COUNTRY PAPPER ON PEPPER PRODUCTION, PROCESSING AND TRADE FOR THE 42nd PEPPER EXPORTERS MEETING

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Introduction

Contribution from Agriculture sector for the GDP of Sri Lanka during 2010 12.0% and the foreign exchange earnings through agricultural products was 24.6% of the total foreign exchange earnings of the country. When employment is concerned nearly 33% of the work force is directly and indirectly involved in Agriculture. Of the share of Agricultural Export Earnings, Export Agricultural Crops (EAC) sector contribution during 2010 was 10.4%, compared to 7.9% in 2009. During the period of concern, the value of Export Agricultural Crops when collectively taken all perennial Spice, Beverage, Essential Oil crops and other crops come under the purview of the Department of Export Agriculture (DEA) export earnings amounted to Rs.24,017.7 Million (US$ 212.4 Million) equivalent to 2.6% of total foreign exchange earnings. Pepper is the second most important perennial spice crop, next to Cinnamon, in Sri Lankan economy, and the most important perennial spice for domestic consumption. More than that, the number of farm holding depends on immediate financial requirement through pepper is higher than all the other spices or perennial crops, as pepper is cultivated in most of the home gardens as small holdings. Foreign exchange earning through pepper exports (include pepper oil) accounted for 20.3% of the total EAC exports. Composition of export earnings of the agriculture sector during 2009 and 2010 is shown in the Table 1.

Table 1. Composition of Agricultural Exports 2009 & 2010

Category	2009		2010	
	Value US $ Million	Share %	Value US $ Million	Share %
Tea	1,185.1	70.1	1,375.4	67.4
Rubber	98.6	5.8	170.4	8.3
Coconut Products	166.2	9.8	173.6	8.5
EAC Products*	**133.5**	**7.9**	**211.8**	**10.4**
Other Agric. Products	106.8	6.3	110.2	5.4
Total	**1,690.3**	**100.0**	**2,041.4**	**100.0**

Source: Central Bank of Sri Lanka

*Includes Spices namely, Cinnamon, Pepper, Clove, Cardamom, Nutmeg and mace, Vanilla; Beverages, Cocoa and Coffee; Oils of Spices & citronella and lemon grass; Others, Areca nuts, Betel, Ginger, Turmeric etc.

2. Production

2.1. Current status of pepper production

In Sri Lanka Pepper is cultivated in Wet and Intermediate agro-ecological zones up to the elevation of about 800 meters above mean sea level. Main pepper growing areas are located in Central, North Western, Western, Sabaragamuwa, Southern and Uva provinces. Kandy, Matale districts in Central province, Kurunegala district in North Western province, Badulla, Monaragala districts in Uva province, Kegalle, Ratnapura districts in Sabaragamuwa province, Galle, Matara districts and a part of Hambantota district in Southern province are prominent. In average higher productivity is experienced in those areas. Extent under pepper cultivation has been calculated based on Census of Agriculture 2002 and adjusted by adding newly planted extent based on progress reports of the Department of Export Agriculture (DEA). Table 3 shows provincial wise distribution for 2010 & 2011.

Table 2. Extent of pepper cultivation for year 2010 & 2011 in Ha. Actual and Projection

Year	New Planting (ha)	Productive Area (ha)	Non- Productive Area (ha)	Total (ha)
2010	403.3	29,385	1,546	30,931
2011*	231.2	29,604	1,558	31,162
2012**	430	30,174	1,905	32,079

*Source: Census of Agriculture 2002 (DCS) and progress reports –DEA *by end of June 2011*
***Projection for 2012*

Table 3. Distribution of pepper cultivation for the year of 2010 & 2011 (up to end June)

Province	2010 (Ha.)	2011 (Ha.)
Central	12,658	12,718
North Western	2,945	2,955
Sabaragamuwa	5,928	6,064
Uva	4,205	4,210
Western	2,140	2,150
Southern	3,001	3,011
Other	54	54
Total	**30,931**	**31,162**

Dept of Census & Statistics, & Dept. of Export Agriculture – Sri Lanka

The aggregate extent under pepper in the country according to the Census of Agriculture was estimated as 27,661hectares in 2002, which is about 33% of the total area under EAC cultivation in the Island. Out of the total extent of 30,931Ha, recorded in 2010, 92.7% of them are less than 8.0Ha. (20 acres) in extent, which is defined as "Small Holdings".

