



The Dutch Disease and Domestic Agriculture

Food Security in an Oil Rich Economy

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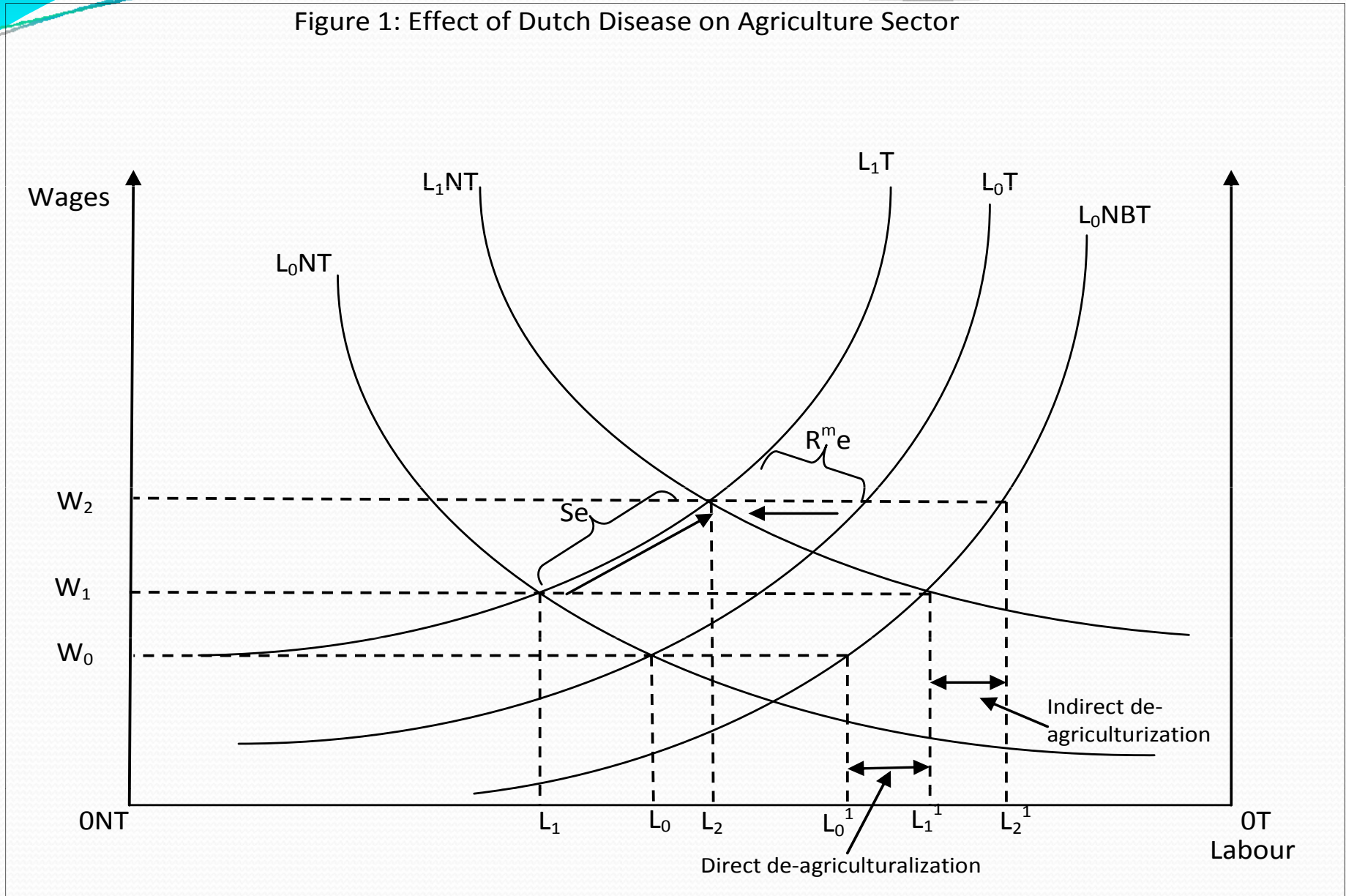


What is the Dutch Disease?

- Negative effects of having a boom in one sector and slump in others
- Deals specifically with hydrocarbon resource producing economies
- Economy is essentially divided into three sectors:
 - Booming Tradable (BT)
 - Non-Booming Tradable (NBT)
 - Non-Tradable (NT) (i.e. Services)
- Y (Total Income) = $T + NT$
- $T = NBT + BT$
- Three Symptoms of the Dutch Disease:
 1. Decline in capacity of the NBT sector
 2. Expansion of the NT sector
 3. Appreciation of the Real Effective Exchange Rate (REER)

How does De-Agriculturization Result?

