



**Dear Reader:**

The Production Marketing Information Service (PROMIS) is ready to take off and provide all with useful accurate information, however, that will not be possible without you, the entire agricultural community. In the initial stages, the focus of the Newsletter will be directed primarily towards the crop production however, future plans will include all other facets of the sector such as Livestock, Poultry, Fish and Agro-Processing. For starters, the data collected will make possible the dissemination of the following:

- **Acreage Planted:** this will give the total area under production of every crop produced in the country.
- **Harvest due date:** will aid in forecasting availability of each produce in the market, and so reduce the quantity of imports.
- **Estimated production:** to better anticipate periods of glut and scarcity.
- **Loss:** this is an indication of possible shortage in the market.
- **Production:** to know the availability of crops in the country during a given period.
- **Yield:** for comparison with other countries to determine how well the country measures up to their agricultural practices.

Antigua and Barbuda is ideally situated to produce the best quality onions and carrots in the Caribbean, therefore, the opportunity exists for farmers to increase production and broaden their horizons in the export arena, as a result of this activity the sector will experience a faster rate of agricultural growth than would be possible if agricultural output was limited to domestic market.

Beside the production, import/export and pricing information, the Newsletter will also include a section for advertising; this will be available to all for a small fee to bring about awareness of the goods, services and job opportunities available in the sector. **So please advertise with us!**

The PROMIS Newsletter promises to be a useful, dynamic tool for all agricultural industry partners and stakeholders such as farmers, hoteliers, restaurateurs, supermarket owners, agro-processors as well as government agencies informing them in a timely and consistent manner of the availability of local produce and prices.

Help us revitalize Agriculture, the real “main” industry in Antigua and Barbuda, to that end, PROMIS will deliver information at its best because Agriculture is priority.

The PROMIS team is looking forward to a strong, enduring working relationship with you.

Sincerely,

**PROMIS Unit**

- Dalma Hill – General Manager
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**Here’s what’s happening in Antigua and Barbuda Agriculture**

Local farmers are preparing the land for a bountiful harvest of the freshest, sweetest, juiciest, most nutritious fruits, tubers and vegetables.

Support your own! Home grown is best! Buy Local!



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### CROP TOP

#### Tomato (*Lycopersicon esculentum* Mill.)

##### Introduction

Tomato is one of the most widely cultivated crops in the world. Production in 2010 was approximately 145.7 million (millions of tons (MT)) with China being the number one producer, contributing 41.9 million (MT).

As it is a relatively short duration crop and gives a high yield, it is economically attractive and as a result, an important cash crop for small and medium-scale farmers. Tomatoes contribute to a healthy, well-balanced diet. They are rich in minerals, vitamins, essential amino acids, sugars and dietary fibers. Tomato contains much vitamin B and C, iron and phosphorus.

The fruits are consumed fresh in salads or cooked in sauces, soup and meat or fish dishes. They can be processed into purées, juices and ketchup. Canned and dried tomatoes are economically important processed products.

##### Fast Facts

- Approximate weight of 1000 seeds is 2.5 – 3.5 g (0.08 – 0.12 oz).
- Grow two other consecutive crops before planting tomato again on the same field.
- Do not rotate tomato with potato, tobacco or eggplant because these plants belong to the same family (*Solanaceae*) and have the same types of pests and diseases.

##### Cultivation

Tomato is an annual plant, which can reach a height of over 6 feet. The first harvest is possible 45-55 days after flowering, or 90-120 days after sowing. The shape of the fruit differs per cultivar. The colour ranges from yellow to red.



Three different types of tomato plants can be distinguished:

- Tall or indeterminate type, are the best choice for a long harvest period as they keep growing after flowering and most suitable to greenhouse production.

- Semi-bush or semi-indeterminate type, usually need no staking.
- Bush or determinate type stops growing after flowering and require less labour.

##### Temperature

Tomato requires a relatively cool, dry climate for high yield and premium quality. The optimum temperature for most varieties lies between 21 and 24 °C. However, the plant tissues are damaged below 10 °C and above 38 °C.

Table 1: Temperature requirements for different stages of tomato.

