ICTs are essential in horticultural crop based systems and their role will be increasingly important in the future.

ICTs promise to spur agricultural productivity and help fight hunger.

Smallholder and commercial farmers can both benefit from the use of ICTs in horticulture crop based systems.

A number of case studies are presented bringing forward the changes brought by ICTs in horticulture crop based systems.

"ICTs play a very important role in the sustainable intensification of crop production. However, the knowledge, application and use of ICTs in horticulture crop based system is limited and less understood..." - Dr Wilfried Baudoin (Italy)

This discussion summary outlines the contributions made during the online discussion on the role of ICTs for Sustainable Crop Production Intensification (SCPI) of horticulture crop-based systems held from 6 March to 4 April 2017 on the e-Agriculture platform. The discussions brought together experts from different backgrounds, who shared their vision regarding three pre-designed questions.

- From your understanding and experiences, what is the role of ICTs in sustainable intensification of horticulture crop based systems for both smallholder and commercial farmers?
- Do you have any concrete examples of successful use of ICTs in sustainable intensification of horticulture crop based systems?
- What are the specific constraints you have faced in the use of ICTs for SCPI of horticulture crop-based systems and do you have any recommendations to decision makers?
The conceptual tone of the discussion was aptly phrased in the forum foreword, which stated that information and communication technologies (ICTs) play a vital role in agricultural production. However, within the horticulture crop based systems the application and use of ICTs was limited and less understood. Many stakeholders within agricultural sector have highlighted the importance of ICTs in sustainably increasing agricultural productivity and facilitating access to agricultural information and services by marginalized groups (mainly women, girls and the youth) and poor communities.

The ability of ICTs to bring refreshed momentum to agriculture appears even more compelling in light of rising investments in agricultural research, the private sector’s strong interest in the development and spread of ICTs, and the upsurge of organizations committed to the agricultural development agenda; in the holistic achievement of UN Sustainable Development Goals.

The forum discussion on ICTs in Sustainable Crop Production Intensification (SCPI) of horticulture crop-based systems was an extension of the ongoing SCPI-hortcrop Dgroup discussion forum. It is from the Dgroup discussion where the potential of ICTs to sustainably intensify production in horticulture become more evident and was widely acknowledged by the participants. This necessitated a fully-fledged discussion on ICTs in Sustainable Crop Production Intensification horticulture crops.

As a way of probing and gathering in depth information and practical cases where ICT has been used in the intensification of horticulture, mainly on fruits, vegetables, roots and tubers. The cases received in the forum will be referenced in an envisaged online sourcebook aiming at presenting how we, “can produce more with less” in horticulture crop-based systems.

Hence, this forum sought to encourage and gather success stories in the application and use of ICTs in sustainable intensification of horticulture crop production systems, with a specific focus on vegetables, fruits, roots and tubers. These technologies include, but not limited to, mobile phone technology, geographic information systems, remote sensing, precision and other innovative smart farming technologies.

Participants in this discussion were challenged to share their motivations for adopting innovative ICT technologies in horticulture crop based systems; to bring to the fore their experiences, lessons learnt and challenges encountered. Shared experiences would be of value to both smallholder farmers and commercial farmers who intend to benefit from ICT innovations and technologies applied in horticulture based farming practices.

The following sections of this summary will report the user contribution to this discussion and will be structured along the three identified sub-discussion topics. The forum received a good number of contributions and these were of high quality and much in line with the discussion questions. It was a highly successful global dialogue with a very stimulating discussion.
The role of ICTs in sustainable intensification of horticulture crop

ICTs in general, Geographic Information Systems (GIS), remote sensing, precision farming have been adopted unreservedly in agriculture and they promise to spur agricultural productivity and consequently help fight against hunger. Evidence exist to show that ICTs have enabled easier access to markets and information resources, in managing farming inputs, in extension support services and building resilience of farmers to harsh weather conditions. The in-sector application of ICTs in agriculture, however, is still yet to be further exploited. It is this latter situation that the first discussion topic of this forum focused on—to understand the role of ICTs in sustainable intensification of horticulture crop based systems for both the smallholder and commercial farmers.

The majority of the participants concurred on the significant role of ICTs in the sustainable intensification of Horticulture crop-based systems basing on scientific and practical evidences. The participants provided several roles in which ICTs (tools, technologies and innovative practices) play in sustainable horticulture crop production. Participants regarded ICTs as enablers of information exchange, dissemination, facilitating and easing horticultural extension services provision, and disease and pest control.

Furthermore, ICTs allow easy access to market data and facilitating producer-consumer linkages, enhancing and simplifying information transfer across the various actors involved in the horticulture production chain. ICTs were seen as availing numerous ways of “producing more with less” in horticulture crop based systems, through (i) rationalizing time spent in the field, (ii) lowering the supply of inputs to precisely match the contextual needs of the plant, and (iii) increased traceability.

In response to the second question, more than 26 case studies where ICTs are in use for sustainably intensifying horticulture crop systems, where shared by the participants.

The discussions confirmed that horticulture, just like any other sector has also benefitted immensely from the ICT revolution and continues to benefit, from older technologies such as radio and television to advanced modern technologies, such as GPS navigation, satellite communication, and wireless connectivity, robots and many others. From the participant’s contributions in response to this topic, they stated some of the major interventions of ICTs in the sustainable intensification of horticulture crop systems for both the smallholder and commercial farmers.

