Investigating a Paradigm of Food System Sustainability:  
The Case of Fresh Vegetable Production 
and Distribution in Crete

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Investigating a Paradigm of Food System Sustainability: 
The Case of Fresh Vegetable Production and Distribution in Crete

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Abstract. In opposition to the current paradigm of the globalized food system, many regional initiatives have arisen to reorganize the food system into localized or regionalized supply chains. This study explores the existing food supply chain for field fruit and vegetable production within the island of Crete, Greece, by examining the production and distribution of food stuffs through the wholesale system and to determining the geographic and retail terminal points for these Cretan-produced items. Through case studies, this paper examines the typology of production and maps the distribution of vegetables and melons produced on the island as the first step to determining the current level of food system sustainability, and opportunities and barriers for greater sustainability. The findings show that in the case of fresh vegetable and melon production, Crete’s consumption is heavily based on locally grown product which is produced on small, diversified farms.

Keywords: Food Quality Products, Agriculture and food technology, Supply chain management, Distribution, Greece.

1 Introduction

The paradigm driving agriculture for the past fifty years has been built around two goals: maximizing profit and maximizing production (Gliessman, 1998). To reach these goals, the portrait of agriculture has changed: farms consolidated, mechanized, experienced an intensification of inputs (fertilizers, pesticides, water), an influx of capital (Gliessman, 1998), and began to participate in the global marketplace (Halweil, 2002). A food system once based around regional activities has grown to be a global web of complex interactions, transactions and dependencies. And while this model has certainly increased the overall production of food, it has done so without consideration for or attention to the resultant environmental and social costs (Gliessman, 1998; Abate, 2008). These detriments are beginning to gain attention and as a result, we are noticing changes emerging in the production, distribution and consumption patterns of food.

The growing presence of industrial agriculture and a global food system and its weaknesses (ranging from environmental concerns like biodiversity loss, soil erosion, water overuse and pollution to concerns about the effects of an industrial food system on public health such as the presence of genetically engineered (GE) foods and an increase in widespread food-borne pathogen outbreaks) has led to the development of more sustainable, healthful methods of food production and distribution. Subsequently, the paradigm driving growth in agriculture is beginning to change direction; the concern is no longer focused solely on quantity, but rather quality (Gliessman, 1998; Abate, 2008). These detriments are beginning to gain attention and as a result, we are noticing changes emerging in the production, distribution and consumption patterns of food.

In contrast, and as a solution, individuals have been turning to alternative forms of food production which are reflective of a provincial system; one that is maintained locally and that closes the production-consumption cycle as much as possible. These alternative food systems have revolved mostly around the ideals of a community based food system (Garrett, 1999) or a short supply-chain concept (Aubry, 2008).
Both are characterized by the consumers’ ability to place value above and beyond that of the actual food item – consumers value the connection to production that the product offers them. Additionally, these alternative food systems describe ‘reterritorialized’ alternative food networks in contrast to the conventional ‘deteriorialized’ global food system.

Greece, and specifically Crete, is in the unique situation of having never fully industrialized the food system. Therefore, it presents an interesting opportunity to study the sustainability of the present food system in light of the shifting paradigm and development of alternative food networks. This study investigates the methods of production and maps the normal distribution of vegetables and melons within and from the island of Crete to determine its potential to develop a fully sustainable, localized food system. The small diversified farms, the existence of fertile soils excellent for vegetable production (especially in coastal areas), geographic isolation of an island environment (making input importation costly and difficult), and Mediterranean growing climate coupled with a large range of altitudes provides, in theory, the conditions to enable a sustainable and localized food system within Crete. Through case studies, this study will map the production and distribution of vegetables and as a first step to determining the current level of sustainability, and opportunities for the island to achieve a higher level of sustainability. Specifically, the study addresses the following questions, through case studies, in order to gain a greater understanding about the sustainability of production and distribution on the island:

- What percentage of vegetables and melons available on the island are produced on the island?
- What are the channels through which vegetables and melons produced on Crete travel?
- What is the general state of production of vegetables and melons on Crete, including the farmers' philosophies as a part of the food system?

This paper discusses the research area, including some basic information about the state of agriculture in the area, presents the methods used to address the research questions including the mechanisms for identifying interviewees to obtain the primary data, and a description of how site observations were included in the research methods. It also presents the research detailing the distribution streams for the types of vegetables of interest for this study and summarizes the findings through the lens of sustainability. Lastly, this paper explores concluding remarks/thoughts about the study and identifies areas for further research to provide greater support for the possibility of Crete to exemplify a local, sustainable food system.

2 Mainstream or conventional verses alternative food systems

A modern food system is defined as having four activities: production, processing and packaging, distribution, and retailing and consumption (Erickesen, 2007). Over the last fifty years, the food system has undergone a number of changes in each stage of the system. Productivity increases have occurred worldwide, yielding more per each measure of input. The nature of production has changed from a small, diversified system dependent upon the knowledge and skill of the grower to a mechanized, system with a homogenization of inputs and outputs. In general, the entire food system has experienced homogenization: now, one or a handful of companies can own the entire chain of production through consumption. This vertical integration coupled with advancements in transportation and storage technology has inflated and pushed an agenda of free market initiatives, encouraging the world-wide distribution of fresh foods, which was economically and physically infeasible in years past (Rabbinge, 2008).

These twin evils of rising input costs and the fact that market prices do not always increase relative to these costs, can result in an overall decrease of farming profits (Schluter, 2007; Connolly, 2008). Environmental damage caused by industrial farming techniques has degraded the very resources upon which agriculture depends: soil, water resources, and genetic diversity (Gliessman, 1998). The motivation of increased production in the name of food security is being replaced by a consumer measurement of quality based around taste and nutrition, and an increased awareness for how the current production methods degrade natural resources and actually put food security of rural communities in jeopardy (Schweisfurth, 2002; Erickesen, 2007).

Now that the environmental, social, and economic impacts of these long food supply chains are beginning to emerge, it is imperative to find appropriate solutions to the detriment this system has caused within
each stage of the food system. Through the assessment of existing food systems, opportunities for improvement towards the goal of greater sustainability in the food sector may become apparent. Through incorporating technological advances in the production of food while focusing on quality of production, reduced environmental detriment and long term economic viability for farmers and still providing an affordable product, a more sustainable method of producing and distributing food can be developed. This more sustainable food system is one that is based around local or regional communities and benefits farmers, consumers, and the environment upon which both depend. Furthermore, a localized, sustainable, production system may allow for growth and rural development keeping in character with the specific needs of the rural communities.

