

CHARACTERISTICS OF CITRUS FRUIT PRICE DEVELOPMENTS ON THE LATAKIA MARKETS, THE SYRIAN ARAB REPUBLIC, AS PRECONDITIONS FOR A FUNCTIONAL MARKETING INFORMATION SYSTEM

Haiyan Sulaiman, Tomas Doucha, Alexander Kandakov
Czech University of Life Sciences Prague
sulaiman@ftz.czu.cz

Abstract. The study concerns the citrus markets in the Latakia region, the Syrian Arab Republic. Despite the high impact of citrus production on the livelihoods of more than 40,000 families in the region, there is a substantial lack of information on market prices, demand, supply, storage etc., involving producers and villages, wholesale markets and the retail sector in the Latakia region. Lack of suitable storage and sorting facilities, financial support and training also represent detrimental barriers for small citrus farmers. Local farmers cannot choose the right market at the right time and they face frequent fluctuations in citrus supply and demand, along with significant differences and volatility in prices across the four local markets represented in this article. This is why an effective Marketing Information System should be created for the region: to eliminate information asymmetry for all stakeholders. Based on the surveys carried out in the period from January 2010 – September 2012 and current market data, the article presents arguments for this need, initially to present basic characteristics of the markets, a prerequisite for the design of an effective information system.

Keywords: Marketing Information System, Latakia, Syria, citrus fruits, price fluctuation.

Introduction

Citrus, which originated from Southeast Asia, is characterized by fragrant flowers and edible juicy fruit. It is an important crop in the Syrian Arab Republic, consumed both as fresh fruit and as citrus juice. It plays also a significant role in the farmers' incomes and in the national economy. The most important commercial commodities include oranges, grapefruits, lemons, tangerines and to a lesser extent tangelos. The national citrus production accounts for 5 % of the gross national agricultural output and 1.3 % of the GDP [1]. Prices for citrus fruits are determined by the supply and demand and tend to show a cyclical pattern. However, the cycles for citrus are usually longer than for other commodities, due to the perennial character of the crop. The supply factors include the amount of land dedicated to cultivation, the yields and age of trees, weather conditions and the incidence of diseases. The demand depends on the factors such as income levels, population growth, the availability and relative prices of substitute fruits and changing consumer preferences for fresh produce, including health, quality, convenience or taste characteristics [2]. The prices of citrus fruits and of orange juice are also highly unstable, being relatively sensitive to changes in the quantity supplied. In developing countries, access to information can truly empower decision-making in the sector, especially in rural areas. Millions of small producers, often illiterate, flounder in business transactions, and their vulnerability is sometimes exploited by consolidated contractors, commissioners and traders [3]. Therefore, one of the solutions to improve the position of small producers is the creation of a functional citrus Market Information System (MIS) collecting, analyzing and distributing the market data, which is especially needed in the wholesale markets in the Latakia region.

The first step to design an effective MIS is the analysis of the basic characteristics of the current markets [4; 5]. The analysis, followed by recommendations for other steps in the design of the MIS, is the main topic of the article. Another important step in the design of the MIS is how to distribute, interpret and use the collected and processed information [6; 7]. The information should highlight changes in prices over time and it is generally more effective to highlight trends reflecting rising and falling prices [4; 8]. Each market surveyed has its own trend lines to show how prices in that market varied over the year. In the MIS prices on different markets can be compared and analyzed, to determine the factors affecting the prices. While every MIS can differ in its details, there are three steps in setting up an MIS in general: (1) the selection of the MIS location and its participants (stakeholders); (2) the analysis and assessment of the local situation; (3) the design and implementation of the MIS [9-13]. The main objective of the article is to highlight how the Marketing Information System can help to reduce information asymmetries and improve the market position of small citrus producers in the Latakia region.

Materials and methods

For the creation and implementation of an MIS in the Latakia region four main wholesale markets (Latakia, Jablih, Al-Haffi, and Al-Qurdaha) were selected for data collection. These markets create centers for pilot areas for citrus fruit production (80 % of Syrian production). Secondary data on citrus fruit prices were used from the official sources of agricultural extension divisions, official agricultural directorates, directorates of agricultural affairs and economic departments of the Ministry of Agriculture.

