

## Status and growth of pineapple production in North Bengal

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Received: 17.09.2010, Revised: 12.05.2011, Accepted: 15.05.2011

### ABSTRACT

Pineapple [*Ananas comosus* (L.) Merr.] is an important tropical fruit that shares about 50 per cent of global fruit market. Worldwide, 82 countries produce pineapple in economic quantities on about 950 thousand hectares and Brazil is the highest pineapple producing country in the world which shares about 14 per cent of world pineapple fruit production. Cultivation of pineapple is introduced in India only 4-5 decades ago and it has very little significance in terms of area coverage (about 1% of total fruit area) in the country. India, having about 84 thousand hectare under pineapple cultivation, shares about 8.42 per cent of world pineapple area and 6.5 per cent of pineapple production. This fruit is grown in states like Assam, Meghalaya, Tripura, Mizoram, Manipur, Nagaland, West Bengal, Kerala, Karnataka and Goa on a large scale. West Bengal is an important fruit growing region in the country. The state shares about 3.34 per cent of total fruit area and 4.27 per cent of total fruit production in the country. It contributes around 24 per cent of country's total pineapple production and North Bengal provides the major bulk of this. Uttar (North) Dinajpur and Darjeeling are two most important pineapple growing districts in the state and an Agri-Export Zone on pineapple is in operation in this zone to induce the farming folk towards the avocation. Time series analysis explores that growth and progress of pineapple cultivation in the country is not encouraging at all. Area under pineapple in the country is increasing non-significantly at 0.009 per cent per annum and its production is increasing (also non-significantly) at 0.017 per cent per annum. In contrast to the general trend, both area and production of pineapple in two most important pineapple growing districts in West Bengal are increasing at significant rate. But the progress is much below the expected level due to some inherent constraints which are analyzed.

**Key words:** Constraints, pineapple, time series analysis.

Pineapple [(*Ananas comosus*) (Linn.) Merr.] is the second most important tropical fruit after banana contributing to over 20 per cent of the world production of tropical fruits (Coveca, 2002). Worldwide, 82 countries produce pineapple in economic quantities on about 950 thousand hectares (Anon, 2008). Brazil is the highest pineapple producing country in the world which shares about 14 per cent of world pineapple fruit production. However, maximum (about 15%) pineapple area is found in Indonesia. India, having about 84 thousand hectare, shares about 8.42 per cent of world pineapple area and 6.5 per cent of pineapple production. This fruit is believed to be originated in Paraguay (Bertoni, 1919) and Southern Brazil (Bekar and Colins, 1939). Thailand, Philippines, Brazil, Indonesia and China are the main pineapple producers (alongwith India) in the world supplying nearly 50 per cent of the total output (FAO, 2004). Other important producers include Nigeria, Kenya, Mexico and Costa Rica.

Asia has remained the major pineapple producing region, contributing 57.43 per cent to the world production. Cultivation of pineapple is introduced in India only 4-5 decades ago and it has very little significance in terms of area coverage (about 1% of total fruit area) in the country. Pineapple is grown in states like Assam, Meghalaya, Tripura, Mizoram, Manipur, Nagaland, West Bengal, Kerala, Karnataka and Goa on a large scale and in Gujarat,

Maharashtra, Tamil Nadu, Andhra Pradesh, Orissa, Bihar and Uttar Pradesh on small scale.

West Bengal is one of the leading pineapple producing states in the country which contributes about 23.97 per cent of nation's pineapple production. Incidentally, the state is having about 12.0 thousand hectare of area under pineapple cultivation which is about 14.5 per cent of total pineapple area in the country (Anon, 2008). Three North Bengal districts namely, Darjeeling, Jalpaiguri and Uttar (North) Dinajpur contribute about 2/3<sup>rd</sup> share of both pineapple area and its production in the state. Pineapple dominates the world trade of tropical fruits, although other fruits have gained market share. Statistics from 2000 indicate that pineapple trade took 51 per cent from a total of 2.1 million tones of whole fruit market in the world with mangoes taking the second place, with 21.7%. It is the best positioned fruit since its trade is oriented to developed countries as Japan, USA and Europe communities (Coveca, 2002). Consequently, during the nineties the world production of pineapple has increased at a rate of 1.9% per year, despite the occurrence of unfavorable weather and economic situations (FAO, 2002). It is in this pretext we are interested to undertake an in-depth study on growth and progress of pineapple in the northern part of West Bengal which incidentally has been declared by the government as Agri-export Zone on Pineapple since 2001.

