1. GENERAL DESCRIPTION OF OLIVE GROWING IN EGYPT

Figure 1. Location of Egypt (Source: UN)

1.1. Introduction

In Egypt, the olive agro-subsector is oriented towards producing table olives, which account for almost 80% of aggregate olive production. Over the last three decades the land under olive cultivation has expanded dramatically, increasing nineteen-fold from 3 700 ha in 1980 to approximately 65 303 ha in 2009. From the start of this expansion process, Egypt has been a world leader in growing olives in arid and semi-arid conditions on desert land with poor sandy soil and less than 80 mm rainfall/year. It was one of the very few countries to use micro irrigation systems at a time when nearly 96% of the world's olives were cultivated under rain-fed conditions. Egypt has built up extensive experience in olive irrigation, particularly using poor quality aquifer water with electrical conductivity (EC) values as high as 11.7 dS/m. Among the major challenges facing the sector is the lack of solid, reliable statistics about olive crop area and tree counts. Hence, one of the component parts of the National Olive Development Plan currently under preparation is to conduct satellite image surveying of olive growing areas followed by on-the-ground verification of the distribution of olive varieties (oil/table/dual purpose). Another challenge, which in reality is a problem, is that with few exceptions olive trees growing olives for oil production are scattered through table olive orchards. (Source: IOC questionnaire)

1.2. Socio-economic indicators

- **Area: 1 002 000 sq km (UN, 2008)**
- **Capital city: Cairo (UN)**
- **Currency: Egyptian Pound (EGP) (UN, 2008)**
- **Population: 82 999 393 (World Bank, 2009)**
- **Urban population: 43% (World Bank, 2010)**
- **Rural population: 57% (World Bank, 2010)**
- **Population growth rate: 1.8% (UN, 2005/10)**
- **Life expectancy: 68.3 years (men), 71.8 years (women) (UN, 2005/10)**
- **Main exports by quantity: oranges, milled rice (FAOSTAT, 2009)**
- **Main imports by quantity: wheat, maize and soybeans (FAOSTAT, 2009)**
- **GNI per capita, PPP (current international $): 6 160 (World Bank, 2010)**
- **GDP per capita, PPP (current international $): 6 281 (World Bank, 2010)**
- **Employment in agriculture: 31.6% (World Bank, 2008)**
- **Employees in agriculture, female: 46% (World Bank, 2008)**
- **Employees in agriculture, male: 28% (World Bank, 2008)**
- **Employment in olive growing: 29 800 work days (IOC, 2009/10)**

2. BACKGROUND DATA

2.1. Olive oils

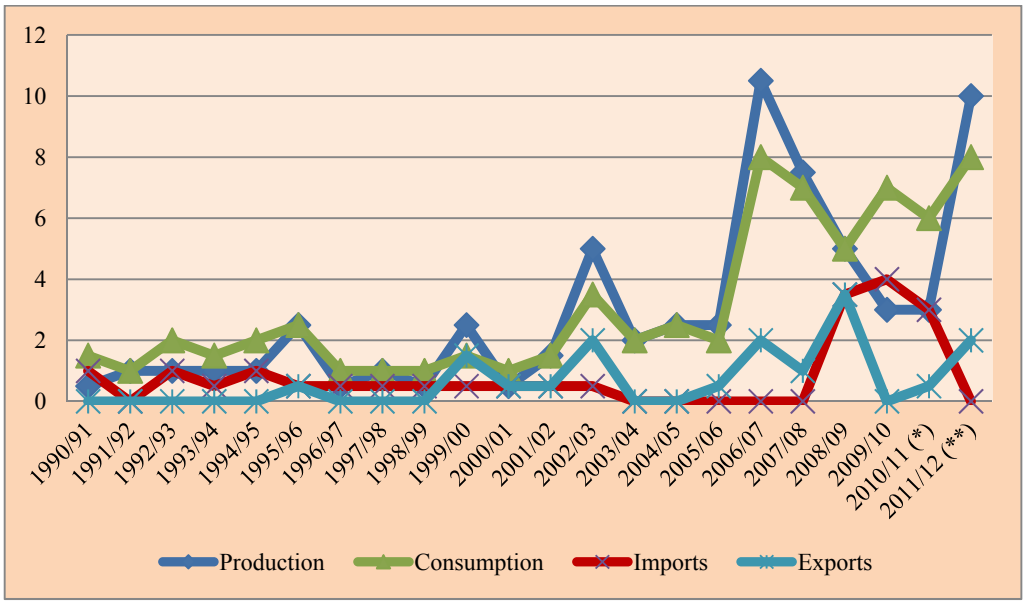

Figure 2. Olive oil production, consumption, imports and exports 1990–2012 (1 000 tonnes)
* Estimates
** Forecasts (Source: IOC)

