

# Total quality management for horticultural products

A MALINS  
S WOODHEAD  
Natural Resources Institute  
Chatham Maritime  
Kent ME4 4TB  
United Kingdom

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### ABSTRACT

The concept of total quality management is described with reference to international standards in quality assurance. The relevance of quality management for horticultural products is explained in the context of legislation governing horticultural marketing in Europe, trends in consumer demands and market competition. The Natural Resources Institute's recent activities in supporting implementation of horticultural product quality assurance systems are described. The requirements of a quality assurance system are outlined and difficulties encountered in implementing quality assurance systems are discussed. Suggestions are made for the role which research and development workers can play in providing technical support for quality assurance of horticultural products.

## Gestion totale de la qualité des productions horticoles.

### RÉSUMÉ

Le concept de la gestion totale de la qualité des productions horticoles est défini à partir de standards internationaux portant sur l'assurance de la qualité. La signification de la gestion de la qualité pour ce type de produits est donnée dans le contexte de la législation touchant le marché de l'horticulture en Europe, des tendances de la demande du consommateur et de la compétition du marché. Les activités récentes de l'Institut des ressources naturelles sont décrites. Elles visent à encourager la mise en place de systèmes d'assurance de la qualité des produits horticoles dont les besoins sont esquissés. Les difficultés rencontrées pour mettre en place ces systèmes sont discutées. Des suggestions sont faites pour définir le rôle que peuvent jouer les acteurs de la recherche et du développement en fournissant la base technique d'une assurance qualité pour les produits horticoles.

## Gestión total de la calidad de las producciones hortícolas.

### RESUMEN

A partir de modelos tipos internacionales sobre la seguridad de la calidad, se determina el concepto de la gestión total de la calidad de las producciones hortícolas. La significación de la gestión de la calidad para este tipo de productos se dá en el contexto de la legislación tocante al mercado de la horticultura en Europa, de las tendencias de la demanda del consumidor y de la competición del mercado. Se describen las recientes actividades del Instituto de los recursos naturales. Estas actividades aspiran a favorecer el montaje de sistemas de seguridad de la calidad de los productos hortícolas cuyas necesidades son esbozadas. Se discuten las dificultades encontradas para montar tales sistemas. Sugestiones son hechas para determinar el papel que pueden jugar los actores de la investigación y del desarrollo suministrando la base técnica de una seguridad calidad para los productos hortícolas.

Received 21 October 1996  
Accepted 10 November 1996

*Fruits*, 1996, vol 51, p 275-281  
© Elsevier, Paris

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### KEYWORDS

Plant products, quality, standards, legislation, markets.

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### MOTS CLÉS

Produit végétal, qualité, norme, législation, marché.

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### PALABRAS CLAVES

Productos de origen vegetal, calidad, normas, legislación, mercados.

## introduction

Quality and price have always been important in the horticultural produce trade but it is particularly relevant to consider the topic of quality assurance at this time.

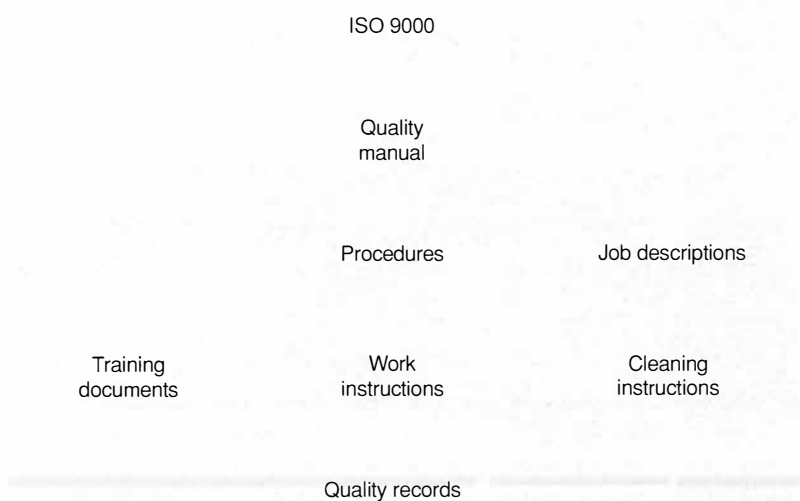
Over the past few years we have seen a race to meet the consumers' demand for an all year round supply of an incredibly diverse range of horticultural produce. This has been achieved through significant development of horticultural exports from many developing countries. Competition for a share in this export trade is fierce. Only those suppliers who can consistently provide the quality required by the customer at a competitive price will succeed. The development of these dynamic export markets in horticultural produce has coincided with the trend to trade globalisation and the emergence of major trading blocks such as the Single European Market. This has been accompanied by harmonisation of legislation within the trading block, such as in phytosanitary requirements and produce quality standards. Added to this, in Europe legislation has been extended to reflect the consumers' growing sensitivity to such issues as food safety, pesticide residues and the environment. Even those exporters who are seeking only to serve small wholesale outlets in