In many developed nations, these alternative food systems came about as a rejection of the industrialization of agriculture. Farmers began to see the impact of their production systems and communities of consumers realized the influence of their purchases, and as a replacement for the current industrialized food system, producer-consumer systems were developed that placed emphasis on environmental, social and economic sustainability in agriculture. However, in Greece, the industrialization of agriculture was of a different nature and the consolidation of farms, monocultures and vertically integrated and distant supply chains dominating the mainstream food system are less prevalent. This provides a unique opportunity to further develop its mainstream agricultural systems within the new paradigm of agriculture, as one that adopts many of the principals of the alternative food systems.

3 Research Area

The unique situation of agriculture in Greece presents a great opportunity for the exploration of sustainability within its food system. It already has the foundation for a localized and relational food system; production systems that are diverse, closely related to nearby urban centers, and often experience pluriactivity. For these reasons, it presents an interesting opportunity to study the feasibility of developing a fully sustainable food system.

The specific case study areas chosen are two of the four prefectures in the island of Crete: Chania and Heraklion. They represent both a significant percentage of the island’s population and agricultural production so in this way can be considered representative of the general production and distribution trends on the island. The data presented here is a combination of information gathered from all resources.

The island of Crete contains four prefectures (Chaina, Rethymno, Heraklion, and Lasithi) and maintains a population of approximately 623,666 people. The island’s climate is primarily Mediterranean, with a major mountain range through the middle of the island. These mountains feature several areas of fertile plateaus and the island contains several other plains areas, especially near the south coast (Greek Ministry of the Interior, 2008). The island of Crete is the largest and southernmost island in Greece, with the Cretan Sea to the north and the Libyan Sea to the south and an area of 8,336 km2 (3,219 square miles). It has a typical Mediterranean climate, with changes in climate due to altitude.

The first study area, the prefecture of Chania is the westernmost part of Crete with an area of approximately 2,376 km2 (917 sq mi). There is a population of 156,371 with approximately 50,000 people living in its capital city and main urban area, also named Chania (NSSG, 2006). The main economic activities of the prefecture are agriculture and tourism. Within agriculture, the main products cultivated in this prefecture are olives and citrus, with a significant portion also in avocados, dairy and vegetables.

The prefecture of Heraklion is the eastern part of Crete with an area of approximately 2,641 km2 (1,120 sq mi) and is situated between the Rethymno and Lasithi Prefectures. There is a total population of 302,846 and its capital, also named Heraklion, is the fourth largest city in Greece and home to approximately 137,700 people (NSSG, 2008). There is a valley of farmlands in the central and the northern parts of the prefecture. Mountains dominate the rest of the prefecture to the south.

The island of Crete presents an interesting opportunity to study sustainability within a food system. It has both a high level of production and a fluctuating demand due to its heavily trafficked tourist industry. It is an island, and so dependent upon outside inputs as most agricultural inputs common to vegetable and fruit production have to be shipped to the island. Agriculture on Crete is well developed and has a well established distribution system and, as a tourist destination, has a great demand for available food above that of its year-long population.
While the progress in agriculture in Greece following WWII is unquestionable, the country as a whole managed to escape a complete shift from subsistence or extensive farming systems to industrial agricultural production. During this time Greek production systems incorporated the new technologies available, as illustrated by an increase in the use of tractors and chemical fertilizers, selective breeds or varieties, and a resultant greater yield (NSSG, 2004). However, agriculture in Greece was never organized into an agri-business characterized by an assumption of endless productivity, maximum mobilization of labor, and simplification of the structures of production (Damianakos, 1997). Even while policies encouraged the development of agri-businesses, the family farm remains the core of Greek agriculture. During this development, Greek agriculture moved to a “semi-peripheral position” (Damianakos, 1997) where rural exodus was countered by the tendency of families to keep the agricultural land and at least one member to remain there to maintain it. This cultural phenomenon of remaining attached to the land, coupled with land reform until the 1950’s, gave rise to a type of agriculture which was something between capitalist agriculture and subsistence farming: Greek farms raise product for home consumption and sell the excess.

Even though it has not developed into an agri-business typology, Greek agriculture remains a mainstay of the Greek economy and culture. According to Damianos (1997), Greece maintains a high level of self-sufficiency for most crops and agricultural products contribute a significant, if declining, percentage of the total exports from Greece. Beopolus (1997) further valuates the unique position of agriculture in Greece by stating that the extensive production systems that remain prevalent in Greek agriculture not only have cultural and social importance, but because of the tendency towards “traditional” methods of production, they use fewer resources and are a significant contributor to the conservation of natural habitats.

4 Methodology

Two types of data were collected to address the questions of this study. Secondary research was gathered from the Farm Structure Survey and other government sources to examine trends in production. Primary qualitative exploratory research was conducted in the two most populated prefectures of Crete: Chania and Heraklion. The concentration and diversity of farming and the density of population of these two areas is believed to be representative of the whole island’s state of vegetable and melon production and distribution. Case studies within the two areas will allow for comparison of commonalities.

Primary research was conducted through interviews and study site observation. Interviews with semi-structured questionnaires were determined to be the most effective method to guarantee a response. They were conducted with the owner/operators of fruit and vegetable wholesale companies, farmers’ organizations (representatives of the common market management organization) and farmers themselves. The interviews were supplemented with observations made from site visits. Additionally, as a result of the researchers’ limited knowledge of the language, all interviews were done with an interpreter present.

4.1 Interviews

Wholesaler interviews

The sample of wholesale business owners was chosen by the snowball or networking method; after initial introduction to the first interviewee, each subsequent interviewee was referred from the first. The main purpose of these interviews was to gain a general understanding of the movement of vegetables from farmer to retailer. However, open ended questions were added in several instances to gain an understanding of the wholesalers’ thoughts about the feasibility of a local food system. All of the interviewees were business owners/operators located at the wholesale vegetable market. It was 1 Extensive production systems are effective land use systems which allow using scarce natural resources in rural semi-arid and highland-lowland areas. In semi-arid properties they are characterized by improved tillage, residue management, plant arrangement (row spacing and plant population) to optimize the crop water supply and fertility to minimize production risk (Gerik, 2004). While extensive production systems are often overlooked when considering value in agriculture, they offer a significant contribution both socially and economically and show promise as a way to keep youth in farming offering a promising way of life and as a way to reduce migration towards urban centers.
determined that a small sample of these businesses in each prefecture would be sufficient to diagram the production-distribution-retail chain in each prefecture that would be representative of the island in general.