2.2 Factors affecting current Production and Productivity of Pepper

Total extent under Pepper has not changed significantly in 2011 in comparison to 2010 but expect adding more extent under new planting during October- December period with onset of the North-East monsoon rains. Increase of the Pepper production during the last four year period is not up to the expected level but the pepper production during 2010 reached beyond the targets despite of several adverse climatic factors experienced at the early part of the year. Unexpected climatic conditions prevailed in year 2009 and 2010 affected on field establishment of newly planted crop and disturbed the flowering of pepper. As a result of climate change, rain fall pattern was completely changed and it directly influenced on flowering. Continuous flowering in the same pepper vine resulted pepper crop of different maturity stages and growers were compelled to harvest mature and immature berries at the same time.

To minimize the incidence of Pepper Yellow Mottled Virus (PYMV) strict precautions have been taken to produce disease free planting material. Unexpected droughts and poor soil moisture conservation practices accelerated the incidence of slow wilt disease, mainly in sloppy lands. New coleopteran pest on pepper was found in Uva province and identified as *Pterolophia annulat;* immediate action against that able to keep it under control.

As an alternative for chemical fertilizer, use of Integrated Soil and plant Nutrient Management (ISPNM) is encouraged and continuous awareness produced good results. Government policy also support the use of organic fertilizer and to produce their own organic fertilizer requirement in the farm itself and research data have confirmed the potential use of support tree loppings, mainly from *Gliricidia sepium,* as a source of green manure and yields obtained with 15kg of fresh green manure per vine per year has given the same or higher yield in comparison to chemical fertilizer. Three major investment assistance scheme launched by the government through the DEA on new and replanting, productivity improvement and quality improvement expected to yield better results in future.

3. Processing and product development

Table4. Production of Black Pepper & white pepper for the year 2010 & 2011(Mt.)

Year	Black Pepper(Mt.)	White Pepper(Mt.)	Total
2010	17,327	5	17,332
2011 (Estimated)	12,995	15	13,010
2012 (Projection)	17,845	20	17,865

Production of white pepper & other products such as, Dehydrated and Salted pepper insignificant compared with the Black Pepper. The present total annual production of white pepper is not exceeds 10 Mt. per year. Some new products such as Green and red pepper sauce, pepper flavored toffees and various curry mixtures have been developed but not commercialized yet. The quality improvement assistance scheme and the encouragement by the policy of the government for value addition expect product diversification, especially to produce more white pepper.

4. Trade

4.1 Current status of pepper exports from Sri Lanka

4.1. a). Export of Black pepper and White Pepper

Table5. Monthly Exports of Whole Pepper 2010 & 2011(up to August)