Table 1.Olive oils (1 000 tonnes) (Source: http://www.internationaloliveoil.org/estaticos/view/131-world-olive-oil-figures)

	2000/01	*2001/02*	*2002/03*	*2003/04*	*2004/05*	*2005/06*	*2006/07*	*2007/08*	*2008/09*	*2009/10*
Production	**0.5**	**1.5**	**5.0**	**2.0**	**2.5**	**2.5**	**10.5**	**7.5**	**5.0**	**3.0**
Consumption	**1.0**	**1.5**	**3.5**	**2.0**	**2.5**	**2.0**	**8.0**	**7.0**	**5.0**	**7.0**
Imports	**0.5**	**0.5**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**3.5**	**4.0**
Exports	**0.5**	**0.5**	**2.0**	**0.0**	**0.0**	**0.5**	**2.0**	**1.0**	**3.5**	**0. 5**

2.2. Table olives

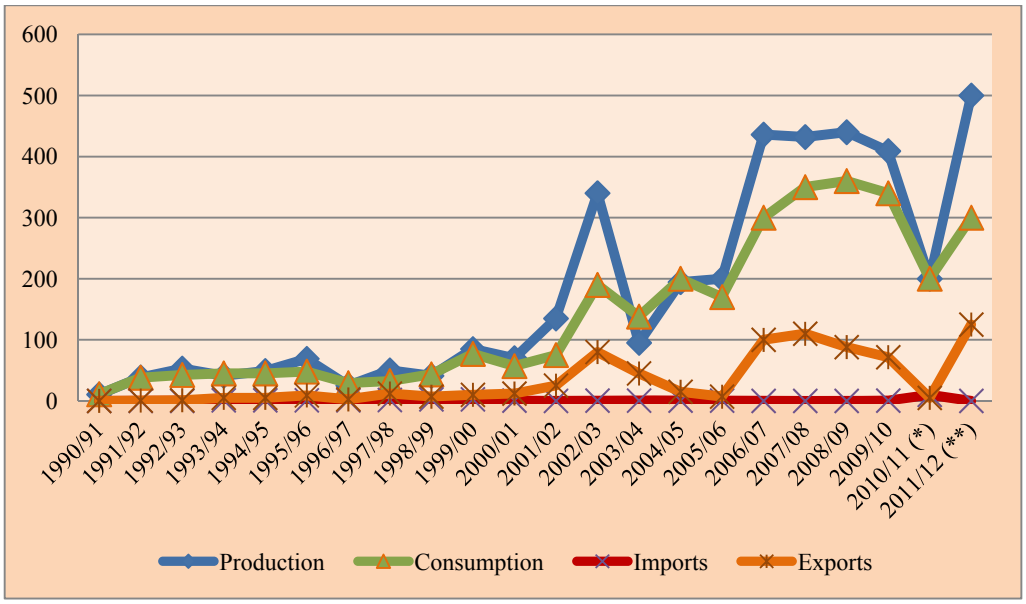

Figure 3. Table olive production, consumption, imports and exports 1990–2012 (1 000 tonnes)
* Estimates
** Forecasts (Source: IOC)

Table 2.Table olives (1 000 tonnes) (Source: http://www.internationaloliveoil.org/estaticos/view/132-world-table-olive-figures)

	2000/01	*2001/02*	*2002/03*	*2003/04*	*2004/05*	*2005/06*	*2006/07*	*2007/08*	*2008/09*	*2009/10*
Production	**70.0**	**135.0**	**340.0**	**95.0**	**194.0**	**200.0**	**436.0**	**432.0**	**440.0**	**409.0**
Consumption	**57.0**	**75.0**	**190.0**	**138.0**	**200.0**	**170.0**	**300.0**	**350.0**	**360.0**	**340.0**
Imports	**0.5**	**0.0**	**0.5**	**0.5**	**0.5**	**0.5**	**0.0**	**0.0**	**0.0**	**0.5**
Exports	**12.0**	**25.0**	**80.0**	**45.0**	**15.0**	**7.0**	**100.0**	**110.0**	**88.0**	**71.0**