Stages	Temperature (° C)		
	Min.	Optimum range	Max.
Seed germination	11	16-29	34
Seedling growth	18	21-24	32
Fruit set	18	20-24	30
Red colour development	10	20-24	30

##### Water and Humidity

Water stress and long dry periods will cause buds and flowers to drop off, and the fruits to split. However, if rains are too heavy and humidity is too high, the growth of mold will increase and the fruit will rot.

Optimum relative humidity (RH) oscillates between 60% and 80%. High RH favors the development of diseases and prohibits fertilization given that the pollen gets compacted and some of the flowers are aborted. Low RH also, inhibits the fixation of the pollen to the stigma of the flower.

##### Soil

Tomato grows well on most mineral soils that have proper water holding capacity and aeration, and are free of salt. It prefers deep, well-drained, sandy loam soils. Soil depth of 15 to 20 cm is needed to grow a healthy crop. In heavy clay soils, deep ploughing allows better root penetration.

Tomato is moderately tolerant to a wide range of pH (level of acidity), but grows well in soils with a pH of 5.5 – 6.8 with adequate nutrient supply and availability. Addition of organic matter is, in general, favourable for good growth. Soils with very high organic matter content, like peat soils, are less suitable due to their high water holding capacity and nutrient deficiencies.



### Preparation and Planting

Cultivating tomato on raised beds, ridges or furrows facilitates drainage of water and irrigation. Tomatoes are normally transplanted because much better results are gained when seedlings are raised in a nursery and the seedlings can be selected for growth and health before planting in the field.

Seedling should be transplanted to the field 3 to 6 weeks after sowing. A week before transplanting, seedlings should be hardened by reducing the application of water, but 12-14 hours before they are taken out of the seedbed they should be thoroughly watered again to avoid excessive damage to the roots. Seedlings of 15-25 cm tall with 3-5 true leaves are most suitable for transplanting. Transplanting should be done in the afternoon or on a cloudy day to reduce the transplanting shock.



Water the plants immediately once they have been transplanted. The common spacing is 50 cm between plants and 75 - 100 cm between rows. Holes for the plants should be deep enough so that the lowest leaves are at ground level.

Staking or trellising tomato plants provides support and keeps the fruit and foliage off the ground. Staking will increase fruit yield and size, reduce fruit rot, and make spraying and harvesting easier.



Weeds compete with the tomato plants for light, water and nutrients. Sometimes they provide shelter for organisms that cause tomato diseases, such as Tomato Yellow Leaf Curl Virus (TYLCV), and reduce the yield. Effective non-chemical weed management begins with deep ploughing, diverse crop rotations and competitive cover crops.

### Pest and disease control

Prevention of pests and diseases in tomato is extremely important. Root-knot nematodes are of major importance in tomato cultivation. Affected plants remain small, and

are liable to soil-borne fungal and bacterial diseases. Nematodes cause yield losses of about 30% in tomato in the tropics.

All stinging and sucking insects, such as whitefly, thrips and aphids cause physical damage only when they occur in large numbers. However, they may transmit viruses, which can cause much greater damage.

Tomato plants are susceptible to several fungi, bacteria and viruses. Fungi and bacteria cause foliar (leaf), fruit, stem or root diseases. A virus infection often leads to dwarfed growth and decreased production. Damage caused by diseases can result considerable yield losses for a farmer.

Pests and diseases can also be controlled by using:

**Synthetic chemicals:** such as Caprid and Cure are most effective in controlling the pests and diseases, but they also kill the pest's natural predators, causing a serious resurgence of some pests when not applied at the right time, in the right way and in the right dosage.

**Natural pesticides:** Natural pesticides are products, such as pyrethrum, derris (rotenone). Their application has a quick effect and can be as toxic to the natural enemies of crop pests as synthetic chemical pesticides.

Other natural pesticides have a slow action, such as neem extract (*Azadirachta indica*), which represses rather than control pests. Besides these pesticides there are other ways to suppress the development of pest populations such as spraying the crop with cow urine, cow dung, garlic and other products.

**Biological control:** controlling an insect pest by using its natural enemies is called biological control. Natural enemies can be birds, spiders, other insects and even fungi or bacteria.

### When to harvest

Tomatoes can be classified in four stages of maturity:

**Stage 1:** Seed are white in colour (immature) and can be cut when the tomato is sliced. There is no juice inside the tomato.