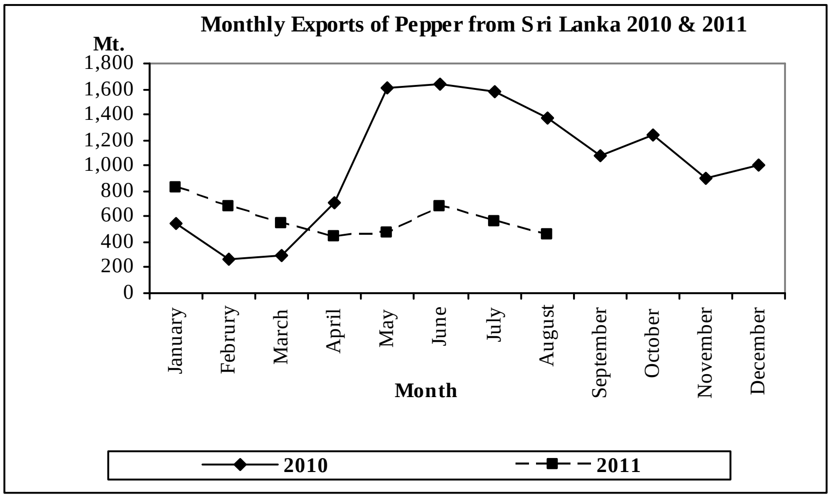
Month	2010		2011	
	Volume(Mt.)	Value('000 SL Rs.)	Volume(Mt.)	Value ('000 SL Rs.)
January	539.1	176,105.8	825.49	379,518.78
February	264.1	88,393.1	676.77	320,815.92
March	290.9	102,366.8	548.94	254,522.89
April	702.8	242,020.5	438.87	220,091.50
May	1602.7	586,218.6	475.20	367,483.44
June	1632.8	610,430.4	677.02	587,945.82
July	1585.9	584,210.6	567.30	515,523.82
August	1374.7	510,852.2	456.94	384,295.09
September	1,080.4	424,025.8		
October	1,241.4	523,580.8		
November	902.8	459,158.4		
December	1,001.3	517,390.6		
Total	**12,218.9**	**4,824,753.5**	**4,666.54**	**3,024,415.45**

Source: Sri Lanka Customs

4.1.b) Estimate of total exports for 2011

2010 is special for Sri Lanka Pepper industry so the highest export volume was reported. Export volume of Black pepper during first eight months of the 2011 has decreased by 3,327Mt over the previous year, which is over 40% drop (Table 5 & Chart 1). In general major cropping season of pepper in Sri Lanka is from June to August resulting flower initiation in latter part of the previous year or January of the same year. Change of climatic pattern, mainly high rains at the end of 2010 and early 2011 resulted low flowering during that period. Heavy rains washed away most of the spikes emerged at that period and high humidity prevailed induced fungal infestation on young spikes. Instead, flowering experienced in middle of the year may not be able to compensate the situation and total production during 2011 estimated to be around 13,000Mt.

Chart 1. Monthly pepper Exports 2010 & 2011



Out of the total exports more than 80% is following main harvesting period. Also 1st quarter (before harvest season) exports was 1,796.9Mt. contributed from 2010 stocks & small crop available during the period from typical agro-ecological zones. Considering the values of stocks brought forward from 2010 to be 1,466Mt. and production of 13,000Mt. and 6,830Mt. for domestic consumption, total exportable volume for 2011 would not exceed 7,000Mt. Production of white pepper also included in this estimation.

4.1. c) Projection of exports for 2012

Production of pepper directly related with the cultivated extent, adoption of proper management practices and the weather. First two factors are controlled by human but not the latter. Flowering physiology of many perennials, especially spices and fruit crops, highly depend on rain fall pattern. Pepper plant needs a moisture stress and a good rain after that for flower induction. If the same rainfall pattern experience during 2010 prevailed during this year too, no good crop could be expected. However, prediction based on past experience, better weather conditions over 2010-2011 could be expected for 2011-2012 period and a better crop could be expected. As a result of the continuation of new planting & productivity improvement programmes for pepper another 3,500Mt of pepper crop could be expected to be added to the production.

Out of the total extent of 30,931 hectares, the productive extent can be estimated as 29,385 hectares. Total production for 2010 was estimated to be 17,332Mt. and the national average yield was estimated as 590Kg/Ha. Expecting productivity improvement to 600Kg/Ha in 2012, total pepper production would be estimated around 17,865Mt. After considering all, total export volume is projected as 12,000 Mt. for 2012.