Figure 1: Effect of Dutch Disease on Agriculture Sector



Agriculture in Trinidad and Tobago

Division of the Agriculture Sector



Domestic + Export Agriculture

- Traditional definition of Agriculture sector:
 - Domestic agriculture which is non-tradable and includes coconuts, bananas, plantains, root crops, pulses, vegetables, tobacco, rice, poultry, eggs, dairy beef and other meat, pork fattening and fish.
 - Export agriculture which is tradable and includes cocoa, citrus and coffee.
 - Sugar cane farming, manufacturing and distillation which is tradable.
- More recently a non-traditional export agriculture sector of T&T has been introduced. This sector includes exports of vegetables, fruits, fish and value-added products (Singh, Rankine and Seepersad, 2005).

The Case of Trinidad and Tobago

Expansion of the Booming Tradable – Oil and Natural Gas



Two Major Economic Booms

- First economic boom → **1973 – 1982**. Resulted from:
 - An increase in the price of oil on the world market and
 - An increase in the production of oil in Trinidad and Tobago
- Second economic boom → **2002 – 2008**. Resulted from:
 - A surge in both the levels of production and market price of natural gas.
 - An increase in the price of oil though levels of domestic oil production fell.

| Year | Unit Market Price of Oil (WTI) | Oil Production | Inflation | Unit Lifting Cost of Oil | Economic Rent |
|-------------|---|-----------------------|------------------|-------------------------------------|----------------------|
| | US\$/BBL | 000 BBL | | US\$/BBL | US\$ million |
| 1973 | 3.29 | 60670 | 0.148 | 1.06279 | 135.125 |
| 1982 | 32.97 | 64617 | 0.114 | 3.54095 | 1901.617 |
| 1993 | 16.97 | 45203 | 0.108 | 9.824396 | 323.003 |
| 1994 | 15.82 | 47843 | 0.088 | 10.68894 | 245.485 |
| 1995 | 17.02 | 47690 | 0.053 | 11.25546 | 274.911 |
| 1996 | 20.67 | 47171 | 0.033 | 11.62689 | 426.573 |
| 1997 | 19.09 | 45190 | 0.036 | 12.04545 | 318.343 |
| 1998 | 12.72 | 44888 | 0.056 | 12.7200 | 0.000 |
| 1999 | 17.97 | 45689 | 0.034 | 13.1525 | 220.108 |
| 2000 | 28.50 | 43681 | 0.035 | 13.6128 | 650.287 |
| 2001 | 24.44 | 41469 | 0.056 | 14.3751 | 417.380 |
| 2002 | 25.02 | 47690 | 0.041 | 14.9645 | 479.546 |
| 2003 | 28.83 | 48981 | 0.037 | 15.5182 | 652.025 |
| 2004 | 38.27 | 44985 | 0.037 | 16.0924 | 997.660 |
| 2005 | 54.52 | 52740 | 0.068 | 17.1867 | 1968.961 |
| 2006 | 65.14 | 52105 | 0.083 | 18.6131 | 2424.282 |
| 2007 | 72.39 | 43807 | 0.079 | 20.0836 | 2291.387 |
| 2008 | 97.26 | 41828 | 0.120 | 22.4936 | 3127.328 |
| 2009 | 61.67 | 39117 | 0.070 | 24.0682 | 1470.871 |
| 2010 | 79.48 | 35855 | 0.113 | 26.7879 | 1889.276 |
| 2011 | 94.88 | 33552 | 0.051 | 28.1541 | 2238.789 |
| 2012 | 95.00 | 25208 | 0.072 | 30.1811 | 1633.930 |



Effect on Production

- The First Boom and Recession:
 - Increase in domestic agriculture from TT\$299 mn in 1973 to TT\$348 mn in 1982.
 - Expansion continues during the recession from 1983 to 1993, resulting in a 14.1% increase in domestic agriculture by 1993 compared to the levels in 1983.
- The Second Boom:
 - The period 1994 – 2008 agriculture began to fluctuate in the face of rapid economic growth in T&T.
 - In 2009 agriculture slumped to TT\$309.3 mn, a 24% decrease from the 1994 level and only a 3.4% increase from the 1973 level.
 - The post-boom recessionary period after 2008 saw domestic agriculture expand once again to TT\$375.8 mn in 2012, a 21.5% increase from 2009 levels.