**Stage 2:** Seeds have a tan colour (mature) and some juice present.

**Stage 3:** Seeds are pushed aside when cut. The colour inside is still green.

**Stage 4:** Juice becomes red in colour.

Tomatoes that are harvested at the first stage of maturity will ripen into poor-quality tomatoes. Tomatoes harvested at third and fourth stages of maturity will ripen into good-quality tomatoes. *Continued on page 5*



### IMPORTATION

Antigua and Barbuda currently import more food than they export due to the fact that what is produced at present is not sufficient to satisfy consumption demands. The seasonality of crops is a major contributing factor to the ability of farmers to be consistent; however with the research of adaptable varieties, this challenge can and must be overcome.

There exists a strong possibility that agricultural imports could slow down a country's agricultural growth so the trend towards a decline on imported crops seen in figure 1, is an indication of the growth experienced by the sector in the last three years. On the other hand, one may also observe in the same graph, that sweet pepper imports appear to be experiencing a steady increase during the last three year period; therefore, farmers are advised to plant more of the said crop.

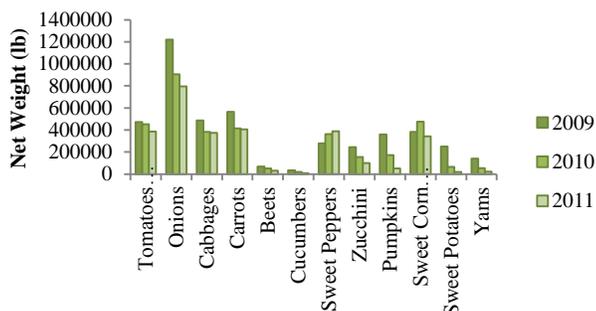


Figure 1: Importation of selected crops for 2009-2011.

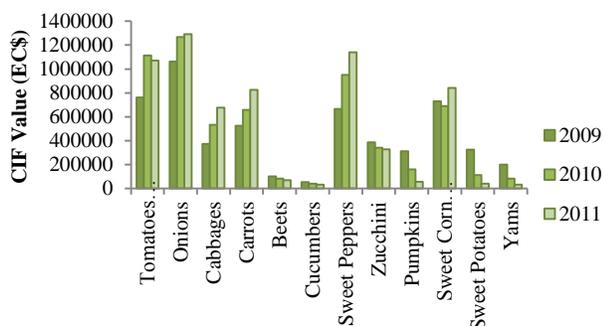


Figure 2: CIF value for selected imported crops for 2009-2011.

A comparative glance at figures 1 and 2 shows that, while the volume of imports was decreasing, the cost was steadily increasing in crops such as, tomatoes, onions, cabbages, carrots, sweet peppers and sweet corn.

This means that the unit price on said commodities (except tomatoes and sweet corn, which fluctuated somewhat) increased significantly in the last three years.

The following table shows the volume and cost of 12 selected crops imported during the year 2011, these crops can be produced successfully on the local market. An increase in local production would signify that those monies would circulate in the local economy providing job opportunities for many and fresher, quality goods for consumers.

Table 1: Monetary value and net weight of selected imported crops for the year 2011.

INDICATORS	CIF* Value (EC\$)	Net Weight (lb)
Tomatoes Fresh Or Chilled	1,071,541.90	386728.3967
Onions	1,292,136.91	795838.6072
Cabbages	675,578.27	373360.7336
Carrots	825,531.39	406538.6726
Beets	69,661.08	31784.17662
Cucumbers	31,469.81	7854.739708
Sweet Peppers	1,140,199.30	389426.5682
Zucchini	328,079.44	100714.7012
Pumpkins	54,531.50	51703.69158
Sweet Corn (Corn On The Cob)	841,011.22	342328.223
Sweet Potatoes	39,169.05	19704.85086
Yams	31,932.99	22276.98407
<b>Total</b>	<b>6,400,842.86</b>	<b>2,928,260.35</b>

\*CIF – Cost Insurance Freight

**YOUR AD COULD BE HERE**





**TOMATO continued from page 3**

It is also good to look carefully at how ripe the tomatoes are. How ripe a tomato is when it is harvested affects the fruit composition and tomato quality. Tomatoes accumulate acids, sugars and ascorbic acid when they ripen on the plant. Field-ripened tomatoes have a better flavour and overall quality than tomatoes that ripen after picking.