4.1. d) Export of pepper by country of destination

Table 6: Export of Pepper & Pepper Products 2010 & 2011

	2010		2011 up to August	
Product	**Volume (Mt)**	**Value(US$)**	**Volume(Mt)**	**Value(US$)**
Black Pepper	6,799.12	23,500,239.42	2,580.5	14,207,240.3
Light Berries	4,145.84	15,782,704.03	1,631.63	11,805,376.2
Crushed Pepper	31.08	134,445.77	30.95	118,476.71
Ground Pepper	1,242.82	3,757,139.02	423.41	1,350,425.59
Pepper Oil	5.26	372,283.19	4.158	551,767.22
Total	**12,224.12**	**43,546,811.43**	**4,670.648**	**28,033,286.06**

Source: Sri Lanka Customs

Table 6.A. Export of Black Pepper by Country of Destination (Heavy berries >450g/L)

Country of Destination	2010		2011 up to August	
	Volume (Mt)	Value(US$)	Volume(Mt)	Value(US$)
Australia	17.85	62,704.89	1.05	7,982.52
Austria			0.17	6,111.34
Belgium	4.00	30,892.21	8.00	69,702.60
Canada	3.11	10,720.01	1.45	10,223.63
Cyprus	21.00	89,415.19		
China	25.00	98,173.09		
Egypt	421.02	1,536,649.49	116.52	552,733.72
France	25.52	107,386.12	0.46	15,690.68
Gambia	15.00	62,342.68		
Georegia			16.00	94,834.88
Greece			16.50	53,462.53
Germany	157.05	1,003,502.45	146.32	1,068,130.00
Hong Kong	8.00	35,658.11	2.30	16,389.50
India	4,087.97	14,954,828.02	1,296.61	8,313,012.67
Italy			1.16	18,936.14
Japan	4.40	33,239.41	2.72	256,465.55
Jordan	47.63	181,276.49	11.27	25,023.53
Kuwait			363.00	926,677.81
Lebanon	8.40	8,494.21	13.16	69,615.06
Mal-dives	4.02	16,350.81	2.00	9,430.60
Malaysia	15.00	68,695.68		
Nether-land	9.51	61,670.86	30.26	187,945.52
New-Zealand			0.80	7,154.70
Norway	0.12	1,117.51		
Pakistan	933.69	1,633,901..04	69.98	125,173.91
Poland	74.30	291,799.18	14.00	54,855.70
Rumania	29.00	96,270.29	15.02	31,139.48
Singapore	43.50	173,577.37		
Spain	106.00	448,118.08	298.00	1,443,790.16
Sau. Arabia	112.00	485,609.13		
S.Africa			12.47	80,756.80
Sweden	13.50	52,990.85	0.30	2,88.31
Switzer land	10.17	69,899.44	8.40	70,353.22
Tunisia			13.75	55,943.52
Turkey	359.00	918,862.17		
U.A.E.	98.36	265,695.97	14.66	69,543.58
U.S.A.	21.81	157,640.27	73.78	528,941.35
U.K	28.06	152,905.34	28.89	261,965.45
Vietnam	75.00	293,705.66		
Yeman	13.92	48,168.84		
Other	5.71	45,927.35	1.52	3,165.69
Total	**6,799.12**	**23,500,239.42**	**2,580.5**	**14,207,240.3**

Source: Sri Lanka Customs

Table 6B. Export of Pepper by Country of Destination (Light berries with density <450g.)

Country of Destination	2010		2011 end of August	
	Volume (Mt)	Value(US$)	Volume(Mt)	Value(US$)
Australia	0.47	2216.44	0.44	2,820.94
Bulgaria	14.50	38,803.38		
Canada			0.10	700.60
China			22.05	171,127.21
Denmark	4.98	15,202.97		
Egypt	471.72	1,676,844.67		
France	0.03	40.67		
Germany	66.00	345,222.26	32.65	230,710.94
Greece	16.02	45,027.79		
India	1,862.05	7,646,033.69	1,455.54	10,517,511.29
Italy	0.43	12,764.21	0.20	6,511.32
Israel	22.90	43,536.48		
Japan	0.80	6,886.74	1.40	10,817.85
Mal dive	1.50	5,387.63	0.50	2,420.30
Lebanon	43.18	146,079.45		
Nether land	15.64	58,955.24		
New Zealand	0.80	4,872.11	0.67	5,223.36
Norway	1.73	25,037.26		
Pakistan	207.34	369,909.53	15.00	21,259.17
Poland	14.00	52,216.57		
Rumania	37.92	139,610.94		
Spain	921.75	3,582,762.68		
Sau. Arabia	112.00	402,863.95		
S. Africa			5.00	28,741.16
Sudan	28.00	115,509.54		
Switzerland			5.00	25,423.07
Turkey	28.00	66,780.38		
U.A.E.	29.00	104,671.06		
U.K.	11.00	32,187.74	12.43	95,741.16
U.S.A	133.60	502,436.12	80.05	682,831.39
Vietnam	95.04	322,308.95		
Yeman	5.00	16,363.63		
N.Koria	0.44	2,171.96	0.64	3,536.63
Total	**4,145.84**	**15,782,704.03**	**1,631.63**	**11,805,376.24**

