



REVIEW ARTICLE

Changes in Agricultural sector during Post-reform Period: Evidence from Assam

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Abstract

India is one of the fastest growing economies in the world today. The economic reforms implemented in the country since the early 1990s have helped India grow at 6-plus percent on an average since 1992-93. India as well as Assam's economic performances in the post-reform have many positive features. The present review reveals that the area under cereal crops, pulse crops, oilseeds crops of Assam are declining in the reform period. Area, production and productivity increased significantly under fruit and vegetable crops during reform and post-reform period. This increase may be due to implementation of various horticultural schemes in the state by the Department for Development Horticulture in 1992-93. The behaviour of agriculture is changed in post-reform period in terms of growth rates. Some crops showing positive growth rates in area, production and productivity. Most of the crops are showing negative growth rate in terms of area, production and productivity, which may be due to lack of promotional measures or increase demand for high valued agricultural crops. Various agricultural crops are classified on the basis of their performance during post-reform period. In Assam, mesta, sugarcane, tobacco and rabi pulses are classified as highly sensitive crops since their production and productivity grown at a faster rate during the reform period. Non-sensitive crops are rice, maize, oilseeds, pulses, coconut, potato, onion, linseed etc. as they showed negative growth rate in area, production and productivity during the reform period.

Keywords: Economic reforms, Assam, post-reform, horticultural schemes, agricultural crops.

Introduction

Assam agriculture is the primary sector in the state's economy. Agriculture and its allied activities has paramount importance in the state of Assam as this sector is the major contributor to the state economy as well as providing livelihood to a significant proportion of the population of the state. Assam agriculture is dominated by small and marginal farmers. Assam producing food crops, cash crops and high valued horticultural crops. Main crops include rice, maize, sugarcane, jute, pineapple, minor fruits, tea, vegetables etc. Though Assam has attained self-sufficiency in rice and fruits and vegetables, a significant shortfall in production is observed in case of oilseeds, pulses, wheat etc. Rice is the main crop of the state and it suffers from depressed price, coupled with low average yield, low cropping intensity and lack of diversification. Under this scenario, with the new economic reform process, the future of the state does not look positive. Considering these, diversification of agriculture with proper measures to improve the average yield of rice as well as lowering the costs of production are an urgent need for the farmers of the state. Before trade liberalization, about 90% of the total cultivable land of Assam was put under food crops and the remaining 10% was put under non-food crops. But after liberalization, there was a change in cropping pattern of Assam along with other states of the country and accordingly area under food crops became decreasing and area under non-food crops increases slightly.

Under the new GATT arrangement and particularly after the birth of World Trade Organization (WTO), farmers' interest are completely protected through the '*sui generis*' legislation to protect the plant varieties. Under this legislation, right of farmers to retain and exchange seeds was not affected. Thus, the farmers in Assam can also avail the benefits of retaining and exchanging seeds of HYV variety produced in their farm without any difficulty (Madaan, 2002). In Assam, the food grains production especially paddy dominates to ensure food security. However, food security should be viewed in terms of "food" rather than merely "food grains". If it is measured in terms of, for instance, nutritional requirement, the shift towards horticultural crops should be welcomed. Further, of Assam agriculture and allied sector lies more in commercialization of the sector, particularly, in view of the fast changing economic scenario, following from WTO, trade liberalization and emergence of globally integrated market forces.

Assam Agriculture during reform period

The area, production and productivity of major crops in Assam during pre-reform, reform and post-reform period are presented in Table 1. It shows that area under cereal crops, pulse crops, oilseeds crops are declining but still the productivity showing increasing trend. While area, production and productivity increases significantly under fruit and vegetable crops during reform and post-reform period.

Table 1. Trend in area, production and productivity of major crops of Assam during 1985-86, 1990-91 and 2008-09
(Area: lakh ha, Production: lakh MT, Yield: Kg/ha).