**Table 1: Production and export of pineapple over the recent years from India**

Year	Area ('000 ha)	Pineapple production ('000 t)	Pineapple export ('000 t)	Percentage of export to total production
2005-06	85.4	1353	4.19	0.31
2006-07	82.6	1362	3.78	0.28
2007-08	80.4	1216	4.40	0.33
2008-09	84	1341	3.89	0.29

Source: Annual Report 2008: National Horticultural Board

## MATERIALS AND METHODS

For identification of trend and growth rate in area, production and productivity of pineapple in India, West Bengal and North Bengal (in particular), secondary information on the related aspects have been culled from various government (Statistical Handbooks etc.) and non-government sources (websites of related institutions/ organisations). Trend analysis has been carried out for the period 1997-98 to 2008-09 for which data is consistently available. Exponential form of trend equation is found to be giving the best fit (higher Adjusted R<sup>2</sup> value) out of the many other forms tried. Growth Rate in respective parameters was calculated from the estimated 'b' values in the fitted equation.

## RESULTS AND DISCUSSION

Progress of pineapple is studied with the help of simple tabular analysis displayed in Table 2 to 6 and then with the trend analysis in Table 7. It is observed that, the area, production and productivity of the total fruit in the country is continued to be increasing over the years) though this increasing trend took place only after 1992 (Table 2). Overall growth rate of total fruit area & production is highly significant. Thus, the total fruit area and production is increasing at 0.07 cent per annum in the country (Table 7). Total fruit area in the country, which was only 2831 thousand hectare during 1987-88, more than doubled to rise to 6101 thousand hectare in 2008-

09. The same is true for pineapple production too. While the percentage change (+ve) in total fruit area coverage in the country between 1987 to 1992 period is only 1.50 per cent, this is 34.62 and 57.69 percent respectively for 1992-2001 and 2001-2009 periods. The same trend though can be inferred regarding total fruit production, cannot be told on the fruit productivity. The country witnessed a sustained progress in total fruit productivity till 2000-01 after which it seems to be stagnated (11 t ha<sup>-1</sup>) which is true for pine apple productivity (16 t ha<sup>-1</sup>) too. In contrast, area under pineapple in the country is continually rising though the pace seems to be retarded to some extent during 2001-09 period (Table 2).

Pineapple area, which was only 45.7 thousand hectare during 1987-88 rose to 84.0 thousand hectare in about 20 years. That means out of increment in total fruit area in the country during 1987-88 to 2008-09 period, pineapple contributed about 1.2 per cent. Actually, progress of pineapple (both area and production) happens to be too slow and non significant too (Table 7). Pineapple production witnessed a slightly better progress during this period. Trade liberalization and governmental stress towards horticultural products seems to be the possible reason for this continued rise in total fruit as well as in pineapple area and production in the country. Each year, the countries like Nepal, Bangladesh, U.A.E import pineapple fruit from India.

**Table 2: Area, production and productivity of total fruits vis-a-vis pineapple in India**

Category	Parameters	During the Year						
		1987-88	1991-92	%Change	2000-01	%Change	2008-09	(%) Change
Total Fruit	Area ('000 ha)	2831.0	2874.0	1.50	3869.0	34.62	6101.0	57.6
	Production (lakh tonnes)	276.7	286.3	3.35	431.4	50.70	684.7	58.7
	Productivity (t ha <sup>-1</sup> )	9.8	10.0	2.00	11.1	11.00	11.2	0.9
Pineapple	Area ('000 ha)	45.7	57.1	24.94	78.1	36.78	84.0	7.6
	Production ('000 t)	578.0	768.5	32.95	1221.1	58.89	1341.0	9.8
	Productivity (t ha <sup>-1</sup> )	12.6	13.5	7.10	15.5	14.80	16.0	3.2