The data were transformed to average weekly and monthly prices. To characterize the markets, six indicators were applied on the data set and used for the assessment of the characteristics of the markets: Mean (arithmetic mean): the sum of all measurements in the period divided by the number of observations in the data set; Volatility (variance): the dispersion of prices from their mean values (mathematical expectation of the average squared deviations from the mean); Coefficient of variation: ratio of standard deviation over mean as a measure of the dispersion of individual data. The higher coefficient, the larger dispersion and the higher volatility of prices [14]; the Skewness coefficient: provides information about the asymmetry of the distribution of values; the Standard deviation (σ): shows how much variation or dispersion exists from the average (mean), or expected value. A low standard deviation indicates that the data tend to be very close to the mean; high standard deviation indicates that the data are spread out over a large range of values; Kurtosis: the distribution of the observed data around the mean. The standard normal distribution has a kurtosis of zero, a positive kurtosis indicates a “peaked” distribution and a negative kurtosis indicates a “flat” distribution.

Two varieties of citrus (Pomilo and Lemon Autochtone) were studied in the Latakia region, specifically in the Al-Hafi, Al-Kurdaha, Latakia, and Jablih districts. Defining the price characteristics (status) in the four regional markets represents the first step towards the creation and implementation of a functional MIS to support fruit farmers and traders in the Latakia region. The production of fruits, marketed quantities, demand and supply are also considered. Price fluctuation is a common feature of any functioning agricultural market [15]. However, in underdeveloped countries it may be extremely large and volatile and may have a negative impact on the consumers’ food security, farmers’ income and the economy of the country [15]. The price fluctuation on the markets studied depends above all on the seasonality of production.

The methodology of Marketing Information System (MIS) formulation defines the MIS development process in two steps. The first step involves a proposal for three separate systems (D-bases) which should depending on the area be covered by that system: (i) a system for citrus products, (ii) a system for citrus producers, (iii) a Market research database.

Each system should provide a relevant D-base for storing basic information before and after processing. However, the most important data concerning the market analysis and the tendencies of minimum and maximum prices of citrus products will be elaborated from the Market research section of the system. The methodology of MIS creation includes algorithm specification and database programming in MySQL, system input and output definitions.

The second step includes the creation of a functional market operator created by the combination of these three separate databases into a complete Marketing Information System (MIS).

Results and discussion

Citrus prices vary considerably during the year in the Latakia region. For example, varieties like Lemon Autochthons and Lemon American produce fruits permanently, and the prices in the summer are two to three times higher than in the winter months for Lemon American and Lemon Autochthon. Other varieties have shorter harvest periods (only four months), which coincide with the prevailing production periods of the other citrus varieties and types. This may affect their fruit prices, due to their surpluses in supply being on the markets in these periods. Three market periods during the year can be recognized: (1) the period of fruit abundance from all varieties (January – April); (2) the period of a medium fruit production (October – December); (3) the period of the lowest fruit production (June - September). These periods significantly differ in fruit supply, generating the fluctuations in fruit prices.

Price developments, trends and statistic indicators for the four studied markets and main varieties

The four wholesale markets in the Latakia region (Lattakia, Jablih, Al-Haffi, and Al-Qurdaha) include production from the citrus orchards of 54, 23, 12 and 11 %, respectively (Citrus Board, 2012). Most of the fruit is sold on the Latakia wholesale market, usually with the highest prices, suggesting that some additional volume of citrus fruits can be marketed here. There are different cyclic patterns in the prices for the citrus varieties – Pomilo and Lemon Autochthon – monitored during the last three years.