their traditional export markets must now be able to comply with complex legislative requirements not previously encountered.

The legislative environment and the increasing market competition make it imperative for any horticultural producer interested in developing or strengthening export trade to give priority attention to quality management of their produce. Further to this, the quality assurance practices applied must be in line with recognised tried and tested international standards in quality systems in order to ensure customer credibility. This is particularly important in regard to food safety legislation in Europe such as the UK's *Food Safety Act 1990* (1991). The act states that: "it will be a defence for the person charged to prove that he took all reasonable precautions and exercised all due diligence to avoid the commission of the offence by himself or a person under his control."

The implementation of a recognised quality management system is likely to be regarded as the best possible demonstration that all reasonable precautions (due diligence) have been taken. A quality management system can also help an exporter to gain competitive advantage through inspiring customer confidence in their ability to meet the specifications required and can help to ensure that produce quality is managed in a cost effective manner.

Figure 1  
Diagram to show the structure of a quality management system and the hierarchy of the documents required.  
(Source: EARLY, 1995).



## international standards in quality assurance

The ISO 9000 series of quality system standards produced by the International Organisation for Standardisation have been adopted by many national and regional standard bodies around the world. The ISO 9000 standards define the requirements for good management practices in quality assurance. They provide a systematic approach to identifying and integrating all quality-related tasks and responsibilities within a particular business involved in production and supply of produce to meet customer requirements. The standards lay out the requirements for documentation of the quality management

system in a quality manual which can be regarded as the primary document of the system (fig 1). The ISO 9000 standards therefore provide a useful reference for development of quality management systems. The standards can also be used as the basis for formal registration programmes whereby individual companies can have their quality management systems audited by a recognised third party to gain ISO 9000 certification. Such accreditation has now been achieved by a number of larger fresh horticultural businesses for their core business activities of production and delivery.

## total quality management

In contrast to the disciplines of a quality management system developed according to ISO 9000, Total Quality Management (TQM) is the phrase applied to an approach to quality improvement which is more philosophical in nature. TQM has been expounded by a number of charismatic quality gurus such as Philip B Crosby and the concept has gained a strong following particularly among market leaders in the engineering, electronics and services industries. TQM requires an awareness of quality to permeate throughout a company from the chief executive to the person who sweeps the floor and the responsibility for quality improvement is seen to extend to all individuals in the company. The TQM concept reinforces the benefits of a quality management system but is not confined to the core business activities, such as production and delivery, since it extends to every activity within the business. The key features of the TQM concept have been summarised by EARLY (1995) as:

- involving everybody in the business of the company,
- creating a universal understanding that the company's success depends on complete participation of everybody,
- providing the opportunity of complete participation by everybody,
- providing everyone with the opportunity to do their job properly.

The TQM ideals are very relevant to quality improvement in dynamic horticultural businesses. There are many examples of the way in which customer satisfaction can be affected by activities which are not part of the post-harvest production and supply operations. Pre-production activities such as crop programming, varietal selection, or ground preparation, can have a significant affect on the ability of the business to completely satisfy the customer's requirements. The people side of horticultural businesses is also very important as these businesses tend to be labour-intensive and staff are often required to work on cultivation activities in the field without close supervision. In such circumstances each individual needs to be keenly aware of the role they play in the success of the enterprise.

The TQM requirements for commitment, culture change, leadership and involvement are very demanding and, while it may be a powerful motivational technique, the TQM route should not be undertaken lightly. In most cases, TQM is not easily applicable without the foundation of an effective quality management system. With these points in mind, full application of the TQM philosophy is perhaps best initiated at an advanced stage of quality improvement.

