Food and Agriculture Organization of the United Nations

PRECISION AGRICULTURE IN SEEDLING PRODUCTION IN ALBANIA

GOOD PRACTICE
SERIES

DIGITAL AGRICULTURE

INTRODUCTION

Like many other farmers in Gorican, Berat district – a rural part of central Albania where the landscape is dominated by greenhouses – Dritan Sula has for years cultivated vegetable seedlings. But unlike others engaged in this activity, Sula soon became convinced that automation was the way forward. After launching his small-scale agribusiness in 1994, for the first nine years the farmer had just 2 000 m2 of greenhouse-covered land, using traditional technology to produce seedlings for a number of vegetable species. Here, most of the regular processes were done by hand. The internal temperature of the greenhouse was checked by thermometer and regulated manually, using a central heating system based on diesel, with staff simply opening windows to increase ventilation. Watering and pesticide application was also done by hand.

In 2003, after increasing the surface of the greenhouse to 3 000 m2, Sula decided to use the extra space as a demonstration plot/showroom, where visiting farmers could inspect different varieties of vegetable seedlings that he was now cultivating, and observe their performance. The temperature and humidity were now controlled by sensors, and automatically adjusted to the required level. Due to the highly intensive nature of the work, the farm employed a large number of staff at a high cost in terms of labour. In parallel, the owner noticed a decline in the quality of seedlings being produced, mainly due to lack of uniformity as a result of imprecise manual work, especially during irrigation, spraying and feeding of the plants.

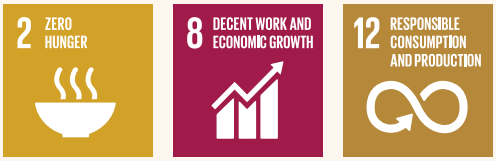
After much research and investigation, in 2016 Sula made further investments to introduce precision agriculture, setting up automated and remote control for spraying and irrigation operations.

Introducing these innovative technologies, the owner had two objectives:

- to reduce manpower and improve the quality of products
- to increase production and quality of seedlings, and efficiency of production

The move towards automation led to a substantial reduction in the workforce, from 28 in 2003 to a current figure of 7, bringing about savings in wages.

Sustainable Development Goals



Objective

The focus of this good practice fact sheet is the experience of a farmer from Albania who has introduced new technologies for the production of vegetable seedlings grown in greenhouses. The document traces the farmer's journey, from his efforts to research precision agriculture technologies to their practical application on his farm. It also explores the impact of this innovation on his output and revenue, while describing how some other farmers in Albania have begun to replicate the practice.

Stakeholders and partners

- *Dritan Sula, Albanian nursery owner*
- *Other Albanian farmers replicating his precision agriculture model*
- *Suppliers of technology*

Most of the remaining staff are women, whose working conditions have been improved by the new technology. Their duties are now less onerous and their contact with chemicals, fertilizers and pesticides is largely reduced.

The nursery and demonstration greenhouse and the equipment installed in it have been designed to resist earthquakes – a significant risk in Albania – since the entire structure is metallic. A new and innovative feature of the digital control system enables the greenhouse windows to be closed automatically when the speed of the wind passes a certain threshold during storms.

METHODOLOGICAL APPROACH

In the absence of any suitable precision agriculture technology available in his own country, Sula embarked on study tours sponsored by the Albanian Ministry of Agriculture and Rural Development to Bulgaria, Hungary, the Netherlands and Serbia.

He also undertook his own market research and visited several agricultural fairs in Hungary, Italy and the Netherlands, before deciding on which technology to invest in. He personally visited a company in Thessaloniki, Greece from which he purchased the temperature and humidity control system. This is powered by central heating, with hot water passing through plastic pipes on the ground throughout the greenhouse.

During the following years the farmer made several improvements. Then in 2016 he introduced other automatization equipment, including a machine for sowing seeds and an automated spraying system – which can deliver water, as well as a mix of feeding solutions or pesticides – that may be programmed to spray at certain times and/or in a precise part of the greenhouse, or remotely controlled as required. This equipment was purchased from an Italian company.

VALIDATION

Validation has been conferred by the market – in terms of increased sales due to improved quality – and by other farmers who have introduced precision agriculture technology after witnessing the successful results achieved by Sula.

IMPACT

The introduction of these innovations has improved the quality and homogeneity of the seedlings grown by Sula. This has increased demand for them by farmers, both in the area and from further afield. At the beginning, the nursery attracted 100–130 customers per year, but that figures has since risen to more than 230. As a result, the nursery has increased both its output and its revenue.

In order to capitalize on the increased efficiency and productivity achieved due to the new technologies, the farmer is looking to buy more land and nearly double his output from 3 million to 5 million seedlings.

The agribusiness has reduced its labour force. The remaining staff (mainly women) have improved their working conditions, including safety. Workers who left the company have become involved in developing vegetable production on their own farms, based on seedlings produced by Sula's nursery.