Source: [www.indiastat.com](http://www.indiastat.com)

It is observed that area and production of total fruit is on the rise in the state (Table 6) and this progress is more pronounced during 2001-2009 period. While total fruit area increased by 20 per cent

during 1991-92 to 2001-02 period, it increased by 52.06 per cent during 2001-02 to 2008-09 period; country's total fruit area being increased by 57.69 per cent during this period. Annual growth rate of total

fruit area and production are 0.05% and 0.06% respectively (Table 7). But pineapple is not at all a constituent part of this progress in total fruit area in the state. Because, though both area and production under pineapple are found to have upswing (16.85 %) during 90s, it began to decline in the post 2000-01 period (Table 4). Of course, production of pineapple

continued to be rising. Thus, though the share of West Bengal in country's total pineapple production covers around 24 per cent, area in the state is either stagnated/diminishing (Table 4) with the years. But pineapple cultivation witnessed a spectacular progress (159%) in the fruit productivity during 1987-88 to 2008-09 periods.

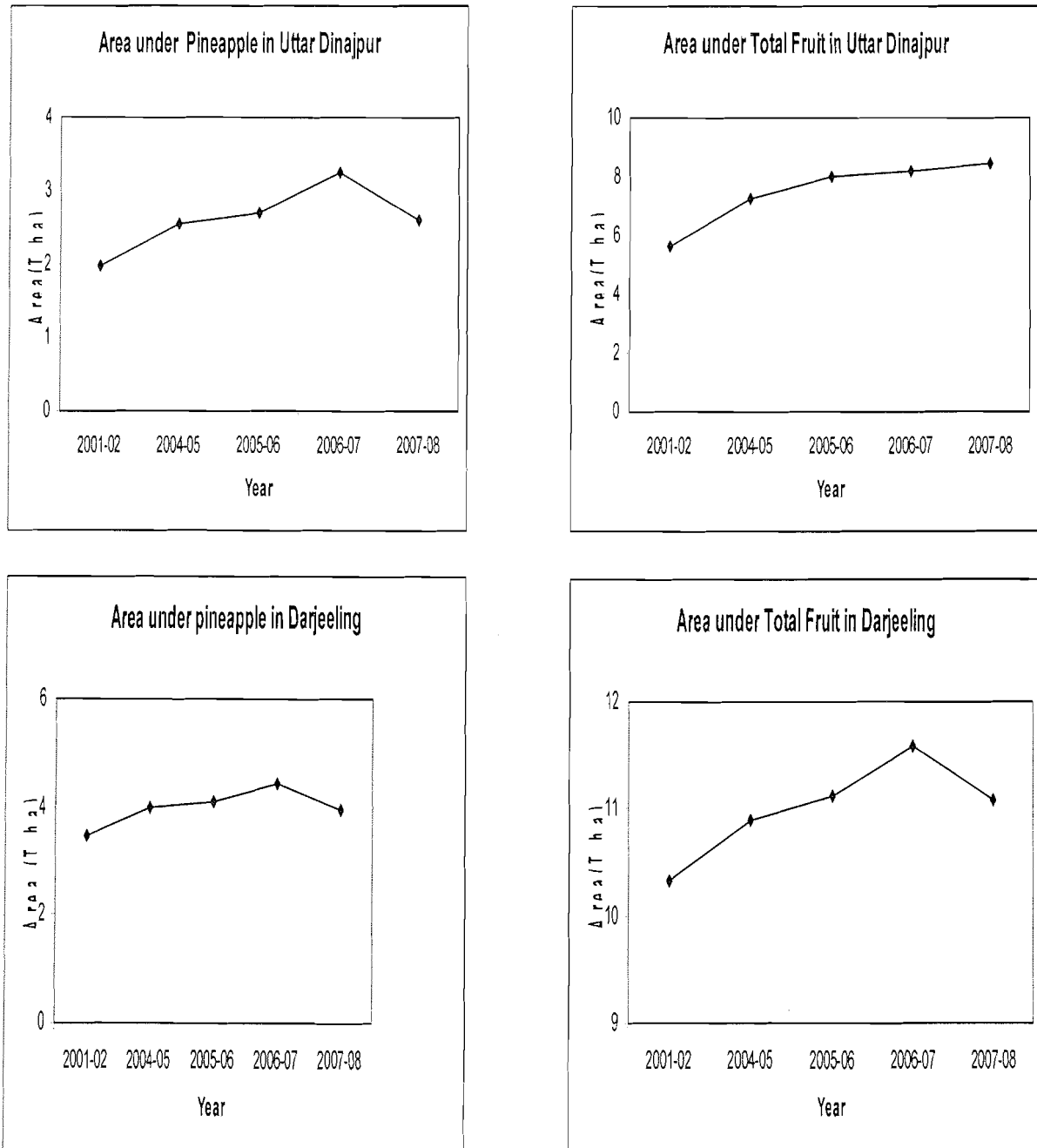


Fig. 1

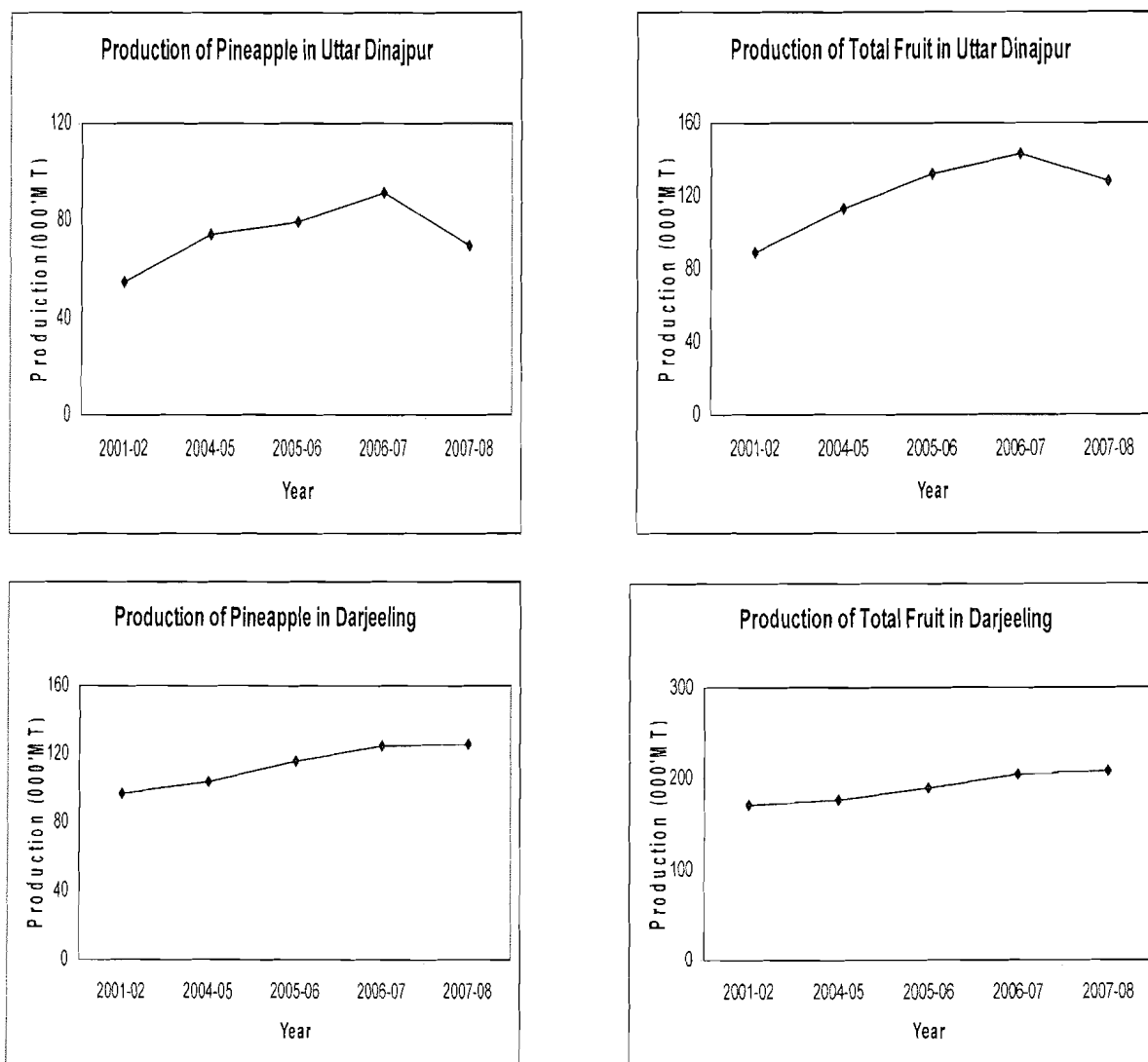


Fig. 2

Table 3: Ranking of West Bengal in total fruit and pineapple production in India

State/Country	Pineapple		Total Fruit	
	Area during triennium ending year 2008-09 ('000 ha)	Production during triennium ending year 2008-09 ('000 t)	Area during triennium ending year 2008-09 ('000 ha)	Production during triennium ending year 2008-09 ('000 t)