Price developments for the Pomilo variety

It proved to be the case that the Latakia wholesale market in general has the highest weekly prices for the Pomilo variety (2010). In 2011 the citrus weekly prices tended to a similar pattern as in 2010. The Latakia wholesale market showed the highest prices and the Al-Qurdaha market the lowest ones. No distinct peaks can be recognized. The same is true for 2012 weekly prices. Statistic indicators for the annual trends in prices for the Pomilo variety in the period of 2010-2012 for the wholesale markets under consideration are presented in Table 1. Table 1 shows the high dispersion (volatility) of Pomilo annual prices around their mean, with an asymmetric distribution, fluctuating (shifting) from the right side (lowering) to the left one (increasing). The amplitude (standard deviation) ranged from 2.89 to 6.47. Also Kurtosis indicates a “peaked” distribution in some cases and a “flat” distribution in the others. The maximum prices were 2 or 3 times higher than the minimum ones. It should be a challenge for the MIS to smooth these differences in prices out to the benefit of the farmers. The prices of citrus varieties were calculated in Syrian pounds (SP).

Table 1

Characteristics of annual trends for the Pomilo prices 2010-2012

Market	Year	Mean	Standard deviation	Minimum, SP·kg-1	Maximum, SP·kg-1	Variance	Kurtosis	Skewness
Jablih	2010	21.45	2.89	10.94	25.44	8.35	3.68	(1.32)
	2011	22.66	3.46	17.00	30.00	11.94	(0.63)	0.48
	2012	23.44	5.73	12.63	38.00	32.84	0.25	0.47
Qurdaha	2010	21.41	3.41	11.17	26.75	11.65	1.32	(0.85)
	2011	19.02	6.47	9.74	34.83	41.90	(0.16)	0.98
	2012	19.80	4.83	11.44	28.15	23.30	(1.33)	0.12
Latakia	2010	25.62	4.27	13.50	33.38	18.20	1.14	(0.81)
	2011	25.38	4.63	14.82	34.50	21.40	(0.31)	0.08
	2012	24.09	5.65	10.63	34.36	31.87	0.22	(0.68)
Haff	2010	24.36	3.14	15.39	29.64	9.86	0.80	(0.44)
	2011	21.53	3.32	13.59	28.83	11.03	(0.06)	0.15
	2012	21.20	3.10	15.02	26.71	9.60	(0.72)	(0.22)

(): Values in parentheses are negative.

Source: Own calculations, 2012

Price developments for the Lemon Autochthon variety

In 2010 the weekly price variation amplitude between the markets studied amounted to 11.4-76.5 SP·kg⁻¹. In general, the Latakia wholesale market showed the highest prices. Price peaks are evident during July-October, which coincides with non-harvesting periods of the other citrus varieties. The weekly prices in 2011 tended similarly to those in 2010, with the highest prices during June-September. The variation amplitude between the markets was 9.9-84.4 SP·kg⁻¹. As usual, the Latakia wholesale market had the highest prices and the Al-Qurdaha market the lowest ones. In 2012 the weekly prices tended to a pattern, somewhat different than those monitored during 2010 and 2011. The variation amplitude between the markets was 9-100.6 SP·kg⁻¹ and the variation magnitude was extended towards the maximum prices more than towards the minimum prices. Table 2 (for the annual prices) shows the high dispersion (volatility) of the prices around their mean, with an asymmetric distribution, fluctuating from the right side (lowering prices) to the left one (increasing prices). The amplitude (standard deviations) ranged from 12.47 to 19.12. Also Kurtosis indicates a “peaked”

distribution in some cases and a “flat” distribution in the others. The maximum prices were 2 or 6 times higher than the minimum ones.

Table 2

Characteristics of annual trends for Lemon Autochthon prices 2010-2012

Market	Year	Mean	Standard deviation	Minimum, SP·kg ⁻¹	Maximum, SP·kg ⁻¹	Variance	Kurtosis	Skewness
Jablih	2010	25.47	17.32	11	62.78	300.07	-0.08	1.21
	2011	24.46	14.67	12.44	68	215.09	1.66	1.53
	2012	34.95	16.69	12	82	278.63	-0.38	0.34
Qurdaha	2010	25.95	15.98	11.66	64.09	255.32	0.57	1.34
	2011	20.96	14.29	9.64	62.92	204.24	1.47	1.58
	2012	26.32	12.47	9.01	53.28	155.58	-0.82	0.36
Latakia	2010	30.85	19.12	14.63	76.5	365.61	0.58	1.36
	2011	29.44	17.83	16	84.38	318.09	2.06	1.64
	2012	35.22	18.12	15.38	100.63	328.39	2.41	1.37
Haff	2010	28.83	18.49	13.02	71.14	341.97	0.56	1.36
	2011	25.39	15.99	12.06	69.06	255.58	0.56	1.3
	2012	33.07	15.22	12.29	83.04	231.6	0.95	0.67

() : Values in parentheses are negative.