## the route to quality management

For the horticultural business interested in quality improvement it can be difficult to get started on the implementation of a quality management system. The ISO 9000 series have been developed from systems applicable to engineering, electronics and construction industries and are not easy to interpret for a horticultural business without experienced guidance. Private consultancy is expensive and may be difficult to come by for many developing country exporters. Recognising these needs, the Overseas Development Administration of the British Government has supported the Natural Resources Institute in the development of a *Manual for Horticultural Export Quality Assurance* (1994). The manual provides detailed practical

information on the implementation of a quality assurance system in line with the requirements of the ISO 9000 standards and introduces some of the important concepts of TQM.

Many horticultural exporters are likely to find that it is inappropriate to commit their limited resources to investing in full accreditation for ISO 9000 through an official certification body. However, a quality management system in line with ISO 9000 will help to ensure that the system meets their business' needs as well as providing a foundation for later accreditation if required. Large horticultural businesses may well decide to seek ISO 9000 accreditation as a means of securing their position against competition and the manual has been designed to provide a useful starting point for them.

The manual provides exporters with a 'do it yourself' package that enables them to establish a basic quality management system tailor-made to meet their specific needs. This approach is important as a quality assurance system, which is not carefully designed to fit a company's particular operations, may easily turn out to be too complex or too costly to operate in the long run. It is also important that the end users are closely involved in the development process to make use of their detailed knowledge of the way the company operates and to ensure that staff are committed to the success of the system.

The manual covers preparation of a quality manual in the form of a Product Management manual and provides examples of the types of records required to manage the processes and procedures included in a quality management system. A detailed explanation of the legislation governing marketing of horticultural produce in Europe is given and supplements to the manual will shortly be available which provide guidance to exporters to the Middle and Far East markets. During its preparation the manual was validated with exporters in Kenya and India. The completed manual has been endorsed by the Fresh Produce Consortium, the representative trade association of major European produce marketing organisations, including importers and retailers. It is expected

that by 1996 the manual will be available in three languages: English, French and Spanish.

Assistance by NRI in the implementation of quality management systems for horticultural exporters is now underway using the NRI manual as a tool. Current activities include seminars and training workshops for exporters to provide general sensitisation to the principles involved. The provision of closer hands-on support in implementation with individual export organisations is also being initiated. This year activities have been conducted in the Caribbean, South America, Asia and Africa.

## constraints to implementation

There is no doubt that horticultural exporters in developing countries face particular constraints in attempting to implement quality assurance systems. Whereas the need for quality assurance is fairly well-recognised by business managers in the more sophisticated markets of Europe, this is not necessarily the case in many developing countries. There the customer-led approach may be quite foreign and the customer is more usually expected to simply buy what is available. Local fresh produce markets often fluctuate from periods of undersupply, when quality is perceived to be of limited importance, to seasonal gluts, when high wastage is accepted as a norm. On top of this local consumer understanding of food safety aspects, such as hygiene or pesticides, is likely to be very limited due to low levels of education and literacy, and in many countries there are no agreed produce quality standards or means by which consumers can assess quality or demand conformity. This perpetuates the situation in which consumers tend to put up with whatever is available in the market and producers are not encouraged to develop a quality culture. Outside the fresh produce trade, the wider business climate in developing countries often lacks the stimulus of competition and this can lead to a sense of complacency, inefficiency and little opportunity for the growth of a quality culture

(INTERNATIONAL TRADE CENTRE, 1993). This background makes concepts of quality management difficult to get to grips with for many businesses in developing countries, not just horticultural exporters. These particular problems are gradually diminishing as the exposure to international markets increases, and as domestic markets are liberalised and the domestic fresh produce sectors become increasingly commercialised.

A further feature of many businesses in the developing world is the tendency to focus on short-term expediency rather than long-term growth. This can stem from restrictive credit facilities or under-capitalisation. The economic benefits of quality management systems may not be clear and this detracts from management interest in committing resources to such systems. It is commonly believed that attention to quality increases production costs particularly if quality improvement is thought to be synonymous with quality inspection. The reality is quite opposite to this. Management are often completely unaware of the considerable costs associated with poor quality of production such as in wastage of staff time, raw materials or other inputs. Implementation of a well-designed quality assurance system should ensure that attention is given to quality right through the production process and that quality is 'built in' rather than 'inspected in'. With this approach the quality assurance system can provide the disciplines which actually help to increase productivity and reduce costs of wastage.