Hence it is important to understand ripeness stages.

**Green ripeness stage:** Fruit surface is completely green. The shade of green may vary from light to dark.

**Breaker ripeness stage:** Break in colour from green to tan yellow, pink or red on not more than 10 % of the tomato skin.

**Turning ripeness stage:** 10% to 30% of the tomato skin is not green. It can be tan yellow, pink or red.

**Pink ripeness stage:** 30% to 60% of the tomato skin is not green. It can be pink or red.

**Light red ripeness stage:** 60% to 90% of skin colour is not green. It can be pinkish red or red.

**Red ripeness stage:** 90% of the tomato skin is not green. It shows a red colour.

Source: Naika, S. et al. 2005. *Cultivation of tomatoes. Agro dok 17. Netherlands.*

**GOOD AGRICULTURAL PRACTICES (GAP)**

Adoption of agricultural practices which protect the environment and ensure the quality and safety of food as well as increasing productivity should enable farmers to increase their incomes from existing markets and take advantage of new market opportunities, thus achieving sustainable improvements in their livelihoods.

According to the Food and Agricultural Organization (FAO) of the United Nations (FAO COAG 2003 GAP paper), Good Agricultural Practices are “practices that address environmental, economic and social sustainability for on-farm processes, and result in safe and quality food and non-food agricultural products.”

GAPs and GMPs (Good Manufacturing Practices) are a set of principles, regulations and technical recommendations applicable to production, processing and food transport, addressing human health care, environment protection and improvement of worker conditions and their families.

**GAP Benefits**

1. Security for people

- a. Improve worker and consumer conditions
- b. Enhance the agricultural family welfare.
- c. Improve food security.
2. Food Safety
  - a. Healthy food not contaminated and of higher quality to improve nutrition and food consumption.
3. Environment
  - a. No contamination of water and soils.
  - b. Rational handling of agro-chemicals.
  - c. Concern about Biodiversity.
4. Animal Welfare
  - a. Animal care.
  - b. Adequate feeding.

**GAP Beneficiaries**

- Farmers will obtain healthy and good quality food to assure their nutrition and nourishment, generating a value added in their products to access markets in a better way.
- Consumers enjoy better and safe quality foods.
- The population in general that will benefit from a better environment.



**GAP Guidelines in Crop Production**

1. Know the history of the field.
2. Recognize more fertile lands and availability of water.
3. Do not plant in fields with chemical contaminants.
4. The field should be free of trash, papers, plastics and empty containers.
5. Check there is no risk of water contamination.
6. Be acquainted with the type of pests, diseases and weeds that exist, mainly in the crop area.
7. Check on possible contamination sources from neighboring plots.
8. Signpost the place where the crop will be planted with the number of the lot or name of the crop. *Continued next issue.*

Source: Izquierdo, J. et al. 2007. *Guidelines: Good Agricultural Practices for Family Agriculture. FAO, Latin America and the Caribbean.*



### SOIL SCIENCE

Soil covers the vast majority of the exposed portion of the earth in a thin layer. It supplies air, water, nutrients, and mechanical support for the roots of growing plants. The productivity of a given soil is largely dependent on its ability to supply a balance of these factors to the plant community.

A desirable surface soil in good condition for plant growth contains approximately 50% solid material and 50% pore space (Figure 3). The solid material is composed of mineral material and organic matter. Mineral material comprises 45% to 48% of the total volume of a typical Mid-Atlantic soil. About 2% to 5% of the volume is made up of organic matter, which may contain both plant and animal residues in varying stages of decay or decomposition. Under ideal moisture conditions for growing plants, the remaining 50% soil pore space would contain approximately equal amounts of air (25%) and water (25%).

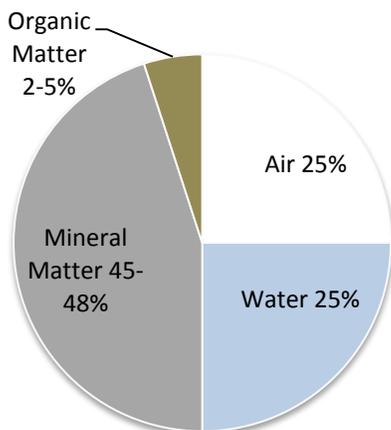


Figure 1: Volume composition of a desirable surface soil.