Effect on Employment

- First Boom and Post-boom period:
 - Employment in domestic agriculture fell continuously from 1973 to 1983. Employment in 1983 showed a **decrease of 31%** from 1973 levels.
 - Between 1984 and 1995 the number of persons employed in domestic agriculture fluctuated between 30,000 and 35,700. Employment levels never returned to the 1973 and 1974 levels of 36,710 and 36,775.
 - Post 1996, employment in domestic agriculture never surpassed 30,000.
- Second Boom and Post-boom period:
 - In 2007 employment in domestic agriculture reached its lowest point, 20,700; 31% lower than the lowest rate of 30,000 in the previous post-boom period.
 - Beyond 2008 employment in domestic agriculture began to increase but at a lower rate than the previous post-boom period of 1984 to 2002.

Employment by industrial sector

| | Agriculture | Export agriculture | Domestic Agriculture | Sugar | Petroleum industries | Manufacturing |
|------|-------------|--------------------|----------------------|-------|----------------------|---------------|
| 1973 | 54188 | 2021 | 34581 | 17586 | 16168 | 39372 |
| 1982 | 40100 | 1000 | 25900 | 13200 | 18200 | 49500 |
| 1993 | 46100 | 2800 | 30700 | 12600 | 15400 | 39200 |
| 1994 | 51800 | 3300 | 35600 | 12900 | 15900 | 40400 |
| 1995 | 46200 | 3100 | 30400 | 12700 | 16100 | 43000 |
| 1996 | 42800 | 3100 | 28300 | 11400 | 16900 | 43300 |
| 1997 | 44000 | 1400 | 28800 | 13800 | 17100 | 44900 |
| 1998 | 39327 | 1723 | 27163 | 10441 | 17524 | 49595 |
| 1999 | 40346 | 1521 | 26851 | 11974 | 14986 | 51196 |
| 2000 | 36600 | 2100 | 25000 | 9500 | 15600 | 53800 |
| 2001 | 40500 | 1500 | 27300 | 11700 | 15500 | 51600 |
| 2002 | 36700 | 2600 | 22300 | 11800 | 17100 | 53900 |
| 2003 | 32000 | 800 | 23300 | 7900 | 16100 | 53600 |
| 2004 | 26800 | 1300 | 21300 | 4200 | 18400 | 57100 |
| 2005 | 25800 | 1100 | 21600 | 3100 | 19000 | 54000 |
| 2006 | 26448 | 712 | 23011 | 2725 | 19095 | 54205 |
| 2007 | 23000 | 700 | 20700 | 1600 | 21400 | 53000 |
| 2008 | 23400 | 400 | 22000 | 1000 | 18800 | 50500 |
| 2009 | 22100 | 700 | 20800 | 600 | 18200 | 49900 |
| 2010 | 22200 | 300 | 21200 | 700 | 17300 | 47200 |
| 2011 | 22100 | 400 | 21300 | 600 | 17400 | 47100 |

Symptoms 2 and 3:

Expansion of the NT Sector and Appreciation of the
Real Effective Exchange Rate




Increased Expenditure on Services → Expansion of the NT Sector

- The increase in wages, in both the BT and NBT sectors of an economy, leads to the expansion of the NT sector of the economy as persons increase their expenditure on services.

GDP from Services 1996 - 2013

| Year | GDP at Constant (1985 for 1996 - 1999) (2000 for remaining years) Prices (TT\$ Millions) | GDP at Constant (1985 for 1996 - 1999) (2000 for remaining years) Prices % Change |
|-------|--|---|
| 1996 | 11917.2 | |
| 1997 | 12581.8 | 5.6 |
| 1998 | 13224.6 | 5.1 |
| 1999 | 13981.8 | 5.7 |
| 2000 | 31163.9 | 5.6 |
| 2001 | 31752.3 | 1.9 |
| 2002 | 33302.4 | 4.9 |
| 2003 | 35510.2 | 6.6 |
| 2004 | 38530.3 | 8.5 |
| 2005 | 39781.3 | 3.4 |
| 2006 | 42078.6 | 5.8 |
| 2007 | 44737.4 | 6.3 |
| 2008 | 46149.8 | 3.2 |
| 2009 | 44952.7 | -5.7 |
| 2010 | 43234.5 | -3.8 |
| 2011 | 43083.5 | -0.3 |
| 2012 | 44117.1 | 2.4 |
| 2013e | 45268.1 | 2.6 |

Source: Review of the Economy (Various Years)

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- In accordance with the mechanics of the Dutch Disease, wages in each of the three sectors (BT, NBT and NT) increased significantly over the time period alongside increases in the Retail Price Index which indicates appreciation of the REER.