Source: Sri Lanka Customs

4.2 Other Pepper products

Black pepper is the main product and a limited quantity of white pepper also is produced and exported. However, accurate figures on white pepper and other pepper product exports are not available. An increasing demand for "Organic Pepper" can be observed but quantified figures are not available. Small quantity of green, salted and other pepper products have been exported but no official figures available.

Table 7. Export of Crushed Pepper by Country of Destination 2009 -2010

Country of	2010		2011 up to August	
Destination	**Volume (Mt)**	**Value(US$)**	**Volume(Mt)**	**Value(US$)**
Australia	6.19	23,629.53	8.10	39,736.87
Austria	0.50	12,242.51	0.03	519.57
Canada	0.07	550.36	0.01	127.07
France	0.54	16,510.50		
Germany	0.24	13,322.68	0.13	10,987.74
India	13.00	16,353.99	19.00	44,412.50
Italy	0.44	12,782.00	0.06	1,457.81
Japan	0.49	3,435.50	0.07	2,059.90
Lebanon	1.24	2,228.76	1.33	3,188.80
Mal-dive	1.68	7,551.72	1.13	6,979.24
New Zealand	0.10	1,765.60	0.09	1,582.04
N.Korea			0.70	4,045.22
U.A.E.	0.79	2,634.09	0.20	648.48
U.K			0.02	61.66
U.S.A	5.08	16,907.03	0.02	369.17
Taiwan	0.72	4,531.49	0.06	2,300.69
Total	**31.08**	**134,445.77**	**30.95**	**118,476.71**

Source: Sri Lanka Customs

Table 8: Export of Ground Pepper by Country of Destination

Country of	2010		2011 up to August	
Destination	**Volume (Mt)**	**Value(US$)**	**Volume(Mt)**	**Value(US$)**
Australia	2.03	12,080.81	0.26	1,938.710
Canada	1.97	9,569.24	0.01	66.48
Germany	14.19	89,494.08	17.39	127,806.43
Greece	1.90	2,685.73		
India	467.56	1,720,407.54	22.50	112,694.94
Italy	0.43	2,998.76	0.30	9,819.70
Japan	1.55	8,389.07	0.66	7,345.38
Jordan	19.60	49,328.02	0.30	1,541.26
Kuwait	398.05	1,117,338.77	280.50	746,216.49
Mal-dive	2.13	7,591.78	0.79	2,776.74
Nether-land	9.40	65,078.21		
Pakistan	259.98	373,355.44	39.00	45,962.34
Rumania	15.00	49,465.32		
S. Africa	4.47	22,776.21	0.48	615.55
S. Korea	6.12	32,220.32		
Spain	3.87	16,237.35	25.00	119,733.22
Switzerland	15.72	76,299.20	3.00	21,813.95
Turkey			14.00	53,121.78
U.A.E.	0.98	3,230.43	0.20	1,444.05
U.K	17.58	91,244.21	4.10	23,923.08
U.S.A.	0.06	448.38	0.70	7,421.05
Yeman			14.00	62,384.89
Other	0.23	6,900.13	0.22	3,799.55
Total	**1,242.82**	**3,757,139.02**	**423.41**	**1,350,425.59**

Source: Sri Lanka Customs

Table 9: Export of Pepper Oil by Country of destination 2010 -2011

Country of Destination	2010		2011 up to August	
	Volume (Mt)	Value(US$)	Volume(Mt)	Value(US$)
France	0.470	25,766.20	0.112	15,682.42
Germany	0.702	53,284.79	0.085	13,286.46
India	3.315	230,114.79	2.790	365,063.88
U.S.A.	0.770	62,996.83	1.080	140,040.63
U.K			0.060	10,940.38
Other	0.002	120.58	0.031	6,753.45
Total	**5.259**	**372,283.19**	**4.158**	**551,767.22**

Source: Sri Lanka Custom

4.3 Import of Pepper

Sri Lanka has imported very small amount of pepper for very specific purposes and figures are given in table 10.