### Soil Formation

The mineral material of a soil is the product of the weathering of underlying rock in place, or the weathering of transported sediments or rock fragments. The material from which a soil has formed is called its parent material.

The rate and extent of weathering depends on:

- The chemical composition of the minerals that comprise the rock or sediment.
- The type, strength, and durability of the material that holds the mineral grains together.

- The extent of rock flaws or fractures.
- The rate of leaching through the material.
- The extent and type of vegetation at the surface

Physical weathering is a mechanical process that occurs during the early stages of soil formation as freeze-thaw processes and differential heating and cooling breaks up rock parent material. After rocks or coarse gravels and sediments are reduced to a size that can retain adequate water and support plant life, the rate of soil formation increases rapidly. As organic materials decompose, the resulting carbon dioxide dissolves in water to form carbonic acid, a weak acid solution. The carbonic acid reacts with and alters many of the primary minerals in the soil matrix to make finer soil particles of sand, silt, and secondary clay minerals.

As soil-forming processes continue, some of the fine clay soil particles (<0.002 mm) are carried, or leached, by water from the upper or surface soil into the lower or subsoil layers. As a result of this leaching action, the surface soil texture becomes coarser and the subsoil texture becomes finer as the soil weathers.

Soils are layered because of the combined effects of organic matter additions to the surface soil and long-term leaching. These layers are called horizons. The vertical sequence of soil horizons found at a given location is collectively called the soil profile (Figure 4). The principal master soil horizons found in managed agricultural fields are:

- O horizon or organic material.
- A horizon or mineral surface soil (if the soil has been plowed, this is called the Ap horizon).
- B horizon or subsoil.
- C horizon or partially weathered parent material.
- Rock (R layer) or unconsolidated parent materials similar to that from which the soil developed.

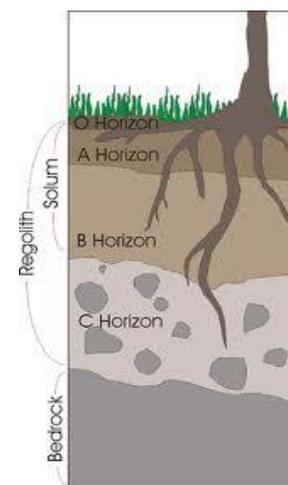


Figure 2: Soil profile horizons.

Continued next issue

Source: Lee Daniels, W. et al. Concepts of basic soil science. Department of Crop and Soil Environmental Sciences. Virginia Tech, Virginia, USA.



### AGRI-CLIMATE

By: Dale Destin – Climatologist

Antigua and Barbuda Meteorological Service

#### Influence of Climate on Crops

Climate is the most important dominating factor influencing the suitability of a crop to a particular region. The yield potential of the crop mainly depends on climate. More than 50 per cent of variation of crops is determined by climate. The most important climatic factors that influence growth, development and yield of crops are solar radiation, temperature and rainfall.

#### Weather and climate summary in brief for Antigua - January 2012

Antigua experienced above normal rainfall during January with 3.00 inches or 76.2 mm; this was 111% of the normal total (1981 – 2010). This is the highest total for the month since 2008. Moisture advection in association with fresh to strong low level winds was responsible for about 75% of the rainfall. At Coolidge, the 11 rainfall days ( $\geq 1$  mm) were near normal; meanwhile, there were two heavy rainfall days ( $\geq 10$  mm), which were above normal. The mean temperature (temp) of 25.1°C was below normal and the lowest since 2008. The mean daily maximum and minimum temperatures of 27.9°C and 22.4°C were below and near normal respectively. Further, the absolute maximum temp of 28.7°C was below normal and the absolute minimum temp of 20.6°C was above normal.

#### Monthly weather outlook – February 2012

##### Rainfall

Near normal rainfall is most likely with than 1.67 to 2.31 inches. Probabilistically, there is a 30% chance of above normal rainfall; 45% chance of near normal rainfall and 25% chance of below normal rainfall.