India	83.67	1316.00	5835.17	63843.84
West Bengal	10.83	313.06	194.93	2727.60
Share of West Bengal (%)	12.94	23.79	3.34	4.27
Rank of West Bengal	4 <sup>th</sup>	1 <sup>st</sup>	12 <sup>th</sup>	8 <sup>th</sup>

Source: Annual Report 2008: National Horticultural Board

**Table 4: Area, production and productivity of total fruits and pineapple in West Bengal**

Category	Parameters	During the Year				
		1991-92	2000-01	% Change	2008-09	% Change
Total Fruits	Area ('000ha)	111.3	133.7	20.1	203.3	52.1
	Production ('000t)	1131.7	1657.1	46.4	2775.6	67.5
	Productivity (t ha <sup>-1</sup> )	10.2	12.4	21.6	13.7	10.5
Pineapple	Area ('000 ha)	8.9	10.4	16.9	9.6	-7.7
	Production ('000 t)	210.8	279.5	32.6	283.9	1.6
	Productivity (t ha <sup>-1</sup> )	23.7	26.9	13.5	29.6	9.9

Source: Annual Report 2008: National Horticultural Board

**Table 5: Area & production of total fruits and pineapple in North Bengal**

Parameters	Total Fruit during the year			Pineapple during the year		
	2001-02	2007-08	% Change	2001-02	2007-08	% Change
Area ('000ha)	62.46	68.20	9.19	10.79	8.46	-21.62
Production ('000t)	886.35	912.50	2.95	303.40	259.99	-14.31
Productivity (t ha <sup>-1</sup> )	14.19	13.38	-5.71	28.11	30.73	9.33

Source: Statistical Abstract (2008), B.A.E.S, Govt. of W.B, Kolkata

**Table 6: Area, production and productivity of total fruits and pineapple in Uttar Dinajpur & Darjeeling**

Districts	Parameters	Total Fruit during the year			Pineapple during the year		
