 2003 to 2014 (%)	Requirement as per 2014 population ('000 tonnes)	Deficit/ Surplus (%)
	TE 2001-2003 ('000 tonnes)	TE 2012-2014 ('000 tonnes)			
Arunachal Pradesh	7.4	10.8	46.22	26.5	-59.20
Assam	63.0	61.6	-2.30	597.9	-89.70
Manipur	3.0	27.8	825.00	52.2	-46.85
Meghalaya	3.4	7.6	123.82	56.9	-86.61
Mizoram	4.5	5.5	22.00	20.9	-73.77
Nagaland	30.4	35.6	16.97	38.0	-6.40
Sikkim	6.3	5.9	-7.14	11.7	-49.83
Tripura	5.4	6.0	10.74	70.4	-91.51
Total NE	123.7	159.8	29.22	874.4	-81.72

case of vegetables, the production increased from 3663 thousand tonnes in TE 2003 to 5223 thousand tones in TE 2014 (Table 4).

Dynamics of Area, Production and Productivity

To estimate the growth performance of agriculture, time series data on area, production and productivity of foodgrains for the period 1972-73 to 2011-12 were analysed. To understand the decadal performance, the whole period was divided into four decades, viz. 1982-83 to 1991-92 (I decade), 1992-93 to 2001-02 (II decade), 2002-03 to 2011-12 (III decade) and overall period 1972-73 to 2011-12.

First Decade (1982-83 to 1991-92)

During this period, the growth in area was observed highest in Mizoram (40.1%), followed by Nagaland (36.3%) and Sikkim (4.3%) and these were positively significant. Arunachal Pradesh, Assam, Mizoram and Nagaland also showed a positive and significant growth in area, while Manipur, Meghalaya and Tripura showed a negative growth rate in area. The same trend was observed in production — highest in Mizoram (47.31%), followed by Nagaland (43.8%) and Sikkim (7.16%) and all were positively significant. All the North-Eastern states have shown positive growth rate in yield, except Meghalaya (-0.32%). It was due to the efforts of ICAR and SAU who started breeder seed production of HYVs and their multiplication and distribution among the farmers involving SHGs in co-ordination with NSC and different governments.

Second Decade (1992-93 to 2001-02)

During this period, Nagaland registered the highest positive significant growth rate in area (3.31%) and production (4.20%), followed by Meghalaya, while Sikkim showed a significant negative growth rate in area (-0.84%) and production (-0.89%). Meghalaya and Mizoram have shown positive and significant growth rates in yield.

Third Decade (2002-03 to 2011-12)

This period witnessed Manipur and Nagaland registering highest positive growth rates in area. All other states, except Meghalaya and Mizoram have also shown a positive growth rate in area. Only Tripura (2.94%) registered a significant and positive growth rate in production during this period.

Total Period (1972-73 to 2011-12)

During the total period, the highest significant growth in area, production and yield was registered by Nagaland, followed by Arunachal Pradesh and Mizoram. All the states have shown a positive growth rate in area, production and yield increase.

Contribution of Area and Productivity to Food Security

The dynamics of area, production and yield of major crops revealed the general pattern of growth and direction of changes in yield and area, but did not evaluate the contribution of area and yield to food security in the NE region. Therefore, it was necessary to examine the sources of output growth. For this, the

Table 4. Production and requirement of fruits and vegetables in North-East region in 2014