Relative Compensation per Worker

Wage comparisons among Domestic Agriculture,
Export Agriculture, Petroleum and Manufacturing

| | Domestic Agri/Export Agri | Domestic Agri/Petroleum | Export Agri/Petroleum | All Agriculture/Petroleum | Domestic Agri/Manufacturing | Export Agri/Manufacturing |
|-------|---------------------------------|----------------------------|--------------------------|------------------------------|--------------------------------|------------------------------|
| 1973 | 18.3 | 6.0 | 32.8 | 13.0 | 15.5 | 84.8 |
| 1982 | 17.4 | 8.4 | 48.6 | 20.8 | 23.1 | 133.3 |
| 1993 | 40.2 | 6.9 | 17.1 | 13.6 | 21.1 | 52.5 |
| 1994 | 45.9 | 6.3 | 13.8 | 13.3 | 18.1 | 39.4 |
| 1995 | 44.2 | 7.1 | 16.0 | 15.0 | 22.3 | 50.4 |
| 1996 | 44.9 | 6.9 | 15.3 | 14.5 | 24.1 | 53.7 |
| 1997 | 20.0 | 6.2 | 31.2 | 14.2 | 17.6 | 88.1 |
| 1998 | 45.9 | 7.0 | 15.2 | 14.3 | 26.0 | 56.7 |
| 1999 | 34.4 | 5.3 | 15.4 | 11.7 | 24.4 | 70.9 |
| 2000 | 46.0 | 5.1 | 11.1 | 12.6 | 23.0 | 50.0 |
| 2001 | 62.0 | 4.5 | 7.3 | 9.4 | 21.2 | 34.1 |
| 2002 | 83.1 | 7.3 | 8.8 | 12.9 | 29.2 | 35.2 |
| 2003 | 29.4 | 4.7 | 16.0 | 9.0 | 24.2 | 82.4 |
| 2004 | 51.1 | 4.9 | 9.6 | 6.8 | 29.6 | 58.0 |
| 2005 | 22.7 | 4.3 | 19.0 | 6.3 | 24.8 | 109.1 |
| 2006 | 60.5 | 3.4 | 5.7 | 4.7 | 21.3 | 35.2 |
| 2007 | 49.1 | 5.4 | 11.1 | 7.1 | 23.5 | 47.9 |
| 2008 | 31.5 | 4.3 | 13.7 | 5.0 | 20.4 | 64.7 |
| 2009 | 75.4 | 4.2 | 5.5 | 4.8 | 22.4 | 29.7 |
| 2010 | 35.3 | 4.3 | 12.0 | 6.0 | 22.1 | 62.5 |
| 2011 | 24.2 | 4.3 | 17.9 | 7.0 | 23.2 | 96.0 |
| 2012p | 22.0 | 4.4 | 20.1 | 7.0 | 24.3 | 110.6 |

What is Food Security?

Does Trinidad and Tobago fit the criteria?



What is Food Security?

- The concept of Food Security exists within four dimensions:
 1. Physical Availability of Food – is food readily available in a sufficient quantity? Deals with food production, net trade and levels of stock.
 2. Economic and Physical Access to Food – do individual households have access to food? Deals with levels of income, market prices and expenditure.
 3. Food Utilisation – are persons getting a sufficient intake of necessary nutrients? Deals with preparation of food, diversity of diet and distribution of food within the household.
 4. Stability of the above three over time – are households in a secure position in the long run? Deals with weather conditions, changes in the economy and political instability.

Food Security in T&T

| | Current State | Areas for Improvement |
|---------------|--|--|
| Availability | <ul style="list-style-type: none">-High levels of imports-Decreasing domestic production | <ul style="list-style-type: none">-Focus on the improvement of Domestic Agriculture to reduce dependence on imports-Improvement of education on healthy eating practices, including nutritional value of local foods. |
| Accessibility | <ul style="list-style-type: none">-Increasing GDP per capita, indicating increased ability to purchase food-Rising food prices, indicating the loss of power of the TT dollar | <ul style="list-style-type: none">-Focus on the reduction of food prices through increased domestic output alongside improvement in packaging, transport and storage of produce. |
| Stability | <ul style="list-style-type: none">-Corruption Perceptions Index rank of 39/100 (2012)-Increased flooding | <ul style="list-style-type: none">-Improvement of control of corruption through greater Government accountability-Improvement or drainage throughout flood prone areas and irrigation in farm lands |