**Farmer interviews**

The sample of farmers interviewed were participants at the common market and all interviews were conducted in-person, during the market day. They were chosen by the snowball or networking method, where after the first introduction, new interviewees were referred by the previous interviewee. The questionnaires were semi-structured in nature and additional questions were added according to the interviewee’s interest and willingness to share additional information. Interviews were conducted with the farmers to determine their feelings about their role as farmers in the current food system and what changes they have experienced throughout their involvement in farming.

The interview results were supplemented with site observations conducted throughout the interview process and the year of study. Farmers’ responses were compared between market days in the same case study area and between the two case study areas.

**Market organizers’ interviews**

Interviews were conducted with the president of the organization in charge of running the common market in the major city of each prefecture. The suggestion to speak with this individual was made by a farmer participating in the interview process and it was determined the organization president could provide a larger view on the difficulties and successes of direct marketing and how farmers are perceived in the community. The interviews were conducted in person, on a market day and contained semi-structured questions. However, additional questions were added at the end of the interview and the president in Chania asked many questions about market operations and difficulties from the researcher’s experience with similar markets in New York City.

**4.2 Site Observations**

Results from this study are also derived from observations that were made at the sites throughout the research period. Observations included the atmosphere and demographics of the market communities, the types of available food outlets within the communities, visits to these outlets and observations about the origin of products sold through these food outlets, visits to farms and observations about farm size and growing practices, in addition to informal conversations with farmers, consumers, residents, and even other researchers within the communities. These findings supported data gathered from interviews and data mining.

**5 Results**

**5.1 Farming Ethos/Philosophy**

For this study, farmers were formally interviewed at one of the common markets; however, throughout the year, the researcher spoke with farmers at the common market and at any other occasion as the opportunities were presented. The results presented here are mostly responses to interviews, but some generalizations that were further supported by other conversations and observations were included.

The farms in Crete are dominated by relatively small average farm size of about 42.2 stremmata (4.2 hectares) and the vast majority of farmers are over the age of 40, with approximately 35% of all farmers older than 65 years (NSSG, 2006). The type of vegetable farming on the island can be typified as being diversified in production, with many different crops, including permanent crops such as olive trees, as a part of one holding. Additionally, over 29% of farming households reported income from sources other than farming (NSSG, 2004). The typology of farms discussed in the interviews is illustrative of the general statistical data available: they farmed an average of 30 stremmata, ranging from 6-50 stremmata.

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2 One stremma equals 1/10 of a hectare (about 1/4 acres).
All farmers interviewed produced vegetables on at least half of their land with the remaining land in tree fruits and (mostly) olive production. The range in age of the farmers varied widely, from late 30’s to early 70’s, with most people being on the older end of the range. This sample seemed to be reflective of all the farmers selling at the common market, where most of the farmers appear at least 50 years old. All of the farmers interviewed sold primarily, if not exclusively, at the common market, often attending three to four per week.

When asked about their motivation for selling at the common market rather than to a wholesaler or retailer, each of them said they preferred to sell directly to the consumer because they could take a higher price and not give this difference to a middle man. One farmer expressed extreme dissatisfaction with the wholesale arrangement stating that he stopped selling to the wholesale vegetable market because he simply didn’t “want to give money to the middle men who do nothing”.

There was a general sense of dissatisfaction from farmers regarding the lack of state support for the farmers and the position of farmers with regard to the rest of society. They feel farming is not regarded as a good occupation, however, they also seem to encourage a ‘better’ life for their children, pushing them to study and work in occupations outside of farming. Additionally, farmers expressed concern for the future, since especially this past year they have experienced greater costs of production (specifically due to increased fertilizer and fuel costs) against relatively static sales.

The researcher was not based in Heraklion, so the occasion to speak with farmers was more limited than in Chania. The majority of the philosophy of farmers from this prefecture was taken from the interviews conducted during a two day period at two separate common markets. There seemed to be a more positive outlook on the nature of their business from farmers in this area as compared to that of Chania’s farmers.

Because of the nature of agriculture in this prefecture, all of the farmers interviewed had at least some area dedicated in greenhouse production of vegetables. The size of farms ranged from 20-30 stremmata, each with about 10 stremmata in vegetable production. Each farmer had dedicated the remaining area to olive production (10-20 stremmata). Of the 10 stremmata in vegetables about half of this area was in greenhouses. These farmers were a bit younger than those interviewed in Chania, between 33-45 years in age. Two of the three farmers interviewed sold their product to a pack house or auction house and in one case to a wholesaler at the wholesale vegetable market, in addition to selling at the common market three to five times per week.

The two farmers who sell their product to both the common market and pack houses expressed that the common market was less profitable than the other markets. When asked why they then continued selling at the common market, they expressed that because the sales are all cash based, it is a regular, guaranteed source of liquidity, since they otherwise had to wait 30 days to be paid by the pack houses. However, each of them also felt it was important to maintain a face-to-face connection with their consumers and they all expressed that they liked the atmosphere at the common market.

In all cases, the farmers felt a lack of support from the state. They each sited different reasons: one mentioned the need for increased marketing efforts on behalf of farmers in general; two other farmers stated that the general nature of policies don’t help farmers at all. One said this was “a global problem, not specific to Crete” and another called the misdirection of policies “the great social conversation”. All of the farmers also expressed the same concern as individuals in Chania: that farming is very local on the social scale of success and one farmer specifically said the government could help by “putting farmers at the center [of life] to give them validity”.

5.2 Chania Common Market

A discussion with the manager of the common market revealed an overview perspective of the difficulties farmers face while dealing with societal changes. He expressed that the “cheap food” policy that is pushed by the administration doesn’t take into consideration the needs of the farmers to earn a living. He

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3 Only one farmer said she sold (her son’s) product to supermarkets, but this was only the fruits that they produced (cherries, pears, oranges). Two other farmers said they have sold to supermarkets or wholesalers before, but weren’t happy with the arrangement and so they switched to keeping the common market as their sole market.