State	Commodity	Production		Increase 2003 to 2014 (%)	Requirement as per 2014 population ('000 tonnes)	Deficit/ Surplus (%)
		TE 2001-2003 ('000 tonnes)	TE 2012-2014 ('000 tonnes)			
Arunachal Pradesh	Fruits	123.1	214.6	74.32	63.7	70.34
	Vegetables	83.7	102.6	22.54	158.4	-35.24
Assam	Fruits	1293.8	1929.8	49.15	1434.8	34.49
	Vegetables	2693.1	3038.7	12.83	3570.7	-14.90
Manipur	Fruits	118.7	460.8	288.18	125.3	72.81
	Vegetables	67.4	235.7	249.67	311.8	-24.41
Meghalaya	Fruits	186.9	324.2	73.47	136.4	57.92
	vegetables	303.6	450.2	48.28	339.6	32.58
Mizoram	Fruits	66.7	309.8	364.47	50.2	83.79
	Vegetables	47.3	237.6	402.37	125.0	90.11
Nagaland	fruits	290.4	379.3	30.63	91.2	75.97
	Vegetables	80.0	357.5	346.88	226.9	57.56
Sikkim	fruits	23.03	21.3	-7.34	28.0	-23.70
	Vegetables	59.7	105.8	77.24	69.6	51.98
Tripura	Fruits	274.7	715.4	160.41	169.0	76.38
	Vegetables	328.1	666.5	103.15	420.6	58.49
Total NE	Fruits	2401.9	4457.6	85.59	2099.0	52.92
	Vegetables	3662.9	5176.6	41.32	5222.5	-0.88

Table 5. Compound growth rates of area, production and yield of major agricultural crops in North-East India state-wise during the decades of 1982-83 to 1991-92, 1992-93 to 2001-02, 2002-03 to 2011-12 and overall period 1972-73 to 2011-12

Period	Factor	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura
1972-73 to 1981-82	Area	7.963	1.136	-0.139	0.955	-7.370	-6.752	NA	-0.131
	Production	11.242	0.834	1.742	2.927**	-9.430	-4.502	NA	4.026
	Yield	3.037	-0.299	1.884	1.953*	-2.224	2.413	NA	4.163
1982-83 to 1991-92	Area	3.558	0.734	-0.162	-0.318	4.051*	3.349*	4.381*	-0.389
	Production	4.225	2.301	1.509	-0.640	4.318*	4.826**	7.163**	3.205
	Yield	0.644	1.556	1.674	-0.323	5.189***	5.484	2.665	3.608**
1992-93 to 2001-02	Area	0.248	-0.066	0.862	0.406**	-2.179	3.317**	-0.842	-0.882
	Production	0.415	1.762	1.891	5.776***	0.787	4.206	-0.891	2.604
	Yield	0.166	1.829**	1.020	5.348***	3.032**	0.861	-0.049	3.518
2002-03 to 2011-12	Area	0.547	0.235	5.466*	-0.138	-3.762*	1.966	0.366	0.559
	Production	4.681	2.766	4.762	1.251	-10.246	3.513	1.346	2.948*
	Yield	4.111	2.524	-0.668	1.391	-6.738	1.518	0.977	2.375*
1972-73 to 2011-12	Area	2.361***	0.357**	0.243	0.149	1.529	5.361***	-0.450	-0.486***
	Production	3.376***	1.864***	1.754***	1.698***	3.369	8.330***	0.499	2.029***
	Yield	0.992***	1.502***	1.508***	1.546***	1.812	2.818***	0.953***	2.527***

Notes: *, ** and *** denote significance at 10 per cent, 5 per cent and 1 per cent levels, respectively

change in production was divided into three effects, viz. area effect, yield effect and interaction effect. With the help of this additive decomposition model, the relative contribution of area, productivity and their interaction on rice, maize, pulses, foodgrains, cereals and oilseeds production in NE states for different periods (1972-73 to 1981-82, 1982-83 to 1991-92, 1992-93 to 2001-02, 2002-03 to 2011-12 and 1972-73 to 2011-12) was estimated and is presented in Table 6.

A perusal of Table 6 reveals that during the first decade, the highest contribution to achieving food security in the region was of area effect (74.81%), followed by yield effect (22.79%). Except Manipur and Tripura wherein the major contribution to food security was of yield effect, the major contribution in other states was of area effect.