Crops	1985-86			1990-91			2008-09		
	A	P	Y	A	P	Y	A	P	Y
Autumn rice	6.07	4.65	778	6.05	5.22	873	3.51	3.74	1084
Winter rice	17.79	22.94	1309	18.01	25.65	1446	17.73	29.24	1674
Summer rice	0.45	0.45	1016	1.17	1.83	1556	3.62	7.73	2136
Total rice	24.64	28.47	1173	25.27	32.70	1313	24.84	40.70	1638
Wheat	0.93	1.01	1082	0.84	1.05	1248	0.50	0.65	1300
Maize	0.19	0.12	618	0.21	0.13	629	0.17	0.13	775
Other cereals	0.10	0.05	514	0.11	0.05	515	0.05	0.03	522
Total cereals	25.86	29.64	1156	26.40	33.90	1284	-	-	-
Gram	0.05	0.03	482	0.03	0.02	476	0.02	0.01	548
Arahar	0.10	0.07	732	0.07	0.05	680	0.05	0.04	725
Black gram	-	-	-	0.32	0.12	364	0.40	0.24	610
Green gram	-	-	-	0.08	0.04	463	0.06	0.03	527
Lentil	-	-	-	0.19	0.08	457	0.22	0.13	581
Pea	-	-	-	0.34	0.14	408	0.21	0.15	700
Rabi pulses	1.25	0.56	449	1.03	0.42	408	-	-	-
Total pulses	1.41	0.66	471	1.13	0.49	427	1.18	0.73	617
Total food grains	21.27	30.31	1126	27.56	34.42	1249	-	-	-
Rape/Mustard	2.91	1.38	481	2.95	1.58	535	2.26	1.25	550
Sesamum	0.15	0.07	488	0.15	0.07	488	0.12	0.07	570
Linseed	0.09	0.040	449	0.08	0.034	420	0.07	0.04	516
Castor	0.02	0.010	433	0.02	0.008	429	0.01	0.005	435
Total oilseeds	3.17	1.50	473	3.20	1.69	530	2.67	1.53	574
Jute	1.30	11.78	1636	0.96	8.67	1632	0.60	6.48	1939
Mesta	0.123	0.534	782	0.074	0.349	830	0.053	0.27	907
Cotton	0.04	0.02	78	0.02	0.01	79	-	-	-
Sugarcane	0.48	19.78	41201	0.36	15.30	42510	0.29	10.97	38295
Tobacco	0.05	0.03	651	0.03	0.02	558	-	-	-
Areca nut	0.51	0.60	171	0.66	0.51	130	-	-	-
Banana	0.30	3.76	12746	0.35	4.58	12917	0.46	8.19	17800
Chillies	0.109	0.063	576	0.129	0.077	596	0.17	0.11	648
Coconut	0.08	0.54	52	0.10	0.73	60	-	-	-
Onion	0.05	0.11	2439	0.06	0.12	1918	0.07	0.17	2375
Potato	0.54	3.09	5717	0.59	2.77	7240	0.78	5.16	6585
Sweet potato	0.082	0.274	3317	0.093	0.296	3189	0.063	0.23	3690
Tapioca	0.023	0.094	4130	0.023	0.098	4277	0.03	0.15	4828
Turmeric	0.090	0.056	622	0.080	0.050	626	0.14	0.1	745
Assam lemon	.05	0.21	4405	0.06	0.29	4498	0.11	0.78	6922
Pineapple	0.12	1.65	1439	0.12	1.77	1464	0.13	2.04	15659
Orange	.04	0.44	990	0.05	0.45	1006	0.10	1.17	11668

(A: Area, P: Production, Y: Yield), Source: Directorate of Agriculture, Assam.

This increase may be due to implementation of various horticultural schemes in the state by the Department for Development of Horticulture in 1992-93. The state sector schemes were development of progeny orchard, development of horticulture, vegetable crops, development of citrus and pineapple and integrated horticulture development. The central sector schemes were integrated programme for development of spice, production of fruits, integrated development of tropical and arid zone fruits and development of areca nut. The state has already observed a "Horticultural Year" during 1991-92, which might be a positive impact of trade liberalization on Assam agriculture (Buragohain, 2007). The compound growth rates of area, production and productivity of major crops of Assam during pre-reform, reform and post-reform period are shown in Table 2.