4 A more detailed description of pack houses and auction houses is discussed in Section 4.3.
feels this is one of the reasons why he has seen a number of farmers go out of business even in the short time he has been involved with the common market; the pressure from policymakers to keep the price of food low coupled with the increasing costs of production and uncertainty of sales leaves the farmers vulnerable to financial failure.

The common market in Chania operates most days of the week, almost daily during the summer months, and provides a source of income for over 100 farmers. The dollar amount or volume of sales for the Chania common market could not be determined; however, the interviewee stated that the price difference between products in the common market in the summer versus winter seasons is large. He also mentioned that in previous times, a farmer selling through this method could make “a lot of money”, but this fact is no longer certain. These discussions also revealed it as something that is of great social importance in the lives of both farmers and consumers.

Some of the difficulties the common market management has faced in the past few years is a result of the fact that the decisions for the common market are made by a committee of individuals that includes people with differing and even conflicting interests from those of the farmers. For example, the committee changes the market locations almost every year, making the market difficult for consumers to find; these new locations have been in less and less desirable areas for the farmers: usually out of the way of foot traffic and hidden from main roads. He mentioned that each time the market location is changed the residents of the new location complain, citing the noise, dirtiness, and inconvenience for parking and driving as greater nuisances than the benefits received as a result of locating the market in their area.

He also discussed the great social role the common market plays in the community. He referred to our current world-wide “crisis of human relations” and mentioned that the common market provides a solution to the erosion of communities that is happening. He discussed how the common market really brings people together around food; it is a chance for the farmers to interact with each other and for consumers to connect with the food they are eating and their neighbors, as it acts as a central meeting point. This sentiment was reinforced with the researcher’s observations at how the farmers really share responsibilities at the market, often handling sales for a neighboring stand if the farmer is away for a moment – even if he is selling the same product at his own stand. The market is a very lively place, where you can always hear laughter and friendly conversation taking place at any point and time. The common market president was concerned by the fact that the mayor and others involved in the management committee don’t see the value of the market beyond the sale of food. However, he also stated this isn’t strictly a result of the committee’s short-sightedness; he feels the farmers need to get more involved in their own welfare and has been trying to encourage farmers to fill those five reserved seats on the committee.

5.3 Distribution Data

The general distribution chain reveals three main mechanisms for the movement of food throughout the island: direct sales (farm to consumer or farm to retailer), wholesales (mostly through companies at the wholesale vegetable market), or sales to auction or pack houses (for export). The wholesale vegetable market supplies the majority of the retail outlets and in order to gain an understanding of the percentage of Cretan-produced vegetables appearing in the retail outlets, interviews were conducted with business owners at the wholesale vegetable market.

Chania Wholesale Vegetable Market

The wholesale vegetable market in Chania is a building housing about 20 different wholesalers each located in their own ‘stand’ with access to a loading dock and a central indoor corridor. It was observed

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5 He gave the example of the current committee members: the town mayor, a building inspector, traffic police, an archeologist and himself. There is space for five farmers to serve on the committee but presently, with himself excepted, they are empty.

6 Supermarkets owned by foreign (non-Greek) companies are also present on the island. These supermarkets operate their own distribution system and rarely use product produced in Crete. This distribution chain was not considered in this study due to both the difficulty of penetrating the administration and the consideration that it is not a significant purchaser of Cretan products or overall fruit and vegetables purchases.
that the majority of the companies at the wholesale vegetable market did not have any form of cooling system for storing the produce.

The size of businesses was estimated by the number of employees at each business and the number of farmers and wholesalers from which the business purchases product. The number of staff ranged from 1-6 full time staff (with an average of 4 full time staff). Only two businesses reported hiring any part-time or seasonal labor. The range in number of farmers and (other) wholesalers each wholesaler purchases per week ranged from 10-80 farmers and 0-20 wholesalers, with an average of 36 farmers and 10 wholesalers. In order to confirm that each wholesaler was indeed involved in the area of product we were interested in they were first questioned about the type of product bought and sold.

Chania wholesale vegetable market purchases

Table 1 details the geographic origin of product purchased by wholesalers at the wholesale vegetable market.

<table>
<thead>
<tr>
<th>Business Location within Market</th>
<th>Origin of Purchases</th>
<th>% of Purchases</th>
<th>From within Chania Prefecture</th>
<th>From within Crete, outside Chania Prefecture</th>
<th>From within Greece, outside Crete</th>
<th>From outside of Greece</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Farmers</td>
<td></td>
<td>90</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9 Farmers &amp; Wholesalers(^a)</td>
<td></td>
<td>80</td>
<td>20</td>
<td>0(^b)</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15 Farmers &amp; Wholesalers</td>
<td></td>
<td>70(^c)</td>
<td>0</td>
<td>20(^d)</td>
<td>10(^d)</td>
<td></td>
</tr>
<tr>
<td>16 Farmers</td>
<td></td>
<td>100(^e)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>19 Farmers &amp; Wholesalers</td>
<td></td>
<td>80</td>
<td>20</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^a\) Purchases from wholesalers are negligible.
\(^b\) Occasionally purchases product from outside Crete, but only because of limited supply of something due to bad weather/crop failure.
\(^c\) Purchases are exclusively from farmers.
\(^d\) Purchases are exclusively from wholesalers.
\(^e\) Purchases in the winter occasionally include locations outside of Chania, within Crete (up to 60%). He also occasionally purchases potatoes and onions from wholesalers in Macedonia, but this occurs only in exceptional years.

Of the total product sold through the wholesale vegetable market, in all cases it was shown that at least 70% of this product is purchased from farmers within the Chania prefecture. While some of these purchases do include those from wholesalers located within the Chania prefecture, which could mean that the product has come from outside of Chania, outside of Crete or even outside of Greece, in each instance these purchases were not a great percentage of the overall purchases and would likely be a negligible contribution to the total amount.

Chania wholesale vegetable market sales

The type of retail outlet and geographical location of total sales was also studied. Table 2 details where the product sold through the wholesale vegetable market terminates (before the consumer) geographically, while Table 3 shows the distribution of product by the type of the retail operation.
Table 2. Geographic Distribution of Product

<table>
<thead>
<tr>
<th>Business Location within Market</th>
<th>% of Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Within Chania Prefecture</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
</tr>
<tr>
<td>9</td>
<td>80</td>
</tr>
<tr>
<td>15</td>
<td>~100</td>
</tr>
<tr>
<td>16</td>
<td>80</td>
</tr>
<tr>
<td>19</td>
<td>80</td>
</tr>
</tbody>
</table>

Each business interviewed reported at least 80% of their product was sold to retailers within the Chania prefecture and only one reported selling any product outside of Crete. This wholesaler stated he occasionally would sell product to a wholesaler in Athens if a particular farmer had a great surplus, but was not a regular occurrence or a significant portion of his sales. The majority of the 20% of his sales outside of Chania prefecture were to other areas in Crete, not outside of Crete, but he could not state a specific percentage at the time of interview.