2.3. Total area planted

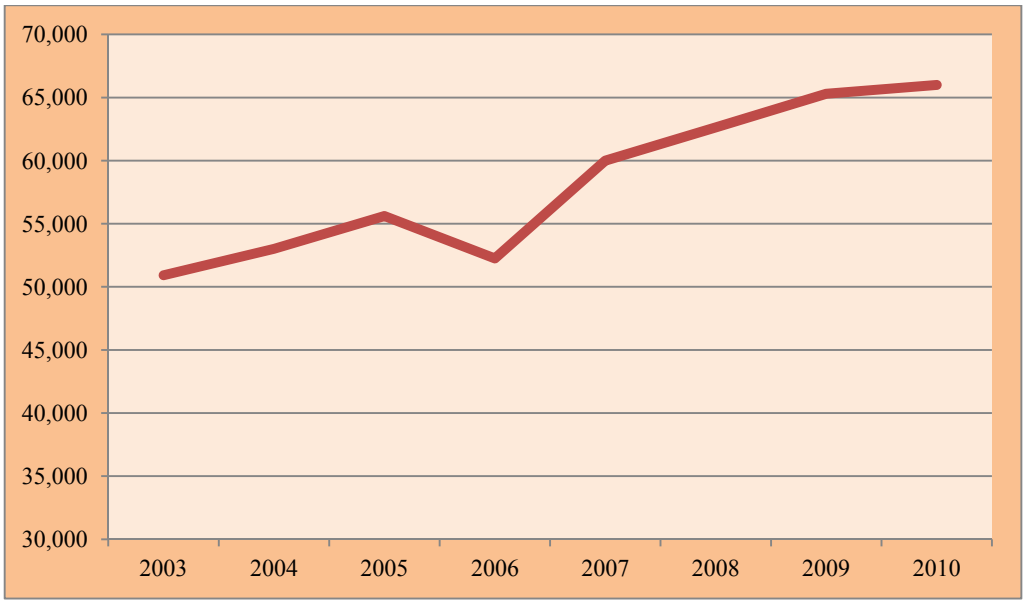

Figure 4. Changes in area planted with olive trees (ha) (Source: IOC)

3. OLIVE INDUSTRY IN EGYPT

3.1. Historical background

Although the existence of the olive tree dates back to the twelfth millennium, the origin of its culture can be traced to Asia Minor some 6 000 years ago.

The earliest evidence of the olive tree in Egypt is found in a relief from Dynasty XVIII (1570–1345 BC). Documents reveal that the Pharaoh Ramses III (1197-1165 BC) promoted olive cultivation and offered the oil extracted from the olives at Helipolis to the Sun God Ra. Many lamps discovered in the tombs of the Pharaohs prove that olive oil was widely used in Egyptian temples. The existence of olive groves in the Thebaid (South), Alexandria and above all at the Fayoum oasis is recorded in documents from the Graeco-Roman period when olive cultivation experienced strong growth.

3.2. Orchard resources

In 2009, a total area of 65 303 ha was planted with olive trees, of which 56 330 ha were crop bearing.

Between 2005 and 2011 new aggregate orchard plantings for both oil and table olives decreased from 2 940 ha to 2 100 ha, albeit with fluctuations in the intervening years. One of the major causes was the uprooting of trees in 2009 and 2010 due to the impact of global warming and climate change, which had first started to be noticed in Egyptian olive groves in 2004. However, at national level, production remained virtually unchanged as new olive orchards planted during the boom of the late 1990s/early 2000s gradually came into commercial production.

A predominant percentage (64%) of the olive tree population is of medium age, between 16 and 50 years old. Only 30.4% is younger, of which 20.6% is 5–15 years old and 9.8% under the age of five.

Average orchard density varies from 70 to 100 trees/ha in rain-fed orchards and from 333 to 400 trees/ha in irrigated orchards. (Source: IOC questionnaire)

3.3. Location

Figure 5. Main producing areas (Source: IOC)

The area under olives represents about 4% of total crop area. The olive tree is widespread and grown successfully in the prevailing conditions of the North-west coastal region, Alexandria, North Sinai and the Oases.