The behaviour of agriculture is changed in post-reform period in terms of growth rates. Some crops showing positive growth rates in area, production and production such as mesta, sugarcane, tobacco and some *rabi* vegetables which may be termed as reform sensitive crops. Most of the crops are showing negative growth rate in terms of area, production and productivity, which may be due to lack of promotional measures or increase demand for high valued agricultural crops. In some crops the area, production and productivity showing positive growth in post-reform period but the rate of growth is decreasing as compared to earlier periods. It may be due to saturation of area, production and productivity of such crops during reform periods. Banana, green gram and jute has negative growth rate in area while production and yield shows positive growth rate.

Table 2. The compound growth rate of area, production and productivity of major crops grown in Assam (% per annum).

Crops	1982-83 to 1990-91			1991-92 to 1999-2000			2000-01 to 2008-09		
	A	P	Y	A	P	Y	A	P	Y
Autumn rice	-0.67	-0.96	-3.5	-3.33**	-1.93	1.59	-11.70**	-11.74**	-0.03
Winter rice	1.91**	4.65*	2.66	-1.21*	0.27	1.49*	-1.81	-4.05	-2.29
Summer rice	32.70**	50.53**	13.23**	23.41**	32.28**	7.28**	1.17	3.35	2.37
Total rice	1.98**	4.69*	2.24	-0.07	2.85**	3.00**	-3.23**	-3.63	-0.77
Wheat	-6.50*	-7.82**	-1.67	3.23*	0.67	-2.32	-9.90**	-8.33**	1.91
Maize	0.51	0.50	1.30**	1.81**	3.91**	3.87**	-4.21**	-3.00**	1.66**
Other cereals & millets	3.55	2.05	0.40	5.11**	-2.76	-1.08	-13.64**	-7.54**	-0.07
Total cereals	1.61**	4.13*	1.70	0.04	2.74**	3.12**	-	-	-
Gram	-6.18	-1.54	-0.21	-6.03*	-5.18	2.05**	-6.03*	0.00	1.58*
Arahar	-14.50**	-10.76**	-1.94**	3.90	11.13*	1.25**	-7.25**	-5.82**	0.59**
Black gram	-	-	-	9.59**	15.20**	5.18**3	-1.06	-0.76	0.56
Green gram	-	-	-	1.95	-2.18	-0.68	-2.34	-1.10	2.30**
Lentil	-	-	-	10.37**	14.57**	3.85**	1.45	1.88	-0.03
Pea	-	-	-	-7.93**	0.99	9.87**	-6.20**	-2.35	3.91**
Other <i>rabi</i> pulses	-3.99**	-2.23	2.11	2.70*	8.07**	7.17**	-	-	-
Total pulses	-4.47**	-3.23	1.02	5.76**	11.81**	5.52**	-3.01**	-0.89	1.31
Total food grains	2.29	3.99**	1.82	0.34	2.93**	2.56**	-3.43**	-3.70	-0.20
Rape and Mustard	2.86*	4.50*	1.67	-0.99	-4.03*	-2.99	-6.00**	-5.18*	1.19
Sesamum	2.05	3.70	0.77*	1.25**	4.72**	1.72**	-5.49**	-2.53	1.64*
Linseed	4.33	2.24	-1.00	7.04**	10.94**	3.35**	-10.07**	-9.38**	-0.45
Castor	-5.22**	-6.29**	-0.27	-1.32	-2.03*	-1.06	-21.29**	-9.72**	1.58**
Total oilseeds	2.82*	5.26**	2.41	2.21**	1.96	-0.22	-7.89**	-6.68	-1.56
Jute	-5.51**	-4.89	0.77	-4.85*	-7.01*	-2.22	-5.33**	-2.89	2.54
Mesta	-16.79**	-13.12**	2.60*	-5.43**	-3.95*	1.07*	0.58	1.98*	1.23**
Cotton	-17.14**	-16.84**	1.42*	-5.84**	-6.36**	-0.34	-	-	-
Sugarcane	-9.12**	-8.38**	0.82	-8.21**	-7.17**	1.11	0.94	1.89	1.34**
Tobacco	-20.46**	-25.02**	-5.76**	-11.58**	-15.07**	-3.19**	-	-	-
Areca nut	9.34**	4.82	-0.32	2.35**	0.05	0.25	-	-	-
Banana	7.89	7.90**	-0.38	1.90**	3.19**	1.20**	0.95	5.19*	3.79*
Chilli	7.93**	9.28**	1.14	5.10**	6.75**	1.61**	3.59**	2.52**	-0.90**
Coconut	12.67**	18.28**	6.48**	10.88**	12.87**	1.00	-	-	-
Onion	13.08**	6.96**	-5.56**	6.93**	11.32**	4.92**	-0.51	-0.48	1.20**
Potato	9.56**	1.94	-0.44	6.96**	14.46**	6.79**	-1.43	-8.63**	-7.14**
Sweet potato	-2.15	-3.16*	-1.07**	0.80*	2.97**	2.20**	-7.44**	-31.73**	1.37**
Tapioca	4.18*	2.78	-1.04*	9.69**	14.51**	3.76**	1.58**	-0.48	0.16
Turmeric	-0.42	1.28	1.06**	9.09**	13.11**	3.68**	3.73**	4.37**	2.33**