##### Temperature

Near normal temperature is most likely with 25.0 to 25.4°C. Probabilistically, there is a 30% chance of above normal temperature; 45% chance of near normal

temperature and 25% chance of below normal temperature.

For much of the month, weather conditions were quite conducive for land preparation, planting and harvesting for most of Antigua and Barbuda. However, some farmers are still feeling the impacts of the excess rainfall of last year.

Notwithstanding the above normal rainfall for the month of January, about half of the days of the month were dry days, which allowed for a significant amount of land preparation and general farming activities. The weather also allowed for the harvesting of such crops as sweet

potatoes, tomatoes, yams, sweet peppers and egg plants. Meanwhile, planted crops included cucumbers, butternut squashes, tomatoes, carrots and onions.

Of the crops on the market, there is a glut of yams, sweet potatoes and tomatoes. The glut of yams is particularly significant. According to news reports, the great abundance of yams on the market has led to the Ministry of Agriculture exploring a programme to educate the public on different ways to utilize the vegetable in food preparation.

In spite of the gluts of a few crops, a number of items remain scarce; crop production is still down on account of the

abundant rainfall of last year. Further, a number of farmers are still feeling the effects of the above normal rainfall of last year. Some of the more clayey soil in some central areas of Antigua remains high in moisture content and continues to be a challenge for farming activities. There have also been crop losses reported for the month on account of the excess soil moisture and gluts. Losses were reported regarding tomatoes, sweet potatoes and yams.

Based on the outlook through April, near normal weather conditions are likely to prevail, which should lead to relatively good farming conditions. For farming purposes among other things, the 7-Day Forecast is strongly encouraged as a very useful planning tool. This forecast and more can be had at:

[www.antiguamet.com/Climate](http://www.antiguamet.com/Climate).



PROMIS ANITGUA BARBUDA  
AGRI-CLIMATE



### AGRO-SHOUT OUT

Featuring: *Fitzmorgan Greenaway*



In each Issue of the PROMIS Newsletter, there will be a featured farmer and, the farmer selected for inclusion in this the first issue of the Newsletter is Mr. Fitzmorgan Greenaway from the village of Liberta.

Mr. Greenaway has been a fully-fledged farmer for more than 20 years. The crops produced include Tomatoes, Sweet Potatoes, Cucumbers, Table Squash, Butternut Squash, Cassava, Yams, Okra, Lettuce and Seasoning Peppers.

Of the aforementioned crops, he is most successful producing tomato which is also his favorite cash crop. From a plot of approximately 1/8 acre of tomatoes, he anticipates a yield of 9000 lbs.

The challenges faced with tomato production are in the early stages when the fruit becomes infested with the Pinworm. A pest that he controls by the application of one of the following: Lannate, Pyrate, Phoenix, Cure or Match.



Mr. Greenaway stresses that tomatoes need good moisture and thrives best in clay soil where plants reach a height of 5 – 6ft.

His Motto is “Proper Preparation Improves Production” (PPIP) and he has benefited from properly preparing land allowing weeds to grow and, before seeding, burns them with Touchdown or Round Up.

A period of 14 days should be allowed to pass before burning, when the cycle is repeated. He states that “Delayed Gratification” is what motivates him during this process and within 28 days the farm becomes almost

weed- free and there is no need for weed control thereafter.

Crop rotation is frequently practiced by Mr. Greenaway and he reaps the benefit as can be seen in the quality and high standard of his crops.

Mr. Greenaway believes in information sharing with other farmers and stakeholders, knowing that the result would be beneficial to all concerned. The major issue, he said, lies with farmers who are too fragmented and need to come together to help one another. He contends that “The **SECTOR** is much bigger than the **INDIVIDUAL**” and with this concept in mind so much more can be accomplished in the twin island nation.

This renowned farmer’s favourite quotation is “He that soweth sparingly shall reap sparingly and he that soweth bountifully shall reap bountifully”.



### AGRO-PRICES

*Table 2: Retail prices of selected commodities to consumers.*

INDICATORS	EC XCD\$/lb
Tomatoes	5.00
Onions	2.50
Cabbages	2.75
Carrots	3.25
Beets	3.00
Cucumbers	3.50
Sweet Peppers	4.50
Pumpkins	3.75
Sweet Potatoes	4.00
Yams	3.50

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