Table 10: Import of Pepper & Pepper products by country of Destination

Country of Destination	2010		2011 up to August	
	Volume (Mt)	Value(US$)	Volume(Mt)	Value(US$)
Black Pepper				
China			0.05	3.03
Cyprus			9.00	40,818.22
Germany			10.00	59,295.48
U.A.E.			0.36	405.44
U.S.A.	8.10	16,066.41		
Other			0.01	49.24
Total	**8.10**	**16,066.41**	**19.42**	**100,571.40**
Light Berries				
India			3.353	3,897.91
Total				**3,897.91**
Crushed Pepper				
China	0.290	113.41	0.098	36.54
U.A.E.	0.019	194.79		176.96
U.K.			1.872	21,267.77
Vietnam	0.035	95.55	0.016	159.93
Total	**0.309**	**308.21**		**21,641.21**
Ground Pepper				
Japan	0.728	1,945.73		
Malaysia			0.049	320.26
S. Korea	0.800	6,858.72		
N. Korea			0.918	5,991.96
Singapore	0.480	276.18		
Spain	48.080	79,207.02	5.600	5,318.09
U.A.E.	0.725	176.72	0.509	3,294.61
Other	0.001	173.63		
Total	**50.814**	**88,638.00**	**7.076**	**14,924.91**
Pepper Oil				
India	0.034	5,187.73	0.020	1,483.61
Total	**0.034**	**5,187.73**	**0.020**	**1,483.61**

Source: Sri Lanka Custom

Table 11. Summery on Production, Exports, Imports, Domestic consumption and carryover stocks of pepper in 2010 and estimates for 2011 and 2012.

Item	2010		2011(Estimate)		2012(Projection)	
	Black	White	Black	White	Black	White
Stock brought forward	2,986		1,466		726	
Production	17,327	5.0	12,995	5	17,650	5
Import	62		60		60	
Domestic Consumption	6,695	0.2	6,800	0.5	6,870	0.5
Export	12,214	4.8	6,995	4.5	10,840	4.5
Stock carry forward	1,466		726		1,566	

6. Issues related to production of Pepper

6.1 Production and Processing

Sri Lankan Government has paid its full attention to develop the spice industry and Pepper is one of the priority crops among them. All the Research and Development programmes focus on production, Productivity and Quality improvement. Planning and Implementation of the programmes are done by the DEA. However, fluctuation of the market price during previous years, escalation of the cost of inputs and adverse weather conditions have affected on the production in 2011.

6.1. (a) Pests and diseases

Despite of the actions taken to minimize the spread of Pepper Yellow Mosaic (PYMV) virus disease through awareness programmes and certification of nursery plants, the disease is spreading in an alarming rate. None of the pepper variety or selection was found to be resistant but some local accessions show tolerance to an extent. Slow decline of pepper due to combination of factors is also a problem especially in old and sloppy lands where root system is mostly exposed due to erosion. Quick wilt also reported as an important disease spreading among nursery plants mainly and some field incidences also reported. The DEA recommend and encourage all the time to practice Integrated pest control and discourage the use of chemical unless otherwise essential.

6.1 (b) Quality problems

Importance of Sri Lankan local pepper as a good quality material due to inherently rich Oil and Oleoresin content is well noted. However, value of this is not fully achieved by local growers due to immature pepper harvesting at 4-5 months maturity due to financial constraints and some social factors and artificial price created by local traders for fresh immature pepper. Sri Lanka government has taken every possible action to minimize this and assistant scheme are in operation to produce quality Black and White pepper and product diversification. Targeting the good markets and value addition for pepper new GMP scheme was launched. Processing equipment disseminated to individual cultivators at a subsidized price and group and nucleus processing centers established with farmer organization and progressive investors. Introduction processing machineries and dryers expected to add more value to the intrinsic quality of the harvest of local pepper cultivars.

