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in

Melgarejo P. (ed.), Valero D. (ed.).
II International Symposium on the Pomegranate

Zaragoza : CIHEAM / Universidad Miguel Hernández
Options Méditerranéennes : Série A. Séminaires Méditerranéens; n. 103

2012
pages 261-264

Article available on line / Article disponible en ligne à l'adresse :

<http://om.ciheam.org/article.php?IDPDF=6965>

To cite this article / Pour citer cet article

Sarig Y., Galili A. **The pomegranate industry in China – Current status and future challenges.**
In : Melgarejo P. (ed.), Valero D. (ed.). *II International Symposium on the Pomegranate.* Zaragoza :
CIHEAM / Universidad Miguel Hernández, 2012. p. 261-264 (Options Méditerranéennes : Série A.
Séminaires Méditerranéens; n. 103)



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The pomegranate industry in China – Current status and future challenges

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Abstract. The pomegranate, one of the oldest fruits known to man, was originally thought to be a native to China. Actually, it was brought to China through the Silk Road during the Tang Dynasty (600-900 BCE). The current production is estimated as 1,600,000 tones and the planted area of 110,000 Ha. Although the pomegranate adopts itself to a variety of climatic conditions and pomegranate can be found in many parts of China, the major orchards in China are in the provinces of Sichuan, Chongqing, Shandong, Shaanxi and Henan. Other provinces where pomegranate is produced (although on a smaller scale) include the provinces of Xinjiang, Hebei, Guangdong and Yunnan. There are over 200 different varieties of pomegranate in China, which vary from province to province, with a range of weights, from 300-1200gr, a scale of colors from light green to deep red and a range of skin thicknesses and kernels hardness (from soft to hard kernels). They also vary in their sugar content and other ingredients in the arils and the rind. The vast size of China constitutes, both, its potential strength, but also the source of its difficulties, which is reflected also in the Chinese pomegranate industry. Although China is one of the world's biggest producer of pomegranate (the biggest, according to some sources), its methods of cultivation resembles a gardening art rather than modern agriculture. Although some significant changes were introduced in recent years, agriculture in China is still characterized by labor intensiveness and small scale and it is a far cry from modern horticultural methods. The current situation is characterized by rather primitive methods of irrigation, lack of adequate facilities for sorting, sizing, packing, transportation and storage especially, cold and CA storage, which results in a relatively low quality of the product and inconsistency in the quality. The fruit is marketed, almost exclusively, in local markets because the current quality can't meet the competitive market economy requirements. China's rapid growth and structural changes, while resolving many problems, have also given rise to new challenges. Nevertheless, China has the capacity to meet these challenges. With the proper guidelines, including training, technology transfer and acquisition of know-how and modern equipment its potential can be realized.

Keywords. China – Pomegranate – Arils – Processing – Arils extraction.

I – Introduction

The pomegranate, one of the oldest fruits known to man, was originally thought to be a native to China. Actually, it was brought to China through the Silk Road during the Tang Dynasty (600-900 BCE). The current production is estimated as 1,600,000 tones and the planted area of 110,000 ha. Because the pomegranate adopts itself to a variety of climatic and soil conditions, it can be found in many parts of China. However, this also accounts for the poor production and low fruit quality in some regions. The major orchards in China are in the provinces of Sichuan, Chongqing, Shandong, Shaanxi and Henan. Other provinces where pomegranate is produced (although on a smaller scale) include the provinces of Xinjiang, Hebei, Guangdong, Anhui, Ningxia and Yunnan. There are over 200 different varieties of pomegranate in China, which vary from province to province, with a range of weights, from 300-1200 g, a scale of colors from light green to deep red and a range of skin thicknesses and kernels hardness (from soft to hard kernels). They also vary in their sugar content and other ingredients in the arils and the peel.

The vast size of China constitutes, both, its potential strength, but also the source of the difficulties in its agriculture, which is reflected also in the Chinese pomegranate industry. Although China is one of the world's biggest and one of the oldest producer of pomegranate, its impact on world's market is very small and it's bound to remain as such, unless major changes are introduced.

II – Current status

For hundreds of years, The Chinese methods of orchards cultivation resemble a gardening art rather than modern agriculture. Although some significant changes were introduced in recent years, fruit growing in China is still characterized by labor intensiveness and small scale and it is a far cry from modern horticultural methods. The household is a basic unit for production, where typically, 2.63 laborers average per household, cultivating 11.7 *mu* (~0.8 Ha) of land. Farmers have to bear the cost of production, including seeds (or cuttings), fertilizers, tools, and other investments in farmland.

Until the late 1970's, farmers were tied down, forced into collectives and made to deliver their rural "surplus" to the government. Then, village by village, farming families started to bribe their way out of the collective. They undertook to grow their share of the grain quota privately, and put the rest of their efforts into chasing other sources of income. The "household responsibility system", meaning decollectivization and the introduction of markets for rural products, was formally endorsed by the central government in 1978. It went on to become the cornerstone of reforms in agriculture and arguably in the whole economy.

It is interesting to note that this reform did not happen gradually. It spread across the land like bush-fire, not because the central government said it should, but because it chose not to stop the spontaneous entrepreneurialism of its farmers. What the government was actually doing was to rush constantly to catch up with the country's natural inclination.

However, the reforms and structural changes didn't change much the farming methods and they still follow, for the most part, the old tradition methods of hundreds of years. Irrigation methods are based, almost exclusively, on flood or furrow irrigation, with very small use of sprinkler and drip irrigation methods. While most of the farmers are well aware of the need for proper fertilization to obtain optimal yield, the cost on one hand, and an inadequate quality assurance of the locally produced fertilizers and seeds on the other hand, result in a relatively low yield and low quality of the product. Moreover, the issue of contaminated product is quite serious in some places where fertilization is still being performed with human secretion.