Table 3. Distribution of Product by Type of Retail Operation

<table>
<thead>
<tr>
<th>Business Location within Market</th>
<th>% of Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Greengrocers/MiniMarkets/Supermarkets</td>
</tr>
<tr>
<td>4</td>
<td>~4</td>
</tr>
<tr>
<td>9</td>
<td>60</td>
</tr>
<tr>
<td>15</td>
<td>90</td>
</tr>
<tr>
<td>16a</td>
<td>5</td>
</tr>
<tr>
<td>19a</td>
<td>6</td>
</tr>
</tbody>
</table>

a) These were grouped together because of similarity of retail operation and inability of the wholesalers to distinguish between them.

b) The common market allows a certain percentage of wholesalers to have stands at the market.
c) "Other" retail operations includes: ferries, naval base, nursing homes, catering, other wholesalers and product that is thrown away.
d) Distribution of sales was significantly different throughout the year.
e) Wholesaler could not provide percentage, so retailers were listed in order of importance from 1 (greatest % of sales) to 6 (least %).

The majority of sales for most wholesalers were to greengrocers/mini-markets/supermarkets, restaurants and hotels. However, since the interviews were conducted in the summer season, these numbers represent the situation during the tourist (summer) season. In the winter, the wholesalers reported a change in the distribution, where a greater percentage of sales went to greengrocers/mini-markets/supermarkets and less to hotels and restaurants. This is due to the fact that many restaurants and most hotels close for the non-tourist, winter season. Many wholesalers also mentioned that the volume of food that moves through their business is significantly less in the winter months, which could also be attributed to the non-tourist season and a subsequent decrease in the island's population (and therefore demand for food) and a general decrease in production for the winter months.
5.4 Heraklion distribution data

This section details the movement of fresh produce through the city of Heraklion. Interviews were conducted with businesses at the wholesale vegetable market on two separate occasions and were identical to those conducted in Chania, but were able to extract more details from these participants (in exchange for interviewing fewer individuals.) Additionally, an extensive interview with administration at the wholesale vegetable market revealed some details about the interactions between wholesalers at the market and provided an overview of purchasing and sales conducted at the wholesale vegetable market.

Heraklion wholesale vegetable market

The wholesale vegetable market in Heraklion was quite a large market, in what appeared to be a relatively modern building. The building housed approximately 40 companies with about 100 total employees (both full- and part-time.) The researcher noticed that the companies all had some form of cold storage and it seems most of the product was kept in the storage areas. Additionally, it seemed to be quite a busy market; each of the interviews were interrupted to allow a sale to occur on several occasions, even though they were conducted at the time of day and week that is considered slow, business-wise.

The businesses interviewed seemed to be about the same size as those in Chania; they had between one and six full-time staff, with one business hiring four part-time seasonal laborers. Each business reported purchasing from approximately the same number of farmers per week (35-40) and (of those who purchase from other wholesalers) approximately ten wholesalers per week. In order to confirm that each wholesaler was indeed involved in the area of product we were interested in they were first questioned about the type of product bought and sold (see Appendix A for the complete questionnaire).

<table>
<thead>
<tr>
<th>Business</th>
<th>Origin of Purchases</th>
<th>% of Total Purchases</th>
<th>From within Heraklion Prefecture</th>
<th>From within Crete, outside Heraklion Prefecture</th>
<th>From within Greece, outside Crete</th>
<th>From outside of Greece</th>
<th>Total Purchases from Crete</th>
<th>Total Purchases from Farmers</th>
<th>Total Purchases from Wholesalers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Farmers</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wholesalers</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50%</td>
<td>50%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
<td>68%</td>
<td>10%</td>
<td>0%</td>
<td>0%</td>
<td>78%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wholesalers*</td>
<td>0%</td>
<td>7%</td>
<td>15%</td>
<td>0%</td>
<td>22%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>68%</td>
<td>17%</td>
<td>15%</td>
<td>0%</td>
<td>85%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Farmers</td>
<td>58.5%</td>
<td>34.5%</td>
<td>0%</td>
<td>0%</td>
<td>93%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wholesalers*</td>
<td>6.5%</td>
<td>0.5%</td>
<td>0%</td>
<td>0%</td>
<td>7%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>65%</td>
<td>35%</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a) Wholesaler data includes cooperatives for this business.

b) Mentioned that all his purchases are from Crete, but since he purchases from other wholesalers, some product may come from other areas in Greece or even abroad.
Heraklion wholesale vegetable market purchases

The table below details the geographic origin of product purchased by wholesalers at the wholesale vegetable market. The total purchases from Crete were at least 85% of the total purchases; however this included up to 22% of purchases from other wholesalers, which could include product from areas other than Crete, or even outside of Greece. The purchases directly from farmers within the Heraklion Prefecture ranged from 50-68% of total purchases; however, purchases from farmers from all of Crete constituted the vast majority of total purchases (78-100%).

The discussion with the administration at the wholesale vegetable market revealed some generalizations that are worth mentioning. He figured about 90% of purchases made within the wholesale vegetable market are product grown in Crete, with approximately 70% of all purchases from the Heraklion Prefecture. These averages were consistent with what was reported from the individual businesses (see Table 8). He also noted that there is a significant increase in purchases from outside of Heraklion during the winter months, but this doesn’t change the overall percentage of purchase from Crete generally at any time of year.

Heraklion wholesale vegetable market sales

Tables 5-6 detail the termination of sales, both geographically (Table 5) and by type of retailer (Table 6).