** Significant at 5% probability level, * Significant at 1% probability level, A: Area, P: Production, Y: Yield.

Table 3. Sensitivity classification of major crops grown in Assam during post-reform period.

Classification	Crops sown in Assam
+A+P+Y	Other <i>rabi</i> pulses, Mesta, Sugarcane, Tobacco
-A-P-Y	Autumn Rice, Winter Rice, Summer Rice, Total Rice, Maize, Total Oilseeds, Arahar, Total pulses, Total food grain, Sesamum, Black gram, Lentil, Coconut, Tapioca, Potato, Turmeric, Sweet potato, Chilli, Onion, Linseed
+A-P-Y	Pea
-A-P+Y	Wheat, Small millet, Rape & mustard, Castor, Total cereal
+A+P-Y	Areca nut, Gram, Cotton
-A+P-Y	Total foodgrain, Onion
-A+P+Y	Banana, Green gram, Jute

A: Area, P: Production, Y: Yield, (+) = Positive, (-) = Negative.

The growth may be due to use of improved variety, irrigation facilities and improved package of practices (Kumar and Grover, 2007). In Table 3, various agricultural crops are classified on the basis of their performance during post-reform period. In Assam, mesta, sugarcane, tobacco and *rabi* pulses are classified as highly sensitive crops as there are, production and productivity are growing at a faster rate during the reform period. Non-sensitive crops are rice, maize, oilseeds, pulses, coconut, potato, onion, linseed etc. as they showed negative growth rate in area, production and productivity during the reform period. Though, the area under banana, green gram and jute has declined in the period but their production and productivity has increased in the reform period which might be due to use of improved varieties such as "Tarun" for Jute and "SG-I (Pratap)" for Green gram (Tyagi and Hasnain, 2000).

Conclusion

Assam has the vast potentiality for development of agriculture sector. The present review has clearly indicated that area, production and productivity increased significantly under fruit and vegetable crops during reform and post-reform period. This increase may be due to implementation of various horticultural schemes in the state by the Department for Development Horticulture in 1992-93. The behaviour of agriculture is changed in post-reform period in terms of growth rates. The negative growth rate of crops in terms of area, production and productivity, which may be due to lack of promotional measures or increase demand for high valued agricultural crops. In Assam, mesta, sugarcane, tobacco and *rabi* pulses are classified as highly sensitive crops as their production and productivity grown at a faster rate during the reform period. Based on the findings the following policy measures are suggested as means to agricultural development in Assam:

1. Increase the productivity of agricultural crop with high yielding varieties. There is availability of HYVs, suited to different agro climatic factors. These varieties have not been fully exploited, the missing link here is adequate initiatives to produce and supply improved varieties.
2. Based on this finding, cultivation of horticultural crops has good potential and can be an economically viable alternative to the existing crop cultivation in Assam. This may require giving incentives to the farmers in the forms of subsidized seed/seedlings, fertilizers, irrigation, water and credit.
3. Farmers should be encouraged for the processing of products at farm level to get more income.
4. Strengthening of production base of commercially potential horticultural crops of the state with area expansion and cluster approach.

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