The climate in Egypt is Mediterranean. The temperature is suitable for olive cultivation, fluctuating from 25 to 35 ºC in summer and from 7 to 18 ºC in winter. Rainfall ranges between 100 and 150 mm and is not therefore adequate for olive cultivation.

Generally, olive growing development has been concentrated along the Mediterranean coastline of the north-western provinces, especially between Alexandria and Sollum, extending along a band 20–30 km wide. This zone has an arid climate, with mild winters. The average temperature during the coldest months is 7–18 ºC and the annual precipitation of 100–150 mm is spread over 3–4 weeks in the autumn and winter months.

The winds are from the northwest and generally quite strong.

In recent years, thanks to the efforts of the Egyptian General Desert Development Organisation, other areas of agronomic interest for olive growing have been developed, namely the Sinai peninsula and the area between Alexandria and Cairo where new intensive olive orchards have been planted to develop desert land not suited to other crops on account of the extreme soil and climatic conditions.

3.4. Varieties

An IOC-sponsored project implemented in Egypt has helped to learn more about genetic olive resources through primary and secondary varietal characterisation. Known as the RESGEN project, this project for the conservation, characterisation, collection and utilisation of genetic olive resources entails varietal research and data collection. The aims are to ensure the varieties grown are adapted to the soil and climatic conditions, with the ensuing benefits in terms of higher productivity and better product quality, and to encourage olive growing in marginal areas where other crops are not feasible, so helping to curb rural depopulation.

Egypt has many genetic resources scattered through different regions (Giza, Fayoum, Arish and Siwa). Initially, it had characterised eight of the most important accessions, but this number has now reached 19.

The most important local varieties are:

Aggezi Shami

This variety is considered very hardy because it adapts to very harsh environmental conditions for the olive (large amount of solar radiation and little moisture). It has a high rooting ability and its start of bearing is intermediate. It is self-compatible and has a medium pistil abortion rate. It displays problems of compatibility with some pollinisers. Its productivity is medium. It is moderately susceptible to the olive fly.

The fruit is large and freestone and it has quite a high flesh-to-stone ratio. The flesh is tasty, firm and resistant to handling. Owing to its low oil content (7–9%) it is suitable for the production of green or stuffed olives. Originating from the district of Fayoum, it is one of the most important table olive varieties in the country and accounts for 20% of olive area.

Hamed

This variety is very hardy. In certain years the trees, which are large in size, may suffer through excessive fruit load. It is very ancient in origin and comes from the Siwa oasis.

It has a good rooting ability and its start of bearing is intermediate. It is self-compatible and has a low pistil abortion rate. Its productivity is high and constant. The fruit is large and very sensitive to damage during transportation and handling. The flesh-to-stone ratio of the fruit is high. Freestone, it is used for green and black pickling. It is resistant to drought and salinity and is grown on 6% of the olive crop area.

Toffahi

This hardy variety has a medium rooting ability and comes into bearing early. It is self-compatible and has a low pistil abortion rate. Flowering and harvesting are early. Its productivity is medium. The fruit is freestone and has a very high flesh-to-stone ratio; it is used primarily for green pickling. It is moderately sensitive to damage during transportation and handling.

Although it changes colour early, it is not suitable for black pickling because the fruit has a tendency to become oversoft and to ferment during the process. The fruit is large and its oil content is low (5–7%). It is moderately sensitive to olive fly. It originates from the district of Fayoum and accounts for 6% of olive area.

Wateken

This ancient variety comes from the Siwa Oasis. The average weight of the fruit is very high and it has a medium flesh-to-stone ratio. Although dual purpose, it is mainly used for oil production, giving an oil which is high in oleic acid content and low in bitterness. Its rooting ability and crop intensity are medium. The best time to harvest the fruit is between October and December.

Outside the Siwa area, its distribution is limited. It accounts for 5% of olive area.

Maraki

This variety used for oil production comes from the district of the Siwa Oasis. The fruit is very heavy and has a medium flesh-to-stone ratio. Its oil is very high in oleic acid content and is of medium bitterness. Its rooting ability is low while its crop intensity is very high. The best time to harvest this variety is from November to December. Accounting for 2% of olive crop area, its distribution is currently limited but it has started to be propagated on a commercial scale and is expected to become Egypt's main oil cultivar.