During the second decade (1982-83 to 1991-92), a pattern similar to that observed in first decade was seen, except in Meghalaya and Sikkim wherein major contribution to food security was of yield effect. During this period, the region witnessed the contribution to food security of area effect as more than half (50.3%), followed by yield effect (42.7%), while national figure for yield effect was 73.46 per cent. During the third decade, yield effect emerged as the major contributor to food security of the region (98.61%) as well as of individual states, except Nagaland and Sikkim wherein the major contributor was area effect. In the fourth decade, the region as a whole (81.15%) as well all states, except Manipur and Mizoram, showed yield effect as the major contributor to food security. When the whole period (1973-2012) was taken together, Arunachal Pradesh and Nagaland registered interaction effect as the highest contributor while Mizoram showed area effect to be the major contributor to food security. Assam, Manipur, Meghalaya, Sikkim, Tripura and N-E region as a whole registered yield effect as the highest contributor to food security. During the whole period, for most of the states, the major contribution to food security was either of yield effect or area effect.

Policy Implications

The study has revealed that during the total study period (1973-74 to 2011-12), across all the states in North-East region, Nagaland has registered the highest significant growth in area, production and yield, followed by Arunachal Pradesh and Mizoram. All the states in NE region have shown positive growth rates in area, production and yield increase. The decomposition analysis of growth has suggested that the sources of output growth were almost same during all the periods. During the first decade (1973-72 to 1981-82), the major contribution to food security in the region was of area effect (74.8%), followed by yield effect (22.8%), whereas at all-India level it was the yield effect (71%). During the second period, the contribution to food security of the region was highest of area effect (50.3%), followed by yield effect (42.7%) while national figure of yield effect was 73.46 per cent. In the third decade, yield effect had made the major contribution to food security of the region (98.6%) as well as of individual states, except Nagaland and Sikkim, wherein the major contributor was the area effect.

Non-availability of adequate quantity of quality seeds of improved varieties and lack of use of inputs like fertilizers, weed control and disease and pests protection chemicals have been identified as the major constraints in foodgrain production in the region. To make this region food and nutritional secure, proper strategies will have to be evolved. Under Rashtriya Krishi Vikas Yojana (RKVY) ₹ 400 crores were allocated for the Eastern and NE regions, of which ₹ 332.87 crores have been released to the seven NE states for extending green revolution during 2011-12. The program aims to improve rice-based cropping system in the selected states. There is THE need for action oriented mega national program for the rain-fed and hilly ecosystems of the region with concerted efforts from all line departments.

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Table 6. Contribution of area, productivity (yield) and their interaction to food security in North-East region during the decades 1972-73 to 1981-82, 1982-83 to 1991-92, 1992-93 to 2001-02, 2002-03 to 2011-12 and overall period 1972-73 to 2011-12