While grain production remains top priority in the country's planning, the reform and open policy have greatly emancipated the production forces and promoted an all-around development of the rural economy. Hence, the interest in fresh fruit production, and even flowers, has been greatly aroused. Once the strict government focus on "grains only" policy has been slackened and especially when it became evident that fresh produce can bring much more income, agricultural production became much more diverse. In addition, with the expansion of market economy, the export of agricultural products, both fresh and processed, is becoming more and more important and Chinese agricultural products reach, not only to the markets in the proximity of the country, but also those in Europe and even America.

However, the competitive market economy entails, not only improvement in production, but also the use of proper postharvest techniques to reduce spoilage and obtain the highest quality required on the world's markets.

The current situation is characterized by lack of adequate facilities for sorting, sizing, packing, transportation and storage, which result in a relatively low quality of the product. It is estimated that more than 40% of the total production of fresh produce is wasted in China because of poor postharvest treatments. In addition, inconsistency in the quality and variation between farmers

and also within a given shipment of one producer, also result in inferior quality yielding low profit. Quality standards, as commonly accepted in world's markets, are still only in the planning, let alone differentiation between domestic and export markets. TQM (Total Quality Management) procedures, while already being introduced gradually in the industry, are still alien to the agricultural sector. The result is that fruit is marketed, almost exclusively, in local markets because the current quality can't meet the competitive market economy requirements.

The current status reflects both, the major progress and development in Chinese agriculture, but also point out the many issues and problems that still need to be solved. Its potential, based on its geography, size, diversity and human resources, is very big. However, it needs a much greater "leap forward", before this potential can be realized.

III – Major constraints and challenges

Agriculture is regarded as a fundamental sector of Chinese economy. However, While China is a country with ~100 million hectares of cultivated land, the conditions for agriculture are far from being ideal. Major constraints, both objective and subjective, present a formidable challenge for the most needed process of modernizing the agriculture in China.

China is a water-deficient country and water shortage has seriously retarded socioeconomic development. Water runoff is below the world average, only about a third is exploitable and most of this is geographically concentrated. The area south of the Yangtze River has 7.5 times more water per square kilometer than the area north of the river. In the south 450 million people – a third of the population – live under threat of flood; in the north 300 counties and 479 cities are short of water. Uneven precipitation and water distribution make the situation even worse and accounts for only 60 percent of exploitable water being actually used. In agriculture alone the shortage of water is estimated to be about 30 billion cubic meters. This shortage will double if China increases irrigated farmland as planned. Groundwater is being tapped to make up the difference, but evidence abounds of over-exploitation.

Despite the shortage of water, its use continues to be wasteful. Most irrigation and drainage systems are badly run and maintained because of fragmented responsibility among levels of government, no direct participation by farmers in decision making, inadequate budget, and water charges that are too low to cover maintenance costs.

The arable land, although large in absolute terms, represent only 7% of the world's total cultivated land, while it is required to support a population of 1.3 billion people, about 22% of the world's total.

Moreover, China is losing arable land due to urbanization. Each year 660,000 hectares of arable land are lost to urban sprawl and other non-agricultural uses. Urbanization has reduced arable land by 0.2% in the past decade. In 1994, for example, a net area of 5.7 million *mu* (~400,000 ha) of cultivated land was lost. Another factor, which accounts for the reduction of land available for cultivation is environmental degradation in all its forms. For example, some 3.7 million square kilometers of land – an area larger than Western Europe – suffer from water and wind erosion. Each year about 0.5 centimeter of topsoil is eroded from the 13 million hectares of mountains and rolling hills in the North China Plain, where some 250 million people live. Further loss of irrigated land is the result of out-of-date water conservation facilities. About one-third of China's water reservoirs do not work properly due to serious silt build-up; only 30% of irrigation projects for over ten-thousands *mu* each work in China, resulting in a loss of an irrigated area of more than three million *mu* every year. In addition, the ongoing process of desertification further reduces the potential available land for a viable agriculture. In the battle with the encroaching desert, the latter still has the upper hand.

Natural disasters, such as floods, draughts and earthquakes, and the declining ability to fight them also contribute to worsening the conditions for agricultural development by further reducing the availability of land and adversely affecting the livelihood of the farmers.

Environmental deterioration, which has been accelerated by the urbanization process, is reaching a nightmarish level of pollution which affects all aspects of life in China and also poses a threat to agricultural development. Water pollution in particular has, not only impact on health, but it affects directly agricultural output.

China's rapid growth and structural changes, while resolving many problems, have also given rise to new challenges. These, if unmet, could undermine the sustainability of agricultural development, including the development and modernization process of the pomegranate industry. Nevertheless, It is argued that China has the capacity to meet these challenges. With the proper guidelines, including training, technology transfer and acquisition of know-how and modern equipment its potential can be realized.

IV – Conclusions

Pomegranate is one of the important and oldest horticulture crop in China and can be found in many parts of the country. China is also one of the major producers (if not the biggest) of pomegranate in the world. However, faced with many constraints, both natural and structural, the current pomegranate is characterized by relatively low yield and poor fruit quality, its fruit is sold only in the domestic market and its contribution to the economy is marginal.

Nevertheless, there is a good chance that with its potential strength and based on the impressive record of its unprecedented economic growth, China has the capacity to meet the challenges that threaten to imperil its fruit industry, including pomegranate. With the proper guidelines, including training, technology transfer and acquisition of modern know-how, coupled with reforms and further structural changes and also providing the necessary financial support, the modernization process of its pomegranate can be realized.