<table>
<thead>
<tr>
<th>Business</th>
<th>% of Sales a</th>
<th>Within Heraklion Prefecture</th>
<th>Within Crete, outside Heraklion Prefecture</th>
<th>Within Greece, outside Crete b</th>
<th>Outside of Greece</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90</td>
<td>0</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>55</td>
<td>35</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>70</td>
<td>20</td>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

a) See below for discussion of changes due to seasonality.
b) Aegean Islands only

The majority of sales remained within the prefecture, but ranged from 55-90% of total sales, with an average of 72%. However the great majority of sales remained on the island of Crete, with a total of 90% reported from each business. The numbers quoted represented the distribution of sales during the summer season. Since off-Crete sales were only to the Aegean Islands, this number greatly decreased during the winter season, mostly due to the decrease in the islands’ populations during the non-tourist season. In the winter months, the percentage of sales outside of Crete was much less, from 1-2% of total sales.

The discussion with the wholesale vegetable market administration revealed similar conclusions. He estimated approximately 80% of sales terminated within Crete, with approximately 20% to Athens and the islands, noting a significant decrease in product sold off Crete in the winter months. He also mentioned that while there are a lot of farmers in the more touristy areas of the island, because purchasers like to gather everything they can in one place, the majority of the food is still sold to these areas through the wholesale vegetable market.
### Table 6. Distribution of Product by Type of Retail Operation

<table>
<thead>
<tr>
<th>Business</th>
<th>% of Sales</th>
<th>Greengrocers/MiniMarkets/</th>
<th>Supermarkets</th>
<th>Hospitals</th>
<th>Hotels</th>
<th>Restaurants</th>
<th>Universities</th>
<th>Other&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2&lt;sup&gt;c&lt;/sup&gt;</td>
<td>main</td>
<td>some</td>
<td>main</td>
<td>some</td>
<td>some</td>
<td>some</td>
<td>some</td>
<td>some</td>
</tr>
<tr>
<td>3</td>
<td>75</td>
<td>0</td>
<td>15</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
</tbody>
</table>

a) These were grouped together because of similarity of retail operation and inability of the wholesalers to distinguish between them.

b) "Other" retail operations includes: ferries, naval base, nursing homes, catering, mobile markets, common market, other wholesalers and product that is thrown away.

c) Wholesaler was not able to provide percentage of sales. Mentioned great differences in seasonality of sales.

The great majority of sales shown here from the Heraklion wholesale vegetable market were to greengrocers/minimarkets/supermarkets and hotels. However, because of population difference between the tourist and non-tourist season (and the subsequent closure of hotels), in the winter the percentages are different, with less product being sold to hotels and therefore a greater percentage going to the grocers. Two business (#2 and #3) reported severe differences between the summer and winter seasons. The first (#2) noted that 70% of the business’s yearly income is earned during the summer months, with hotels being a significant buyer. The other (#3) noted that during the winter, he doesn’t sell to hotels at all and the sales are then reverted to the grocers, making up 90% of the sales.

An interesting revelation that came out of the discussion with the wholesale vegetable market secretary was with regard to the cooperation between businesses. As noted above, the “other” category includes other wholesales and it was discovered that it is not uncommon when one wholesaler is short or does not carry a certain product, he will purchase product from another to satisfy the needs of his sale. He stated this is due to the fact that wholesalers will often specialize slightly in product areas and therefore often don’t have enough volume or variety to satisfy a sale and in that case will look to his "neighboring” businesses to fill the gap.

### 6 Discussion

#### 6.1 Small, diversified and local is more sustainable

According to the Food and Agricultural Organization (FAO) of the United Nations (1995) a sustainable agriculture is not “just a means to obtain more food and income, in socially acceptable ways which do not degrade the environment…[but rather] an opportunity to improve the quality of the environment…and social, economic, and institutional components.” This means sustainable agriculture and land use must consider its multiple functions within economic, social, and environmental longevity and as a means to improve the situation on all levels for rural and urban communities. Small farms with localized distribution systems have been shown to address the need to develop systems that are more sustainable economically, socially, and environmentally.

The ecology behind sustainable agricultural practices revolves around closed systems and close sourcing of inputs, ideally within a farming system (Schweisfurth, 2002). In practice, this typically means using localized inputs (fertilizers, etc), recycling of nutrients, and small, diversified cropping systems. Further analysis of sustainable farm systems includes the wider community (that outside of the farm) and has
grown to include the distribution systems as well. This means sourcing imports and selling product locally. The agricultural landscape in Crete – a primarily localized food system, at least in the case of vegetable and field fruit production, which is dominated by small, diversified farms and a consumer base that is aware of seasonality and sophisticated in their determination of quality – is one that is well suited to become an example of sustainability. However, the current methods of production, the change in consumer habits and the lack of true government support are considerable barriers to creating a truly sustainable food system.

6.2 Small, diverse farming systems

The majority of farming in Crete is done on small-holdings and with diversified cropping systems. Both these characteristics have been defined as important components to a farm’s sustainability (Gliessman, 1998). Small farms are often efficient stewards of the available natural resources and soil, since they often have a vested interest in its sustainability because of ownership (Rosset, 2000). Because of the diversity of their farming systems, integration of soil amending practices like cover crops and fallowing, and the inclusion of open space and woodlands within the farming systems, small farms contribute positively to the surrounding environment’s biodiversity, can reverse land degradation and soil erosion, and provide open space for the surrounding communities (D’Souza, 1996). Reidmsa (2008) has also found that on-farm diversity can benefit an overall farming system by lessening its vulnerability to unforeseen influences, meaning a diverse farming system is less likely to suffer losses due to an unpredictable climate, further reinforcing its ability to be profitable within any growing year and for the future.

Furthermore, if we consider a measure of sustainability to be the productivity of a farming system, small farms are at least as efficient as the large more commercial systems and there is even evidence of “diseconomies of scale as farm size increases” (Peterson, 1997; Rossett, 1999). The data revealed an average farm size in Crete of 4.2 ha (NSSG, 2004) and each of the farmers interviewed produced at least the 13 different vegetables and fruits determined of interest for this study and usually more, revealing generally diversified farm systems. While chemical fertilizers are commonly used in Cretan farming, because of the nature of the small farm size and diversified systems found in Crete, it can be stated that generally the type of vegetable farming found in Crete is more environmentally sustainable, since it has not experienced severe consolidation and specialization.

A report issued by the United States Department of Agriculture (USDA) Commission on Small Farms (USDA, 1998) details the many benefits of small farms. The report refers to the numerous general public benefits gained by the presence of small farms, beyond their environmental stewardship and including the economic benefits of decentralized land ownership. In this case, local people owning local production systems produce a more equitable opportunity for people in rural communities, and create empowerment and a sense of responsibility towards their roles in the community, leading to a sense of responsibility towards how their actions affect the greater community. This means that locally owned businesses contribute significantly to the development, long-term viability, and economic strength of a community by keeping the money spent on that business within the community, as compared with absentee business owners. The USDA Commission on Small Farms concludes its study with a powerful call to create policies that support small farms in an effort to revitalize communities throughout the United States (USDA, 1998).