Pollution from pesticide use has been reduced. Spraying is now done using the precise amount of pesticide required, in contrast with normal practice in small-scale seedling production, when farmers tend to overestimate the volume of pesticide needed. Under the new system, the seedlings are produced on shelves or on the paved floor, so there is no leakage of water or pesticides after plants have been treated.

Geographical coverage

This practice was first introduced in Berat district, central Albania and has since been replicated in several other rural areas of the country. It is also suitable for other parts of the region that are in a similar stage of agricultural development.

Source: Author's elaboration, conforms to Map No. 3769 Rev. 8 August 2020*

Results

Through implementation of precision agriculture, the owner was able to build a nursery with a controlled environment (temperature, humidity, spraying, watering, wind control, integrated pest control for plants) for the production of vegetable seedlings. He has also built a demonstration greenhouse, with a controlled environment, where he demonstrates the performances of the different varieties that he produces and distributes.
The new technology proved easy to operate, and nursery workers as well as the owner and his son soon learned how to set the temperature, humidity level and the system to open windows automatically.

SUCCESS FACTORS

- The farmer had a clear vision of what he wanted to achieve: increased production and quality of seedlings.
- He invested his own funds from his business and he had his own land, so no institutional support was needed.
- He researched the new technologies carefully by travelling to various suppliers in Europe before making his selection and investment decision.
- The new technologies and results were readily accepted by surrounding farmers, as Sula was the only seedling provider in his area
- The farmer implemented the technology on a step-by-step basis, introducing and refining changes gradually.

CONSTRAINTS

When Sula first embarked on his drive to introduce new technology, he encountered difficulties in sourcing information about the options. No other farmer was using precision agriculture at that time in Albania, nor were any companies supplying the technology in the country. Information on the internet was insufficient, so the only way to obtain the knowledge he required was to attend international fairs abroad.

Nursery farmer reaps return on investment

Since Sula introduced automatization at his nursery, seedling production has increased exponentially – from 400 000 seedlings in 2003 to 1 400 000 seedlings in 2014. The target is to produce 4 million seedlings in 2020. The total investment over a period of almost 20 years has been EUR 854 000 (USD 1 million), financed by loans from banks. With a consistent increase in output and revenue, the farmer has been able to pay back the loans, and is continuing to invest in improved technology.

LESSONS LEARNED

For producers with limited land surface, the only way to increase income generation is to intensify production as much as possible.

Programming and remote control are the two most important features of the innovations introduced, and are largely responsible for the successful business outcome.

SUSTAINABILITY

The technology leads to high and uniform quality of seedlings, which is an important consideration for buyers, who as a result make repeat purchases and become regular clients. For new customers, the demonstration plot gives them a clearer idea of what they are buying.

As regards environmental sustainability, the automated precision spraying leads to less pollution from pesticides, with no leakage due to the fact that the seedlings are cultivated on a paved floor.

A percentage of the increased profits is being reinvested in further innovation, so the agribusiness is likely to develop further. Sula recently renovated the fuel burning room of the furnace, to enable him to use more efficient and green fuel, such as methane gas. He has invested in building two tanks, one for cleaning water used for irrigation and the other for collecting rainwater and using it for the greenhouse boiler/furnace.

REPLICABILITY AND/OR UPSCALING

The number of seedlings produced every year in Albania is approximately 70 million, of which Sula currently produces about 2 million. Even if he were to increase his production several times over, there would still be space in the market for other nursery owners wanting to move into precision agriculture.

A number of farmers from other areas of Albania have visited Sula's farm, and he has been open about discussing his innovations and the benefits. Some of these farmers have since implemented similar technology.

This good practice has now been promoted by Albania's public and private sector extension services.

CONCLUSION

There are several beneficiaries of this practice. The owner of the nursery has improved the quality of his products, enhanced the efficiency of his agribusiness, and increased his income as a result. Workers (mainly female) have improved their working conditions, including safety. Importantly, other nursery farmers have been given access to information about precision agriculture, without the difficulties that Sula himself encountered when he first started automating his business, and some of them have now adopted the new technology.

Having a clear vision and carefully researching the technology and its potential benefits before investing proved critical to the successful outcome of this experience, as did a phased introduction of innovations, once each one had proved its value.

A more enabling environment would encourage further adoption of precision agriculture, particularly in the area of access to reliable and up-to-date information about new practices and technology suppliers, as well as support through grants.

Experience capitalization is a systematic, iterative and participatory process through which an experience is analysed and documented. This creates knowledge, which can be shared and used to generate change.

FAO and the Global Forum for Rural Advisory Services (GFRAS) organized an online course on experience capitalization in 2020. The hands-on series of mentoring webinars helped learners to work on their case studies.

What are you going to capitalize upon? Who for? What for? What happened? How and why? What have you learned?

This case was capitalized by Petrit Dobi, working for the Rural Association Support Programme, and based on Dritan Sula's experience with precision agriculture technologies.

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EXPERIENCE CAPITALIZATION

e-learning course on experience capitalization
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Massive Open Online Course on experience capitalization
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FAO Good practice template
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