

Current Trends and Emerging Challenges in Horticulture

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Horticulture is a boon of nature which is refined by human skill as a science to obtain more and more benefits. It involves rigorous cropping expertise, including the improvement, production, distribution and use of vegetables, fruits, woody landscape and greenhouse plants. Horticulture is now one of the fastest growing industry with striking professional opportunities. An increasing proportion of the world's population is living in metropolitan environments where their understanding of farming, and therefore of food production, is becoming progressively more poor. While in 1950 approximately 71% of the world's population lived in rural locations, this had declined to 50% in 2011 and is anticipated to be as low as 30% globally by 2050 [1]. Ironically however, these same urban-based consumers have become increasing verbal about various issues such as use of pesticides, labour conditions for farm workers, carbon taxes, buy-local campaigns, and the sustainability of production methods. These are often driven as "matters of ethics" and are in isolation from the reality of current production methods or of the opportunity to realistically meet these consumer demands.

To meet the steadily rising requirements of low-cost, year-round supply of premium quality fruit and vegetables especially in developing countries, production of fresh vegetables for export has grown rapidly in a number of countries around the world over the last decade. This trade brings producers and exporters of world together with importers and retailers. Usually urbanization is also impacting considerably on the availability of labour for farming activities. The general unavailability of low-cost labour and the increasing cost of land have seen a turn down in horticultural production in many developed countries around the world. As a result, production has shifted to countries where land and labour permit cost- competitiveness, for instance Kenya.

In many countries large scale production of agronomic crops through genetic manipulation is being extensively used. However, in some countries, production of horticultural crops by genetic manipulations is of great concern and a matter of debates regarding the safety and the wider justification of GMOs. The lack of consciousness about the role that conventional plant breeding plays in the production of new cultivars and the uncertainty that often prevails between conventional breeding and plants produced using gene transfer technologies is a matter of concern regarding horticulture practices.

Current trends indicate that consumers are looking for increased variety, freshness, and healthy options in their eating choices. They are also seeking greater ease and a higher proportion of fresh produce in their diets. Those in metropolitan environments are more and more aware of and dependent on green spaces for their livelihoods and well-being. The future for horticulture and its foundation sciences within such an environment is, therefore, exhilarating, tricky, motivating and surely worthwhile.

Emerging Challenges for Horticulture

The organized supply of a wide range of reasonably priced horticultural crops in most developed countries has led to a marked gratification about the need for ongoing R&D programmes in horticulture. Consequently, many governments world-wide have scaled back funding for food production (at least in the applied areas

of R&D) and unfortunately, most research- driven universities have now disbanded horticulture/horticultural science departments and combined them into plant science departments with a very strong focus on the molecular sciences. On the contrary, the basic necessity for research on horticultural crops has not decreased, rather the challenges have increased in complexity given the existing consumer demands for affordability, safety and continuity of supply; increasing needs to achieve sustainable practices; and the requirements to deal with challenges originating from a more uneven climate, the loss of productive soils through urban intrusion, and the loss of low-cost labour. Hence, specific priorities, as given below need to be identified for horticultural research to meet such challenges.

With ever increasing public consciousness, the promotion of healthy habit benefits through the eating of various fresh and dried fruits and vegetables as well as their juices, dried products and extracts—many of which have extensive on-label claims [2] is on the rise. However many such claims have not in fact been clinically confirmed and regulators are increasingly requiring label claims to either be substantiated or removed. Obviously, to correctly determine the presumed health benefits in many fruits and vegetables would be an interesting area of endeavour where there is a union of horticultural science with nutritional and medical research. Further, owing to increased consumer interest towards the eating of fresh rather than frozen produce, another challenge for horticultural science is to improve methods for short- term storage so that best quality is retained rather than to focus on longer-term storage for prolonged marketing.

The concept of sustainability of horticultural crops narrate both to the use of resources, such as water and nutrients, in a way which considers future needs, and the accountable use of objectionable compounds such as pesticides which will not compromise the quality of the environment. Availability of water is the most relevant issue that is facing horticultural production in almost all areas of the world. Hence, research is desirable to decide issues such as the development of drought tolerant crops, dealing with increased salinity, the management of crops under managed water deficits, use of low quality/ waste water and the use of more efficient application methods, viz. enclosed systems such as simple greenhouses. Integrated crop production systems have been revealed to be useful on a number of crops for reducing the pesticide applications and for shifting to new control compounds that have less perseverance in the environment and which are of lower overall toxicity.

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Integrated pest management programme for apples in New Zealand [3] is one such example.

The continual supply of safe, healthy fruit and vegetables and cut-flower crops to consumers has, over the past 50 years, mainly been through a combination of locally-produced and imported crops that have been handled through various transport and storage regimes. The high costs of energy for transport and for storage, changes in consumer use preferences and consumer concerns, increasingly mean that these options may no longer be viable for some markets. Together these issues pose a great challenge and would need to be addressed through inter-organizational/industry talk.

The demand for useful and applicable information is growing as horticulture enterprises become more sophisticated and often more focused on exporting their produce. Further, with the advent of new technologies, viz. remote sensing, environmental monitoring, image analysis and others, there is a growing expansion of the different types of information. The challenges relate to the provision of relevant knowledge and the more effective means of transmitting the specific information that is required [4]. Hence specific databases and web links providing useful knowledge related to horticulture would need to be put in public domain via internet.

Finally, the conservation of plant germplasm for the use of future generations is important and the creation of Svalbard global seed

vault is one such popular example (<http://www.croptrust.org/main>). However since most fruit crops of horticultural consequence are vegetatively propagated and not seed propagated limits the options for their conservation other than through relatively expensive live plant collections; hence such issues too need to be addressed and remain a challenge.

The unrelenting globalization of the horticultural industry will see a rapid transfer and adoption of knowledge. This will comprise the transfer of major enterprises from developed to developing countries as they would have to meet the needs of year-round production and in response to securing lower-cost land and labour. Eventually, this process would require involvement of governments too if and when incidences of food scarcity increase.

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