These strong sentiments were echoed in the discussion with both farmers and the administration of the common market. Many farmers realize their importance within the communities and stated concern about the government’s lack of support and policies that don’t support their efforts. Certainly the discussions with the common market administration in both prefectures revealed that farmers and those who support farmers are acutely aware of the global crisis faced by the world-wide community of farmers and feel they are struggling from all perspectives to validate their worth. While they all seem to take great pride in their role, they at the same time feel that the changes within the marketplace and society in general are putting great pressure on their survival.

While small, diverse farms have qualities that make a farming system more sustainable than a highly mechanized resource dependent model, there are practices currently in use by many farmers in Crete that leave significant room for improvement. However, because of the types of farm systems already in place, Cretan farmers are well suited to transition to more sustainable or organic practices. In fact, owners of small, diversified farms have been shown to be the best suited and most open to adapting more
sustainable practices and extensification schemes (Mann, 2005; D'Souza, 1996), and as having the greatest success in adopting these changes.

6.3 Local distribution systems and diverse local markets

As stated earlier, the developed world has noticed a new paradigm of agriculture developing, to the point where an “alternative” method of food distribution has been set in place to counter the large agribusiness focus under which agriculture has developed within the last 50 years. This study determined that the current distribution system on Crete draws more parallels to these alternative forms of distribution than the industrialized system that is more common in northern European and North American countries. Because of the generally localized nature of the food system in Crete, there are great opportunities to encourage these efforts and nurture a more sustainable food system.

There are a total of 3,231 retail operations in Crete that operate in the food sector. Of these, only 2% are international markets (Synodinou, 2006), making the majority of retail operations owned and operated by small locally-owned chains or cooperatives (such as INKA, Ariadne, COOP, or Veropolous). Therefore a maximum of 2% of the total number of retail operations on Crete maintain their own distribution networks, cutting local farmers out of only around 2% of the retail market. The remaining 98% of the retail operations receive fresh produce through the existing localized distribution channels (direct sales and through the wholesale vegetable market). Additionally, the research conducted in this study shows the great majority of product sold through the wholesale vegetable market is purchased from the island of Crete and often from the same prefecture.

The research found that Crete is a major producer of vegetables and field fruits, and in fact produces enough that a significant percentage of the production is exported from Crete. Discussions with the businesses at the wholesale vegetable market revealed that approximately two-thirds of the total product produced on the island remains on the island either moving through the wholesale vegetable market or by direct sales. The remaining third is sold off the island of Crete, often through sales to auction houses or to pack houses. While it is important to realize that a significant amount of production is sold off the island, and therefore contributing to a more regional or global food system and economic security for many of the producers that participate in these sales, it is at the same time necessary to encourage the maintenance of the current localization of much of the production, at least to the point of preventing the introduction of internationally owned retail operations or their centralized distribution that could complicate the localized distribution and prevent farmers from participating in local markets. If the growth of international markets on the island increases, which is likely (Synodinou, 2006), methods of encouraging more local purchases within the internationally owned supermarkets should be a requirement of allowing the growth of this industry on the island.

Crete is fortunate in that it hasn’t developed a highly industrial food system, especially in light of all the negative implications this type of food system has shown. The challenge for the island now is to maintain its localized system of production and distribution and allow for growth in the food sector at the same time, in order to make it economically viable and attractive to future generations. While this is indeed a difficult task, especially since all market forces seem to encourage a different kind of development, the structures currently in place – as well as the general perception and preferences of consumers – are a solid foundation to force development in the direction of sustainable growth.

6.4 Consumer preferences to local food

This study did not specifically explore consumer preferences or buying habits, however the semi-structured nature of the questionnaires allowed for a wide range of topics to be discussed for the purpose of initial exploration of the food system on the island. Interviews with farmers, the administration at the common market, and businesses at the wholesale vegetable market all noted some change in the nature of buying habits of consumers. Most notably, the Secretary of the common market management in Heraklion noticed that over the past five years the nature of purchases at the common market has become more “European” – stating specifically that people are buying smaller quantities and demanding a very high cosmetic quality. Additionally, several companies at the wholesale vegetable market have noted changes in demand from the hotels – they are requesting items that aren’t commonly grown in the area, such as iceberg lettuce.
However, overwhelmingly, it is noted that consumers in Crete are well accustomed to seasonal availability of different products and prefer to purchase products grown in Crete. Additionally, throughout Greece, Cretan vegetables are known as being very high quality, to the point where several businesses interviewed at the wholesale vegetable market noted that sometimes products are imported into Greece and then, as one company employee stated, “christened” Cretan in order to command a higher price and gain the preferential market. Additionally, several farmers and both members of the management of the common market commented on the reasons why consumers seem to purchase product directly from farmers. The reasons given were that the consumers prefer the higher quality and freshness available when purchasing directly from farmers. Additionally, the common market offers a wide variety of farmers, so consumers can pick and choose which farmers they prefer based on the quality of what is available that day. The daily presence and size of the common market speaks to the preference of consumers to purchase directly from farmers; each of the markets is rather large in size, with usually 30-100 different stands at each common market. These are located in various places around the cities, which, unless commonly shopped at, would not have a population to support them. Lastly, something that was not formally inquired about, but was observed from the researcher’s frequent visits to the common market was the phenomenon of tavernas and restaurants purchasing their vegetable supplies directly from the farmers at these markets. On a number of occasions individuals were introduced to the researcher as taverna owners, as they were purchasing many kilograms of product.

The tendency towards seasonality and locally produced product was even noted on a market access report issued by the USDA (Synodinou, 2006). These consumer familiarities and preferences support the idea that in the case of fresh product, Crete's food system is already mainly localized.