Variable	Arunachal Pradesh	Assam	Manipur	Meghalaya	Mizoram	Nagaland	Sikkim	Tripura	North-East region	India
					1972-73 to 1981-82					
ΔP	87.9	22.8	289.2	34.5	-38.7	-3.7	NA	174.4	42.8	36310.9
	(100)	(100)	(12.76)	(100)	(100)	(100)		(100)	(100)	(100)
$A_0\Delta Y$	9.86	175.92	68.29	13.23	6.01	20.66	NA	151.24	97.73	26012.76
	(11.22)	(771.57)	(77.69)	(38.34)	(15.54)	(558.29)		(86.72)	(22.79)	(71.64)
$Y_0\Delta A$	65.59	214.46	14.09	19.17	-41.32	-17.59	NA	12.76	320.8	8120.92
	(74.62)	(940.63)	(16.03)	(55.55)	(106.77)	(475.42)		(7.32)	(74.81)	(22.36)
ΔAΔY	12.44	-15.74	5.52	2.11	-3.4	-6.77	NA	10.4	10.26	2177.22
	(14.16)	(69.05)	(6.28)	(6.11)	(8.77)	(182.88)		(5.96)	(2.39)	(6)
					1982-83 to 1991-92					
ΔP	72.7	648.7	121.6	1.7	85	190.2	47.7	61.4	1229	44261.7
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
$A_0\Delta Y$	16.79	306.12	120.53	3.1	3	7.59	22.44	105.02	525.33	32515.27
	(23.09)	(47.19)	(99.12)	(182.12)	(3.53)	(3.99)	(47.05)	(171.05)	(42.74)	(73.46)
$Y_0\Delta A$	50.18	308.53	0.7	-1.37	52	116.61	18.65	-35.03	618.46	9390.68
	(69.03)	(47.56)	(0.57)	(80.49)	(61.18)	(61.31)	(39.1)	(57.06)	(50.32)	(21.22)
ΔAΔY	5.73	34.06	0.37	2.11	30	66.01	6.6	-8.59	85.21	2355.75
	(7.88)	(5.25)	(0.3)	(6.11)	(35.29)	(34.7)	(13.84)	(13.99)	(6.93)	(5.32)
					1992-93 to 2001-02					
ΔP	23	535.2	123.1	79.5	21.5	126.7	-6.3	139	1041.7	27680.3
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
$A_0\Delta Y$	17.11	636.1	74.22	74.5	33.38	30.22	1.17	159.11	1027.17	48145.67
	(74.41)	(118.85)	(60.29)	(93.71)	(155.27)	(23.86)	(18.62)	(114.47)	(98.61)	(173.93)
$Y_0\Delta A$	5.41	-85.34	38.56	3.31	-9.01	85.21	-7.39	-14.93	12.05	-16242.27
	(23.52)	(15.95)	(31.33)	(4.16)	(41.92)	(67.26)	(117.31)	(10.74)	(1.16)	(58.68)
ΔAΔY	0.48	-15.56	10.32	1.7	-2.87	11.26	-0.08	-5.18	2.48	-4223.1
	(2.07)	(2.91)	(8.38)	(2.13)	(13.35)	(8.89)	(1.31)	(3.73)	(0.24)	(15.26)
					2002-03 to 2011-12					
ΔP	120.2	769.32	325.37	21.95	-61.15	178.46	6.57	118.1	1478.82	84551.77
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
$A_0\Delta Y$	106.77	791.2	27.78	25.15	-33.49	88.1	11.64	88.5	1200.02	61905.03
	(88.83)	(102.84)	(8.54)	(114.59)	(54.77)	(49.37)	(177.14)	(74.93)	(81.15)	(73.22)
$Y_0\Delta A$	9.32	-18.19	275.34	-2.88	-37.35	73.64	-4.52	25.86	231.9	16723.26
	(7.75)	(2.36)	(84.62)	(13.13)	(61.08)	(41.27)	(68.85)	(21.9)	(15.68)	(19.78)
ΔAΔY	4.11	-3.7	22.25	-0.32	9.69	16.72	-0.54	3.74	46.91	5923.48
	(3.42)	(0.48)	(6.84)	(1.45)	(15.84)	(9.37)	(8.29)	(3.17)	(3.17)	(7.01)
					1982-83 to 2011-12					
ΔP	120.2	769.32	325.37	21.95	-61.15	178.46	6.57	118.1	1478.82	84551.77
	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)
$A_0\Delta Y$	106.77	791.2	27.78	25.15	-33.49	88.1	11.64	88.5	1200.02	61905.03
	(88.83)	(102.84)	(8.54)	(114.59)	(54.77)	(49.37)	(177.14)	(74.93)	(81.15)	(73.22)
$Y_0\Delta A$	9.32	-18.19	275.34	-2.88	-37.35	73.64	-4.52	25.86	231.9	16723.26
	(7.75)	(2.36)	(84.62)	(13.13)	(61.08)	(41.27)	(68.85)	(21.9)	(15.68)	(19.78)
ΔAΔY	4.11	-3.7	22.25	-0.32	9.69	16.72	-0.54	3.74	46.91	5923.48
	(3.42)	(0.48)	(6.84)	(1.45)	(15.84)	(9.37)	(8.29)	(3.17)	(3.17)	(7.01)

Note: The values within the parentheses are percentage share of column total (P= Production in '000 tonnes, A= Area in '000 ha, Y= Yield in tonnes/ha, ΔP, ΔA and ΔY are change in production, area and yield, respectively.)

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