Aggizi Akse

This variety originally from the Fayoum district has a high rooting ability and productivity. Its fruit is very heavy and has a medium flesh-to-stone ratio. It is suitable for green pickling. Initially found on a limited scale it is now widely distributed.

(Source: IOC questionnaire)

3.5. Olive oil: production and yield

In 2009, 10 305 ha of Egypt's aggregate crop area was planted for conventional oil production and 445 ha for organic oil. Of these areas, respectively 8 960 ha and 400 ha were in production.

In 2008/09, crop production averaged 10.35 kg olives/ha in conventional orchards and 7.38 kg olives/ha in organic orchards growing olives for oil production.

For the time being, Egypt is not very mechanisation-oriented because the country is geared more towards the production of table olives for which hand picking adds competitive edge. Furthermore, labour supply is not a problem. Nevertheless, in the last three years there have been some initiatives by growers to use battery operated hand-held vibrating rakes and wrap-around harvesters for the semi-mechanical harvesting of oil varieties. This practice is expected to become predominant within the next five years.

(Source: IOC questionnaire)

3.6. Olive oil: processing sector

In Egypt olive oil processing capacity exceeds the supply of raw olives. There are no traditional oil mills although there are 25 mills with presses and 48 with continuous-process facilities with an average aggregate production capacity of 1 008 t/eight-hour day.

Olive oil production in Egypt is characterised by a high percentage of extra virgin olive oil, often accounting for more than 70% of total oil production. The factors contributing to this percentage share are the fact that the olives are picked by hand and that mill capacity is more than able to cope with the volume of olives for crushing. Year-to-year fluctuations can occur in the percentage breakdown of virgin grades as a result of alternate bearing, a short hot growing season with the ensuing negative impact on oil synthesis and fruit ripening and other factors.

According to the figures available for 2008/09, 65% of the virgin olive oils produced were extra virgin (up to 0.8º) and 15% were virgin (up to 2º). The same breakdown for 2009/10 was 45% and 20%, respectively.

(Source: IOC questionnaire)

3.7. Olive oil: marketing, domestic consumption and foreign trade

During the 2009/10 crop year, growers were paid an average €0.40/kg for conventional oil-olives and €0.44/kg for organic oil-olives (bulk in both cases) (at the exchange rate applied on 30 October 2009, i.e. EUR 1 = 8.0758 Egyptian Pounds) while the price paid for virgin olive oils at the mill was €2.91/kg for conventional olive oil and €3.02/kg for organic product.

Irrigated oil-olives give low percentage oil yields at the mill, ranging between 14% and 18% at best, which has a negative impact on final product prices. Though smaller in volume terms, dry-farmed oil-olives can give extraction rates as high as 22%.

Over the last decade, Egyptians have consumed an average 3 950 t of olive oil per year. This represents a jump compared with the preceding 10-year period when they consumed 1 500 t/year on average. However, consumption behaviour differed through the decade, peaking at 3 500 t/ year in the first half and 8 000 t/ year in the second.

Egypt does some foreign trade in olive oil, exporting 1 000 t/year in the period 2000/01–2009/10, which translates into a 400% gain on the previous ten-year period (see next table).

Table 3. OLIVE OIL (Source: IOC)

	Average (t) 1990/91–1999/00	Average (t) 2000/01–2009/10	Change (%)
Production	1 150	4 000	247.82
Consumption	1 500	3 950	163.33
Imports	600	900	50
Exports	200	1 000	400

3.8. Table olives: production and yield

The olive industry in Egypt is heavily oriented towards table olive production. The table olive sector recorded strong growth in the first decade of the 21st century, with production reaching 340 000 t in 2002/03 and rising even higher from 2005/06 onwards.

Of the total 65 303 ha of olive orchards planted in the country in 2009, 36 945 ha were planted with table olive varieties in conventional orchards and 890 ha in organic orchards. The areas actually producing crops for table olive processing came to 31 800 ha and 650 ha, respectively.

The 'Aggezi Shami' is the most widespread local variety of table olive and is cultivated in 20% of the country's orchards. Other local varieties grown for table olive processing are 'Toffahi', found in Giza, Fayoum and Beni Suef, and 'Hamed' cultivated in Siwa and northern Sinai.