6.5 Barriers to Greater Sustainability

Farmer production practices

A major focus of sustainable agriculture revolves around how the product is produced. While the majority of farms producing vegetables in Crete are small-holdings with diverse products, there is also a great dependence on chemical fertilizers, pesticides and herbicides (as indicated by the small percentage of farmers utilizing integrated and organic farming techniques). These practices can degrade the integrity of the soil, and if not countered with other methods of pest control and soil amendments, can lead to greater and greater dependency on these products (Matson et al., 1997). One common complaint of the farmers interviewed was the rising cost of these inputs. It would benefit the farmers greatly, and improve the long-term viability of their land, to adopt practices that are now taught under the category of organic or biological agriculture, such as compost amendments, crop rotations, and companion plantings. Additionally, lessening the dependence of farmers on these chemicals can greatly reduce their costs of outside inputs and therefore increase their overall profitability. However, educating farmers in these practices requires both the willingness of the farmer and an individual to transfer this knowledge. Both of these may be of little availability in Crete, which, coupled with an older farming population, could explain the existing limited presence of these more sustainable farming practices on the island.

Lack of consumer support and presence of international supermarkets

While there is a great tendency of consumers to prefer local products in Crete, it is very likely that this could change. The convenience of purchasing everything in one place has encouraged consumers to purchase all their products from the supermarkets, many of which do not carry locally produced vegetables. Both the farmers and the management of the common market noticed that consumers were beginning to prefer shopping at supermarkets and it is likely this will continue, especially as the number of supermarkets on the island increases and more consumers occupy multiple-income households, where all family members work outside the home.7

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7 A study conducted by the Organization for Economic Co-operation and Development (OECD, 1998) showed that from 1985-1996 there was a 7.5% increase in the number of two-adult households with both adults working.
Government support

All the farmers noted the lack of support for small farming efforts. Additionally, the management at the common market seemed in constant struggle with the municipal governments to maintain good locations for the markets. Without government support of the current efforts and greater support to expand these efforts, the localized food system could very well be co-opted by the increasing presence of international supermarkets and erode the already localized nature of the food system. Additionally, government support to increase sustainable production practices would help to improve the environmental sustainability of the farms themselves.

7 Conclusions

The food industry in many developed nations is experiencing a paradigm shift where development is being focused around community-based systems with short supply chains, rather than export-driven and industrial commodity-based systems. As a result of consumer dissatisfaction with food quality, in many instances due to concerns of food safety and environmental detriment of industrial agriculture, there is a growing movement to re-localize the global food system. The benefits of localization are wide, but can be summarized in its flexibility to alter forms of production and distribution to maintain success and therefore long-term sustainability for the whole system.

The extreme intensification of agriculture was never fully adopted in Greece, more specifically in Crete. Agriculture in Greece is still dominated by small-holdings with mostly diversified production systems and is a focus of Greek life. However, being more traditional in practice, these diversified, small holding systems are seen as a relic of the past, not as a key element to the future paradigm of agriculture. It is through the integration of traditional ideals and modern methods of production and distribution that agriculture in Crete could develop into an example for food system sustainability; a diversified production system, that effectively and efficiently uses local resources to provide high quality food, distributed equitably to meet the needs of the local community without compromising available resources for future generations. There is presently great opportunity to develop the agricultural sector and the food distribution system in a way that provides the greatest benefits to all actors in both the existing and future communities in Crete. This ideal is best encompassed in the concept of localized, community-based food systems.

Through these case studies, it was found that two thirds of vegetables and field fruits produced on the island is kept on the island to meet the needs of the local market. Additionally, it was discovered that for the major mechanism by which these products are distributed to retail operations and institutions (restaurants, hospitals, universities, etc) a great majority of the food is produced locally, resulting in the conclusion, at least in the case of vegetables and fruits, that Crete’s food system is highly localized. This, along with the dominant typology of farming as small, diverse farms, puts Crete in a positive position to develop a model for sustainable development in agriculture.

The initial intent of this study was to discover the areas where local farmers are being prevented from entering the market. However, upon investigation, this study determined that the majority of farmers are indeed accessing local markets, since the food system is strongly regionally based. The distribution system in Crete, at least in the case of vegetables and fruits produced in the field, was found for the most part to be a local or regionalized system, based within the island’s geographic boundaries and more often even within the boundaries of the prefectures of the island. It is for this reason that Crete is actually ahead of the new paradigm for agricultural development. Since agriculture on the island has not yet undergone a great level of intensification in agriculture nor developed a system based solely on export production, Crete’s food system has achieved what many developed nations are just now beginning to reinvent. However, it faces some challenges in the fact that the policies are focused around preserving the past rather than integrating the functions of the past into the development of agriculture for the future or solely around production for export.

It was noted in the previous section that a localized food system does not necessarily always equate to greater environmental sustainability. This was shown to be the case when looking at the production practices common to many of the farmers who depend greatly on outside inputs such as fertilizers and pesticides. However, these farmers were also smaller in size and diverse in production, characteristics which have shown to have positive impacts in the viability of rural communities. Additionally, small diversified farming systems have been shown to be open to and have greater success in adopting
measures to improve the practices in ways that are beneficial to the environment and the economic well-being of the farm systems, such as organic production measures (Mann, 2005; D’Souza, 1996). All of these factors lead to the ability of Crete to develop its agricultural system better than has been done in other developed nations: Crete can learn from the mistakes made by industrial profit-driven models of production and distribution and further develop their food system in ways that will ultimately lead to a healthier environment and a healthier population, avoiding all the missteps of environmental degradation and nutrition related illnesses they are currently beginning to face.

However, there are already some signs that Crete will ignore mistakes made by other developing nations. Specifically, the introduction and growth of international supermarkets on the island (along with their centralized distribution systems), a shift in consumers’ buying habits, and an ageing farmer population are all signs that the current localized food system and diversified small holdings which provide product to this system are in danger. Additionally, farming as an occupation is not given the proper respect within society that it should receive. All the farmers interviewed expressed concerns about the lack of support they receive from the government and the (most precisely, urban) communities, and the fact that the youth do not see a future in farming. Without the proper support from society as a whole, smaller scale farming can almost certainly see extinction on the horizon.

There is great opportunity now to take advantage of the fact that farming and food still maintain a core in the Cretan culture. Cretans are beginning to experience problems of obesity in their children (Mamalakis, 2000) and farmers are beginning to face the difficulties associated with dependence on chemical fertilizers. Generally, people are noting an erosion of community, while others are simultaneously embracing the idea that localized production and community markets can provide the solution to this “great social crisis” (Kapastanakis, age 45). Building the ideals of sustainability into the food system by placing greater importance on small scale, regenerative production practices and community-based distribution – and following it up with support – could be an end to greater social erosion and environmental degradation.

8 Endnotes


