Editorial

Key research needs to support an increasing fresh produce demand

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I am writing this note on Earth Day, April 22, a particular date that reminds us of the limits of resource availability in this planet and the need to manage those resources sparsely and wisely Farmers and corporations are confronted with the situation of having to produce more fruits and vegetables with less land, less water, less agricultural inputs, less pesticides, less labor and less capital.

At the same time, population growth continues, adding 1 billion people to the Earth population every 12-13years. This implies an increasing demand for fresh healthy fruits and vegetables. This demand is particularly obvious in Asia, where most of the population growth is taking place and where land availability is scarce, due to land competition with cities or because the terrain is mountainous or desertic.

Right now, more than half of the population lives in cities and by 2030. 60% of the world population will live in cities 100,000 to 500,000 people. This means that fruit production centers are far apart from consumption centers. Therefore not only fresh produce production poses challenges, but also the packaging, distribution and preservation will become more crucial, since fruits and vegetables will be produced further from where they are consumed.

Addressing the needs for fresh produce of this large population, with more and more limited resources poses enormous challenges. These needs should set the priorities for the horticultural research agenda of the next 20 years.

Let us take the subject of water and land availability. Good agricultural land is scarce worldwide due to a series of factors: poor soil structure, poor drainage, salinity, soil diseases... limit the amount of fertile land available. Water is also a very limited resource especially in parts of the world where weather is good. Many tropical and subtropical production areas have problems with water availability or water salinity and in coastal areas there is salt water intrusion in the aquifers.

A key research priority is the development of substrates and substrate production systems to substitute soil use in areas where climate is good, but direct soil planting is not possible due to structure or salinity issues. Concurrently, the development of less energy-intensive, more environmentally-friendly technologies to desalinize sea or underground saline water are essential for the development of agriculture in the arid regions.

Even good soils run the risk of being degraded through erosion, salinization compaction and loss of organic matter. Soil conservation and fertility are key research areas especially in arid production zones.

Pesticides use is being limited worldwide by authorities and retail chains worldwide, based on the demands of the consumers. Research on biological control of pests and diseases will continue to be a key trend. The key point here are efficacy studies and replicability: unfortunately many products in the market do not provide consistent pest and disease control results.

At the same time some diseases cannot be controlled today even with synthetic chemical compounds, (e.g. *Fusarium oxysporum* ssp cubensis race 4 in banana) and many diseases have developed resistance to conventional fungicides (e.g. *Mycosphaerella fijiensis* in banana). There is insufficient research in these areas and this points out a key research (and business) opportunity for key commercial crops.

Postharvest handling of fresh produce is a key research need, due to the urban development of the population worldwide. Fresh produce losses at harvest and in the distribution chain reach often 30-40%. Key research areas include biological postharvest disease control, improved modified atmosphere packaging, ethylene absorbents and better ripening systems among others.

Finally the development of new varieties and rootstocks which provide better tolerance to disease, better fruit quality, better shelf life and less chill requirements is a key research target. This research target is also becoming a very lucrative business: most of the variety development today is run by private enterprises, since the public agriculture research institutes have seen their funds reduced significantly.

These research targets originate out of the key challenge to provide healthy, tasty fruit and vegetables to a growing population, with fewer natural resources. They are great scientific and business opportunities for those willing to invest and risk providing a growing consumer population with wholesome fresh produce.

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Conflict of interest

The author declares no conflict of interest.

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