Source: Own calculations, 2012

The conception of the Marketing information System

The Marketing Information System should be so designed as to enable it to disseminate data through online systems to various agro-food operators helping in the finding of business partners, in promoting and marketing products and services, in minimizing the effective time needed for the market analysis and in becoming more informed about agricultural market trends.

The MIS should be developed and launched on the market as a form of consultancy. Its final shape, which determines its operational properties and capacity, is displayed in Fig. 1. The system consists of three databases: **Product D-base** (six modules of citrus varieties: *Lemon Autochthon*, *Tangerines*, *Jaffa*, *Clementine*, *Valencia* and *Grapefruit*), **Producers D-base** (one group, divided in subgroups such as: *personal information*, *property types*, *area*, *production* and *citrus varieties*.) and **Market Research D-base** (data on the dynamics of the minimum and maximum price developments for citrus products on the local agricultural markets in the Latakia region).

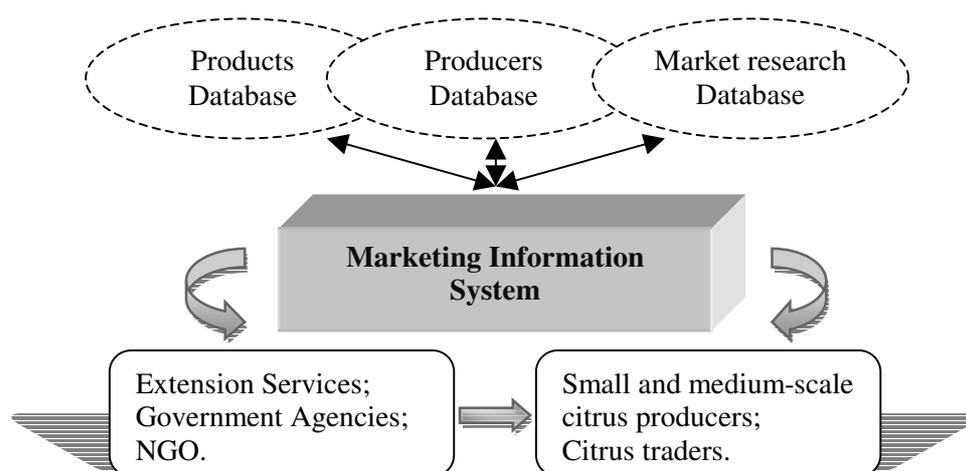


Fig. 1. Final conception of Marketing Information System

Figure 1 shows that the information system setting will allow a continuous flow of information to support especially rural primary producers and citrus traders in the Latakia region. But the MIS can also act as a facilitator in the field of offers and demands for citrus products and agricultural inputs, as

an informer on technology packages as well as an analytic site for market prices and sales opportunities. In the field of the citrus business a MIS creates a unique opportunity for citrus producers and traders to establish both, the growing strategy and sale approaches and to flexibly respond to the quickly changing situation on citrus markets.

Conclusions

The citrus fruit prices differed across the studied wholesale markets, where the Latakia wholesale market showed the highest prices and the Al-Qurdaha wholesale market the lowest ones. The differences between the markets also increased during the period of 2010-2012. The differences can be influenced by more factors such as the lack of the market information and a continuous information asymmetry, the influence of large retail chains in Latakia city, the purchasing power of the population, transport to other cities, the rate of annual inflation due to currency depreciation, etc. In addition, the different harvesting periods of the fruit varieties affect the prices, due to surpluses in supply in January – April and a shortage of supply in the summer periods. This relates especially to Lemon varieties, which recorded the highest dispersion of citrus prices (the standard deviation ranged from 12.47 to 19.12), followed by Pomilo varieties (the standard deviation ranged from 2.89 to 6.47).