| | 1991 | 2001 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 |
|----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| Cocoa | 1512 | 649 | 1146 | 569 | 598 | 575 | 517 | 515 | 339 | 438 |
| Coffee | 914 | 406 | 102 | 94 | 237 | 167 | 19 | 13 | 1 | 7 |
| Citrus | 3460 | 3897 | 167 | 978 | 758 | 1933 | 2107 | 286 | n.a. | n.a. |
| Tomato | 1463 | 2737 | 1645 | 1781 | 3465 | 1815 | 1861 | 2144 | 1510 | 1223* |
| Cabbage | 2658 | 1412 | 991 | 921 | 937 | 970 | 533 | 291 | 787 | 1011* |
| Cucumber | 2982 | 3503 | 4590 | 2194 | 2176 | 1557 | 1363 | 1291 | 1193 | 1032* |
| Dasheen | 1277 | 923 | 4239 | 2100 | 2643 | 2694 | 3185 | 2279 | 2741 | 2142* |
| Rice | 19950 | 6256 | 2082 | 1555 | 2413 | 1815 | 1861 | 2259 | 1510 | 1223* |
| Pigeon Peas | 1807 | 785 | 954 | 1554 | 713 | 1775 | 911 | 121 | 2033 | 677* |
| Pumpkin | 3024 | 11449 | 2172 | 2030 | 2226 | 3328 | 3312 | 1773 | 4818 | 946* |
| Melongene | 1083 | 947 | 2232 | 1293 | 2856 | 1775 | 911 | 533 | 1577 | 677* |
| Meat (Excl. Poultry) | 3875 | 2883 | 2982 | 2599 | 4302 | 3726 | 4026 | 4014 | 3915 | 1788** |
| Broilers | 12949 | 23852 | 29550 | 31918 | 32640 | 33140 | 35499 | 35664 | 34220 | 16087** |
| Eggs | 3860 | 5022 | 7018 | 5748 | 6642 | 7032 | 9547 | 8081 | 5498 | 2960** |
| Milk | 11391 | 10352 | 9188 | 6866 | 6034 | 5152 | 4830 | 4286 | 5621 | 1636** |

Source: CBTT Annual Economic Survey

*Jan-Sep 2012

**Jan-Jun 2012

Policy Suggestions

Improving Agriculture in Trinidad and Tobago



Availability

1. Improvement of the Quantity and Quality of Research:
 - Alignment of research to address current issues in the agriculture sector.
2. Improvement of Storage, Transport, Packaging and Production of Value-Added Products
 - Training of farmers in post-harvest handling including packaging and correct storage.
 - Focus can also be placed on the production of value-added products.
3. Regularisation of Land Tenure for Farmers and Increased Use of Modern Technologies:
 - Focus on regularisation of land tenure for farmers to facilitate their access to loans
 - Greenhouse Technology, Tractor Pool, Aquaponics, Hydroponics, Aquaculture and Mariculture
4. Focus on Efficient Use of Small Farms
 - Identification of the various soil types on T&T's farms and the crops which are best suited to these soil types and are most ideal to be grown on smaller areas of land (i.e. 2 acres)
5. Innovative use of alternative staples for example increased use of cassava flour.



Accessibility

1. Reduction of Prices via Increased Investment and Training of farmers in livestock rearing
2. Reduction of Cost of Production through production of animal feed, tilapia feed and fertilizer locally using waste products from agriculture for the former and composting of grass clippings from work done by CEPEP and URP for the latter
3. Production of Safe Foods and Identification of Markets for our Produce



Stability

1. Improve/Update Legislation and Organisation of Relative Government Ministries under overarching goals for the agriculture sector
2. Use of Greenhouses, Aquaculture and Mariculture to prevent against the impact of unpredictable weather and over-fishing
3. Promotion of domestic farming using hydroponics and aquaculture.



Conclusion

- Trinidad and Tobago has displayed the characteristics of the Dutch Disease including the decline in the NBT sector of agriculture.
- There is evidence of food insecurity in the country, especially due to the over-reliance on imports.
- Policy suggestions for the Improvement of Production include:
 - Improvement/Updating of Legislation and Organisation of Relative Government Ministries
 - Improvement in Quantity and Quality of Research
 - Improvement of Storage, Transport, Packaging and Production of Value-Added Products
 - Regularisation of Land Tenure for Farmers and Increased Use of Modern Technologies
 - Increased Investment, Training and Use of Waste Products
 - Production of Safe Foods and Identification of Markets for our Produce