These interventions mentioned included:

- facilitating exchange of data,
- information and knowledge,
- enhancing extension systems in horticulture,
- improving production (efficiency and efficacy-) from pre- to post production phases,
- facilitating risk management,
- facilitating access to markets, marketing and,
- certification and traceability of horticultural produce.
Thereafter, the discussion was dominated by contributions of actual case studies by the participants. On this page we have included a selection of a few cases.

A sample of cases shared during the discussion

**Sustainable intensification of strawberry production using computerized control system**

In West Bank and Gaza, farmers are achieving a threefold increase in strawberry yields with only 70 percent of the water use compared to traditional greenhouse production by growing hanging strawberries. The strawberries are grown in soilless media using a computerized system controlling the quantity and frequency of irrigation and application of fertilizers. By Azzam Saleh Ayasa (West Bank and Gaza)

**Hurudza Case Study: Paprika Growers’ Scheme**

Under the Paprika scheme, there is enhanced value chain linkages, inputs services and asset acquisition to paprika growing farmers. The case details aGrnomiX system and also includes the agricultural Reference Bureau and Value Chain linkages Management System. By Alan Goodrich (Zimbabwe)

**Geodata to control potato late blight in Bangladesh (GEOPOTATO)**

GEOPOTATO developed to implement a decision support service (DSS) in Bangladesh for an optimal control strategy of late blight in potato. The DSS is envisaged to provide over 750,000 smallholder farmers with agricultural advice services. By Hasib Ahsan (Bangladesh)

For a complete overview of all the cases visit: [http://www.e-agriculture.org/forums/discussions/role-icts-sustainable-crop-production-intensification-scpi-horticulture-crop](http://www.e-agriculture.org/forums/discussions/role-icts-sustainable-crop-production-intensification-scpi-horticulture-crop)

Constraints and challenges

Regarding the challenges and problems associated with ICTs, many participants pointed out that, ICTs were not a golden panacea to dozen of production and productivity related problems encountered by horticultural farmers worldwide. The issue of costs, accessibility, and infrastructure especially among the most vulnerable and marginalized groups in the developing world stills needs a lot of attention from policy makers and requires localized collective actions.

Constraints that were brought forward in the discussion

- Lack of proper infrastructure in general: access to electricity and access to internet connection or mobile networks. It remains important to take these overall challenge in mind and think of offline solutions where needed.
- High cost of ICT equipment, access to internet and electricity
- Lack of capacity development of farmers in the use of the ICT tools and applications
- Lack of trust from farmers regarding the adoption of ICT solutions: Farmers tend to see these technologies as something too advanced and complicated for them, and understandably, they do not place very much trust in impersonal digital system. Systems need to be put in place to facilitate trust through trusted extension workers or the youth of the farming villages.
- Lack of “tailored” ICT tools and applications: It is important that the ICT tools and applications are adapted to the local context in order to facilitate their adoption.
- Lack of awareness of the benefits of using ICTs and lack of information on how to use them
- Illiteracy among farmers – as well alphabetization as digital literacy
• Ensure proper infrastructure in rural areas and promote the use of renewable sources of energy such as solar power.
• Coordinate efforts to increase availability and openness of data and information and making it interoperable.
• Increase the involvement of National and Local Governments in the implementation of projects and programmes but also in the improvement of regulation, infrastructure and information sharing among the farmers.
• The interests of farmers should come first in the development of platforms.
• Work with ambassadors or champions that are farmers to promote the tools among other farmers to increase uptake.

The online forum on Information and communication technologies (ICTs) in Sustainable Crop Production Intensification (SCPI) of horticulture crop based systems was well received by the participants as evidenced by the quality and quantity of contributions submitted.

It was widely acknowledged that, to sustainably increase horticulture crop production there is a need of embracing ICT, as it offers and promises a multitude of advantages for producing more with less as highlighted above.

However, to end hunger, achieve food security and improved nutrition and promote sustainable agriculture, there is need of a holistic approach towards increased horticulture crop production and productivity. ICT, is just a part of the bigger puzzle, there is need to incorporate ICTs into the already existing integrated and innovative, save and grow practices for SCPI, which includes conservation agriculture, good agricultural practices, organic agriculture and integrated crop management.

Recommendations and conclusions

Based on the challenges faced during the different experiences of using ICTs in horticulture, participants brought forward some recommendations for decision makers. It is clear that in order to improve the enabling environment and to increase the appropriate implementation and use of ICTs at the farmer level, a stronger involvement of Government can play a key role. Embrace business and business development.

The following recommendations were advanced:

• Incentivizing the adoption of ICTs at the farm level through grants, facilitated access to credit and tax incentives.
• Sponsor capacity building programs for both farmers and rural advisory service providers: More awareness and training programmes should be organized by agricultural state departments and research institutions to increase confidence, competence and skills to use the ICTs for agricultural development.

“ICTs increase the productivity of the farmer by rationalizing the time spent for his farming and business activities. For example, operational tasks can be evaluated remotely…”

Harris Moysiadis (Greece)
Resources

The full overview of the e-Agriculture forum is available here:

www.e-agriculture.org/forums/forum-archive

Subject matter experts

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- Dr Azzam Saleh Ayasa - Head of Programme Food and Agriculture Organization of the United Nations (FAO)
- Dr Simone Sala - ICT-4- Agriculture and Environment Expert – Food and Agriculture Organization of the United Nations (FAO).

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