Based on the presented results relating to the main price characteristics of the citrus fruits markets in the Latakia region, it should be emphasized that a Marketing Information System can be developed as an instrument to help small farmers find proper markets and information about seasonal price trends. The results suggest that for the elimination of the information asymmetry and improvement of the market position of small citrus producers in the Latakia region it is important to distribute real and current market information through the Marketing Information System to farmers and thereby improve their decision-making in marketing their goods.

References

1. Bureau of Agricultural Statistics. 2009. STAT. Syrian Arab Republic. (Accessed on 14 March 2013)
2. Binayee B S. Marketing Information System An overview of agriculture marketing systems in South Asia 2005. Program Manager/ANSAB, International (TCDC) Marketing Expert. for FAO TCP project on Marketing System Development for NWFPS in Lao PDR, 2005. [online] [18.10.2013]. Available at: http://www.ansab.org/wp-content/uploads/2010/07/AgriMISSouthAsia_Report.pdf
3. Kotler P. Marketing Management: Analysis, Planning, and Control, 9th ed. Prentice-Hall, Inc., Englewood Cliffs, NJ, 1988. ISBN-13: 978-0135561508.
4. Bouchitté A, Dardel S. Europe Aid: Agricultural Markets and Small-scale Producers: Access and Risk Management Tools. European Commission, 2012. [online] [08.06.2013]. Available at http://ec.europa.eu/europeaid/infopoint/publications/europeaid/documents/269a_en.pdf.
5. Ramesh B, Singh Y P, Sachdeva R K. Establishing a management information system: Improving agricultural extension. Food and Agricultural Organization. Reference manual. Rome, Italy, 1996. [online] [25.05.2013]. Available at: <http://www.fao.org/docrep/w5830e/w5830e0k.htm>
6. Rao C S S. Agricultural extension management system in India: Past, present and modalities in future. Indian Journal of Extension Education. 21 (1 & 2), 1985, pp. 32-35.
7. Simon H A. The new science of management decision. Administrative Science Quarterly. New Jersey: Prentice-Hall. 22 (2), 1977, pp. 342-351.
8. Egg J, Galtier F. From price reporting systems to variable geometry oriented market information services. Cirad/Inra. 2, 2003, pp. 52-70.
9. Ramesh B, Singh Y P. Management information system in an agricultural extension organization. In Proceedings of the national seminar on management of information system in management of agricultural extension. Hyderabad: NIRD, 1987, pp. 1-15.
10. Gakuru M, et al. Inventory of Innovative Farmer Advisory Services using ICTs. Forum for Agricultural Research in Africa, 2009. [online] [22.05.2013]. Available at http://www.farafrica.org/media/uploads/File/NSF2/RAILS/Innovative_Farmer_Advisory_Systems.pdf.
11. Davis G B, Olson M H. Management information systems: Conceptual foundations, structure, and development. New York: McGraw-Hill, 1985. ISBN-10: 0070158282

12. Lucas H C Jr. Information systems concepts for management. New York: McGraw-Hill, 1990. ISBN: 978-058-311-4.
13. McLeod R Jr. Management information systems: A study of computer-based information systems, 6th ed.. New Delhi: Prentice Hall of India, 1995. ISBN:0-02-379501-8.
14. Tothova M. Main Challenges of Price Volatility in Agricultural Commodity Markets. New York: Springer. ISBN: 978-1-4419-7634-5, 2011. [online] [06.03.2013]. Available at http://link.springer.com/chapter/10.1007%2F978-1-4419-7634-5_2.
15. Addoh, S. L. Strengthening the capabilities of agricultural organization networks through analysis of the evolution of local grain prices in Burkina, Mali, and Niger, during the period 2001-2010 and its repercussions for warrantee in Niger. Africa Verte International, December 2010. [Online] [23.05.2013]. Available: http://www.afriqueverte.org/r2_public/media/fck/File/Documentation/DocsAV/evolution-grain-prices-burkina-mali-niger-warrantage.pdf.