		2001-02	2007-08	Change (%)	2001-02	2007-08	Change (%)
Uttar Dinajpur	Area ('000ha)	5.65	8.41	48.85	1.98	2.60	31.31
	Production ('000t)	55.10	70.00	27.04	55.10	70.00	27.04
	Productivity (t ha <sup>-1</sup> )	15.79	15.18	-3.85	27.83	26.92	-3.27
Darjeeling	Area ('000 ha)	10.33	11.09	7.37	3.46	3.95	14.19
	Production ('000 t)	171.13	207.61	21.32	97.25	126.40	29.97
	Productivity (t ha <sup>-1</sup> )	16.57	18.72	12.99	28.12	32.00	13.80

Source: Statistical Abstract 2008, B.A.E.S, Govt. of W.B, Kolkata

West Bengal is an important fruit growing region in the country. The state shares about 3.34 per cent of total fruit area (ranked 12<sup>th</sup>) and 4.27 per cent of total fruit production (ranked 8<sup>th</sup>) in the country (Table 3). In fact, the role of horticulture, specially fruit and vegetable crops in the state of West Bengal, where vast potentialities are available, needs hardly any emphasis. This is probably because in the initial years of post independence planning era, horticultural crops received very less attention. However, the relative advancement of the Horticultural sector in West Bengal may be gauged from the fact that the production of fruits increased from 8.76 lakh tones in 1985-86 to 27.76 lakh tones in 2008-09. Although, fruits are seasonal in nature, a number of them are being made available for longer periods in this state owing to adoption of early and late varieties and application of hybrid technology.