In 2008/09, crop yields averaged 10.20 t olives/ha in conventional table olive groves and 7.30 t olives/ha in organic orchards.

(Source: IOC questionnaire)

3.9. Table olives: processing sector

Egypt has approximately 25 table olive processing plants with an average production capacity of 5 000 t/season/plant in addition to numerous micro-processing units which bring total national table olive processing capacity to 300 000 t/year.

Viewed by type, 36.83% of the total table crop was processed as conventional green olives in 2008/09, 28.35% as conventional olives turning colour and 28.35% as conventional black table olives. The percentage shares of organic product for the same season were 0.58% green table olives; 0.52% table olives turning colour; and 0.44% black table olives.

The rankings by type were similar in 2009/10.

(Source: IOC questionnaire)

3.10. Table olives: marketing, domestic consumption and foreign trade

The prices paid to growers for their table olive crop differ only minimally from region to region. In 2009/10 conventional olives for green table olive production fetched a farm gate price of €0.49/kg whereas organic product fetched €0.54/kg.

The profit growers earn therefore depends on their production costs, which can vary widely according to the producing region and are impacted by factors such as irrigation – groves may be irrigated with surface water or with water from deep wells (200–300 m) or shallow wells (> 100 m) – and the extent of pest infestation and management.

Between 2004/05 and 2009/10, almost 10–15% of the raw olives harvested for table olives were exported in bulk, either as fresh unprocessed olives shipped in refrigerated containers to neighbouring countries or as olives preserved in brine shipped to distant destinations such as California in the United States. Hence, this percentage did not go to domestic table olive processing plants.

(Source: IOC questionnaire IOC)

Average table olive imports plummeted by 71.42% t between 1990/91–1999/00 and 2000/01–2009/10 while exports climbed to 55 350 t, soaring by 964.42% between the two decades (see table below).

Table 4.TABLE OLIVES (Source: IOC)

	Average (t) 1990/91–1999/00	Average (t) 2000/01–2009/10	Change (%)
Production	46 200	275 150	495.56
Consumption	41 150	218 000	429.76
Imports	1 050	300	-71.42
Exports	5 200	55 350	964.42

3.11. Future measures

Major measures are planned in several spheres to enhance olive growing and its associated industries:

Orchard improvement:

- Launch of the National Olive Development Plan as soon as funds are allocated
- Application of GAP and traceability schemes to improve quality and raise yields
- Expansion of olive growing on marginal land by using poor quality water resources that cannot be used for irrigating other crops
- Use of grafting to switch from non-commercial or non-adapted varieties
- Up-scaling and dissemination of lessons learned during the boom years through training, workshops and field days
- Building of a national industry image and branding of Egyptian olive products in export markets in cooperation with producers and processors

Modernisation of the olive oil industry and by-product reuse:

- Promotion of a participatory approach to research by involving olive growers in R&D programmes
- Solution of the problems of Δ-7 stigmastenol and linolenic acid (C18:3) content
- Expansion and improvement of olive oil bottling lines
- Introduction of semi-mechanical harvesting
- Replacement of imports by domestically produced oil
- Focus on oil varieties in the next stage of development to overcome the shortage of raw olive supplies for mills and to meet the increasing demand for olive oil in export and domestic markets
- Exportation of small quantities of bottled and branded extra virgin olive oil targeted at niche markets in the short and medium term and industry image building

- Implementation of 'zero tolerance' polices as regards compliance with hygiene, food safety and health standards
- Application of research findings on the reuse of wastewater and olive pomace to fertilise olive orchards

Modernisation of the table olive industry:

- Promotion of a participatory approach to research by involving olive growers in R&D programmes
- Increase of revenues and profits from table olive exports by switching from bulk to added-value packaging in A-10 packs, jars and easy-to-open tins
- Implementation of 'zero tolerance' polices as regards compliance with hygiene, food safety and health standards
- Application of research findings on environmental protection from contamination by lye solutions and organic waste

4. SOURCES

IOC questionnaire

IOC database

http://www.internationaloliveoil.org/estaticos/view/130-survey-and-assessment-division

United Nations

http://data.un.org/Default.aspx

World Bank

http://data.worldbank.org/country

FAOSTAT

http://faostat.fao.org/site/342/default.aspx