6.2. Trade of Pepper within the country and overseas

Trade of all the agricultural products in international market is completely control by the private sector and the involvement of the Government is mainly on market promotion, quality assurance, developing standards and resolve trade related problems. The Spice Council (TSC) and the Spices and Allied Product Producers and Traders Association (SAPPTA) are the main private sector organizations involved in marketing. The DEA and the Export Development Board (EDB), the Department of Commerce of Sri Lanka are closely working with private and government organizations to improve the prevailing marketing system in the country as well as abroad.

6.3 Domestic Consumption / Per Capita consumption

Population of the country, per capita consumption and other sector consumption are summarized in table 12. Per Capita consumption of pepper was calculated based on Household income &

Expenditure survey carried out by the SLDCS in 2006. According to that it is 270g/person per year. It shows an increasing trend in recent years when compared with 199.2g in 1996 & 263.2g in 2002.

Table 12: Population & Consumption of Pepper in Sri Lanka 2010 - 2012

Item	2010	2011(Estimate)	2012(Projection)
Population('000 persons)	20,653	20,857	21,000
Per Capita Consumption(g/yr)*	270	270	280
Household Consumption(Mt.))	5,524	5,600	5,870
Industry Sector Consumption(Mt.)	615	700	700
Catering Service Consumption(Mt.)	500	500	500

** source:Household Income & Expenditure Survey 2006/2007, Dept. of Census & Statistics Sri Lanka*

Total estimated productive extent and production of Pepper is given in Table 13.

Table 13. Estimated acreage and production for the year 2 020-2012

Year	Extent (ha)	Production (Mt.)
2010 (Actual)	30,931	17,332
2011(Estimated)	31,300	13,000
2012(Projection)	31,600	17,650

Source; Dept..of Export Agriculture, Sri Lanka

6.4. Trade and Investment policies

Investment assistance scheme for new planting of pepper, productivity improvement of the existing pepper lands and establishment of processing centers are in operation. Those who are willing to invest on joint ventures can approach through the Board of Investment in Sri Lanka for assistance. Sri Lankan government is planning to give more incentives towards value addition. Government has intervene to assist quality improvement and on value addition of pepper to create better future.

7. Ongoing Research and Development programmes on Pepper

The priority of Research is given for Crop improvement, Crop production (husbandry, soil fertility management), Crop protection and Post harvest Technology. Under the crop improvement, selected local accessions of pepper are evaluation for their adoptability under different Agro-ecological regions and Hybridization to combing desirable characters is in progress. Series of studies on Integrated Soil and Plant Nutrient Management (ISPNM) were successfully completed and further studies are in progress. Supportive research on "Organic farming" is in progress to be away from chemicals as much as possible without yield loss in comparison to conventional practices.

At the same time Bio- Pest control practices were developed and transferring technology and mass propagation of the agents are in progress. More attention is given on quality related research, mechanization of processing for cleaner and good quality products and value addition as well as product diversification.

Development activities target on Production improvement through new and replanting as well by implementing the Productivity improvement programme. Technical advises, investment assistance and supply of certified planting material, Quality improvement through introduction of Good Manufacturing practices are handles by the Development division of the DEA.

7.2. Measures taken for controlling pesticide residues

Sri lank is blessed with minimum incidence of pests and diseases for Black pepper. The Department of Export Agriculture, always advice to adopt Good Agricultural Practices and Good Manufacturing Practices to keep agrochemicals away and even to minimize the use of chemical fertilizer. Weeding is always done manually and clean weeding is done only at the base of the plant, rest is slashed weed to minimize soil erosion. To control slow wilt and/or quick wilt incidence application of organic amendments are recommended and, application of copper based fungicides are recommended when necessary.