These erroneous perceptions of quality improvement systems and the short term outlook can be serious constraints to gaining acceptance for the need for introduction of quality assurance systems. However, the recent changes in legislation requiring 'due diligence' have put new emphasis on the need for quality management systems. It is important to recognise that quality management systems implemented purely in response to such external pressures may be doomed to failure if there is a lack of real commitment from top management and appreciation of the system's intrinsic value as a management tool. The work culture and quality attitudes of staff within an organisa-

tion can only be effectively influenced through consistent and committed leadership from the top.

Quality assurance systems require effective staff management and development of staff through training. This is often a difficult area for horticultural businesses. Managers may have received little management training and yet the labour intensive nature of horticultural businesses places particular pressure on staff management skills. Limited investment in support staff training is often due to the high percentage of casual staff employed in a horticultural business. Supervision of staff may be weak and methods of payment, such as piecework, may be designed to encourage productivity without protection of quality standards. All these factors tend to create extra difficulties in implementation of quality management systems.

Documentation and record keeping are essential components of the quality assurance system to ensure adherence to the procedures laid down and to allow analysis and improvement of performance. These important requirements may be difficult to implement where there is low literacy among staff or may be difficult to manage where there is a supply base of many small farmers. The difficulty is particularly acute in attempting to conform to the requirements for control of pesticide use. We still find that there is much uninformed use of pesticides by farmers in the developing world, sometimes exacerbated by poor control at the national level. It is particularly important that efforts are made to overcome these problems not only for the sake of export development but also for the health of the domestic consumers.

## opportunities for technical support

There are many areas in which technical innovation and guidance can support the improved use of quality assurance systems particularly in developing countries. The records generated by quality assurance systems will themselves provide an important

guide to technologists seeking information on technical constraints affecting quality of produce and can be used to assist in determining research priorities.

Opportunities abound for improved understanding of pre- and post-harvest factors affecting the quality of the wide range of fresh produce now entering export trade. Many newly exploited tropical and exotic horticultural crops have received little research attention. An improved knowledge of these crops and development of appropriate post-harvest handling systems are essential to the implementation of effective quality assurance systems. Practical guidance is required on the key parameters which should be controlled or assessed as part of the quality assurance system for a particular commodity. Not only identification of optimum practices is required but also a knowledge of the limits of good practice. This means, for example, that it is not only necessary to know the optimum cooling method and storage conditions for a crop, but the effect of varying delays in cooling on subsequent shelf life of a particular product also needs to be determined, so that an exporter can effectively manage their product quality.

Innovations are required to provide appropriate equipment for quality assurance purposes which is in keeping with the resources available locally in terms of cost, materials, skills or power or water supplies. Particular attention is required to improve techniques for control of pesticide use which are simple to use in the field. This might include techniques for rapid assessment of residues in the field or simple systems for ensuring correct concentrations. In keeping with this NRI has been developing field test kits which are suitable for use by extension officers for checking fungicide concentration levels in post-harvest dip treatments. Techniques which allow reduced chemical input are required. This has stimulated one of NRI's recent research initiatives in investigating the use of biological control methods for crown rot in bananas.

A further area which continues to be of prime interest to the horticultural produce

trade is improved quality inspection equipment, particularly of the non-destructive type. This is required to assist packers or inspectors to efficiently select or check produce for maturity, degree of ripeness, eating quality, internal defects, etc. At the moment there are few low cost or effective devices available for these purposes.

Improved economic data can also assist in development of quality assurance systems by defining points of pre- and post-harvest quantitative or qualitative loss in cost terms. This information can be incorporated in the design of quality assurance systems to ensure that they provide appropriate management control of the crop production and marketing process in a manner most conducive to improved business profitability.

## conclusions

This paper has outlined why quality management is important to horticultural exporters. Undoubtedly quality management of produce will continue to be of ascending importance in continued development of horticulture. Developing countries require maximum support to assist them in overcoming the many constraints to the implementation of quality management systems if they are to succeed in development of their export trade. There is extensive scope for technical support from horticultural specialists to facilitate the improved use of quality management systems and this meeting provides an ideal forum in which to explore these opportunities in more detail.

## acknowledgement

We acknowledge support of the Overseas Development Administration under their Renewable Natural Resources Research Strategy in undertaking this work.

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