North Bengal is one of the major fruit growing areas which shares about 35 per cent of total fruit area in the state and cultivation of pineapple in the state is mainly confined to this area. Almost about 89 percent of state's pineapple area can be found in

this zone. In contrast to the general trend in the state (and the zone as well), pineapple area is on the rise in two important North Bengal districts namely Uttar (North) Dinajpur and Darjeeling. Area under pineapple cultivation in Uttar Dinajpur rose steadily (CV 16 per cent) to 2.6 thousand ha in 2007-08 which was 1.98 thousand hectare in 2001-02 (Table 5, 6). Similarly, pineapple area increased about 14.19 per cent in Darjeeling district during this period. Same trend is observed in case of pineapple production too. Urbanization, changes in lifestyle, growth in economy as well as sizeable addition to population have increased the demand for domestic products. Recent trade liberalization and substantial increase in investment for Horticulture (from Rs. 240 million in seventh plan to Rs. 10000 million in the eighth plan) have opened up the prospects for export as well as for processing industry of fruits and vegetables in the country (Kumar *et al.*, 1995). Area under pineapple cultivation increases at a significant annual rate of 0.06 and 0.036 per cent per annum in Uttar (North) Dinajpur and Darjeeling district respectively (Table 7). Almost similar is the case of pineapple production in these two districts.

Table 7: Growth of area, production and productivity of total fruit and pine apple

Country /State /District	Parameters	Area			Production			Productivity		
		SGR	CGR	CV	SGR	CGR	CV	SGR	CGR	CV
India	Total Fruit	0.06	0.07***	15.5	0.07	0.068***	15.3	0.004	0.002ns	7.1
	Pine Apple	0.01	0.01 <sup>NS</sup>	3.2	0.00	0.017 <sup>NS</sup>	6.1	-0.002	0.008ns	3.7
West Bengal	Total Fruit	0.04	0.05***	10.2	0.06	0.068***	16.8	0.008	0.021*	6.8
	Pine Apple	-0.02	-0.01 <sup>NS</sup>	7.7	-0.02	-0.004 <sup>NS</sup>	9.4	0.009	0.003 <sup>NS</sup>	3.2
Darjeeling	Total Fruit	0.01	0.02***	4.2	0.03	0.036***	8.5	0.01	0.019**	14.3
	Pine Apple	0.02	0.04**	9.3	0.04	0.05***	11.6	0.01	0.015 <sup>NS</sup>	5.2
Uttar Dinajpur	Total Fruit	0.07	0.07***	14.6	0.06	0.079***	18.2	-0.005	0.011 <sup>NS</sup>	5.9
	Pine Apple	0.04	0.06**	16.6	0.04	0.065**	17.8	-0.004	0.001 <sup>NS</sup>	3.8

\* Significant at 10 per cent; \*\* : Significant at 5%; \*\*\* : Significant at 1%

SGR : Simple Growth Rate, CGR : Compound Growth Rate, CV : Coefficient of Variation

Thus, it is found that progress of pineapple cultivation in West Bengal particularly in North Bengal zone is not encouraging at all. Though the zone was declared as an important Agri-Export Zone on pine apple, its performance is far from the expectation. It may be due to the major constraints which need to be seriously thought of, like: Low opportunity cost / Low Income potentiality as the crop can generate only one time income in two years, high price fluctuation due to the perishable nature of the crop, labour migration problem, rather high capital-intensive nature (maintenance cost is around, ₹40,000 per acre/year), replacement of pineapple area with allocation (of the replaced area) under tea which is fast growing as a competitive crop in the area, pest and disease problems, non uniformity in fruit size and weight etc.

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