

# Morocco's horticulture needs to be more productive and more sustainable

Horticulture in Morocco must become more productive and more sustainable. Researches at the University of Wageningen have, therefore, designed a greenhouse prototype. They also want to develop a research and developmental programme with regional partners. Plant and economics researchers at Wageningen are working in collaboration on this project. "Tomato production in Agadir can easily be doubled. The focus is on small steps, since a cheaper strategy works best for most producers."

Cecilia Stanghellini of Wageningen Plant Research says: "In Morocco, tomato production can be improved in terms of quality and quantity. Quality is important in order to export to Europe. Due to the increasing drought, it is also essential to decrease the amount of water used." Morocco wants to further develop its sizable agricultural sector in order to increase the income generated by agricultural businesses in the rural areas. They also want to prepare themselves for future challenges in the areas of food security and climate change.

Besides producing other fruit and vegetables, the country produces more than 1.25 million tons of tomatoes. Almost one third is exported internationally, with the remainder going to the local market. The most important tomato growing region in Morocco is Agadir. "There are several large tomato growers in Agadir who export their produce to Europe. There are also many small and middle-sized producers who mainly supply the local market", says Marc Ruijs of Wageningen Economic Research.

## Centre of Excellence

Stanghellini and Ruijs recently designed the demonstration and research greenhouse. They have also started working on the research and development programme. The plan, which will lay the foundation for a Centre of Excellence in Horticulture in Agadir, was developed in conjunction with the Complex Horticole d'Agadir (CHA). The association of fruit and vegetable producers in Morocco (APEFEL) were also involved, as well as the Dutch Embassy's Agricultural Advisor. The study is being financed by the Ministry of Foreign Affairs via the Netherlands Enterprise Agency. "The Netherlands is at the forefront of horticulture and greenhouses. Dutch companies are exporting knowledge and technology", says horticultural economist, Ruijs.

## Climate control

"Tomato production in Agadir can easily be doubled from between 15 and 20 kg to 40 kg per square meter", says Stanghellini, who is a specialist in the field of greenhouse techniques and the reduction of energy and water usage. In one demonstration, growers can see the difference in the current cultivation techniques and the effect of innovations and techniques that increase productivity and sustainability. "It is not a large investment, but it can lead to a better, more sustainable product," adds Ruijs.

Better climate control produces larger, higher quality crops. The Agadir region has an arid climate, with warm days and cold nights. "The current greenhouses do not have controlled vents in the, almost, flat roofs. They are subject to great fluctuations in temperatures", explains Stanghellini. "A better designed greenhouse with ventilation control will solve this problem. The use of aluminium energy screens, placed above the crops, under the plastic sheets at night will help keep the heat inside."

## Closed irrigation system

As a result of climate change, there is less rainfall than in the past in the already dry region and the dry periods last longer. In addition, there is bad irrigation control. Pumping water from underground causes the ground water level to drop a few metres every year. "The growers must switch to closed irrigation systems to allow for the reuse of recycled water", Stanghellini continues. "For this, they will have to grow their crops on the substrate and not in the soil." One of the first tests done in the demo greenhouse was to measure water and nutrient use with open and closed irrigation systems. "We had done this earlier in Italy and the growers could see for themselves how much they could save on fertilisers with a closed system. The fact that growers realise they will have a return on their investment within a few years, acts as an incentive."

## Future growers and researchers

Not only technicians need to be trained to a higher level, but also growers, researchers, trainers and university lecturers. Wageningen has become involved in an educational set-up whereby the new greenhouse facilities will be used to train people on different levels. "Together with CHA colleagues at the Institut Agronomique et Vétérinaire Hassan II, where future engineers are trained, we have identified four priorities, namely, climate control, water and fertilizer control, crop protection and crop

control", says Ruijs. Possible later additions are chain analysis and the prevention of post-harvest losses.

The building of the demonstration and research greenhouse is now being offered to interested Dutch companies. Experts from Wageningen and CHA personnel are also busy developing a new two-year training course for more advanced greenhouse personnel. The current project will be completed in July 2018. Before that, the involved parties will be looking for financing for further activities.

### Successful horticultural projects

The Agadir project shows how supplementary expertise in different research disciplines at Wageningen are integrated into successful horticultural projects around the world. Wageningen Plant Research have contributed to the creation of several knowledge centres, for example, Mexico, Chili, the Middle East, Saudi Arabia en Dubai. "We are also working on optimising greenhouse systems in Indonesia, Turkey, China, Argentina en Australia. We do a lot of these kinds of projects, sometimes with other departments, such as Wageningen Economic Research and Wageningen Environmental Research", added Stanghellini.

Ruijs and his colleagues at Wageningen Economic Research study local, regional and worldwide markets, analyse delivery chains and study the socio-economic impact on, for example, the local job market. "It is not just about technology and productivity. Quality is also important. We, therefore, look at possibilities for high quality products and different market sectors. In Agadir, higher prices can be asked for certain varieties of tomatoes. Restaurants and hotels are prepared to pay more."

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