

Mission report on training 2 in Armenia

Dates: 26 April – 1 May 2015

Trainer: Ineke van Meggelen (text and pictures)

Persons met and participating in (part of) the training:

Sahak Nazaryan, Hakob Poghosyan, Ara Bitar, Karen Harutyunyan, Anna Karapetyan, Gayane Martirosyan and different growers and students (names to be found in presence list of seminar d.d. 30 April 2015)

A list of people met during the mission can be found in annex 3.

The majority of the days was spent with Sahak Nazaryan, Hakob Poghosyan and Ara Bitar for training, and Karen Harutyunyan and Anna Karapetyan as management staff. The itinerary (annex 2) provides detailed info of the program executed.

Reporting according to ToR:

1. During the four days training there will be two seminars for growers, organized by CARD and executed by Sahak Nazaryan and Hakob Poghosyan with possible help of Ara Bitar. The trainer will give feedback on execution of the program and transfer of knowledge.

Topics chosen to prepare are:

- Fertilizer & irrigation
- Climate control

On Thursday 30 April a seminar was organized by the three young consultants Sahak Nazaryan, Hakob Poghosyan and Ara Bitar based on PowerPoints provided by GreenQ and translated in Armenian language and to local circumstances. The seminar was attended by 7 growers and 7 students from the Agrarian University. List of participants is separately provided.

Chosen topics based on present importance are “Fertigation and irrigation” and “Pest, diseases and crop protection”. These were translated in Armenian language. A presentation on Hygiene was added in English language (of GreenQ) for this appeared to be the most actual problem at the time. The three consultants performed very well, each in their own way. Apart from lectures also movies were shown on biologic control of pests. The presentation on Hygiene contained many pictures and was apart from useful also fun.

Before and after the seminar a test was taken by the participants, a way in which could be determined whether attendees gained knowledge (see annex 5). Apart from this an evaluation was done. The results were very positive (see annex 4).



Figure 1 audience during seminar 30 April



Figure 2 Tests were taken before and after the seminar



Figure 3 Youtube animations were used to explain the working of biological control of pests



Figure 4 Interactive approach

2. Also some technical training by the trainer will take place on Hygiene and the Mollier diagram. Hygiene is an important topic and will prevent many of the problems with spreading of diseases occurring now. Mollier diagram will provide better understanding of the greenhouse climate.

The training is taken by Gayane Martirosyan, Sahak Nazaryan, Hakob Poghosyan and Ara Bitar. Hygiene is discussed as basic information, but should lead to improved awareness and for consultants to be able to discuss with growers. This is especially needed since many problems with contaminations occur in Armenia and improvement is probably simple by using hygienic measures.

The workshop Mollier diagram contained several assignments in order to understand what the diagram is and how it can be used. Assignments 1 and 2 (including sub questions) have been discussed thoroughly, the rest is homework and will be discussed later this week.



Figure 5 workshop Mollier diagram with exercises to practice its use



Figure 6 discussion at Darakert FSC about problems seen in greenhouses




3. In the final week also the training packages (for seminars) within this project have to be finalized. It is decided that the language to use is Armenian language.

Chosen topics are:

- Fertilizer & irrigation
- Climate control
- Plant = factory
- Pest control

The PowerPoints have been translated in Armenian language and adapted to local circumstances. They are available upon request. Examples of slides can be found on this page.

**Հասուն բույսերի
ջրման ստրատեգիա**




Լուսավորության զուտարժեք՝ 1000 ջրուլ/սմ² → 3.0 լ/մ² ջրել
→ 2 լիտր բույս+1 լիտր դրենաժ (33%)

Այլ կերպ ասած՝
Պոմիդոր և Վարունգ - 3 մլ/մ² / ջրուլ/սմ²
Պղպեղ - 2.5 մլ/մ² / ջրուլ/սմ²

Օրինակ՝ 2400 ջրուլ/սմ² x 3 → 7200 մլ/մ² ռոտզում

Figure 7 slide from PowerPoint 'Calculation of nutrients'

Common pests







 ԼՎԻՃ	 ՏՐԻՊՍ	 Ոստայնատիզ
 ՑԵՑ	 Ականող ճանճ	 Սպիտակաթևիկ

Figure 8 slide from PowerPoint 'Pest Control'

4. Mid-April Sahak Nazaryan and/or Hakob Poghosyan will visit growers to find a case suitable for individual consultancy, e.g. a problem with a disease. During the mission the grower will be visited and the problem discussed and solutions found.

- Visited on Monday 27 April: Biogroup, Dzoraghbyur community

Problems with diseases and uneven lowering of A and B container. As it turns out the B-container lacks 31 litres of HNO_3 , thus the EC is much lower (1,45) than the A-container (+2,20)



Figure 10 BER



Figure 9 fruit cracking

- Visited Tuesday 28 April: KaGa, Dzoraghbyur community

Discussion with Arthur on tomato plants that suddenly die after about six months cultivation. According to grower and consultant seed quality is the problem, but since no problems occurred until now this is unlikely. Based on information given advice is asked by distance support of GreenQ staff member Wim van den Eenden. E-mail from trainer to Wim:

"In the greenhouse of 2 ha and another one of 1 hectare the variety Machitos of Rijk Zwaan is planted more than 6 months ago. Rockwool is used (Cultilene Optimax xx cross fibre), irrigation seems to be fine as well as fertilization. After about six months with normal production some plants suddenly die, after which more plants in the same row start wilting and die. The laboratory can't find any diseases in the plant, during the visit however lots of mildew and white fly can be observed. EC of the slab is 4,85, pH 6,2 according to the grower. Temperature in the afternoon was 21 degrees at a RH of 37 – 42 %.

A check of the roots shows little amount of roots, mostly not a very white colour and they are easy to break. Irrigation strategy is start 2 hrs after sun up, stop 3 hours before sunset. Total irrigation is 2 litres per plant, with 15 to 20% drain.



I attached some pictures of the wilting plant, the roots of the same plant, and how it looks in the row with the left side completely dead."



Visited Tuesday 28 April: Mavas group, Dzoraghbyur community

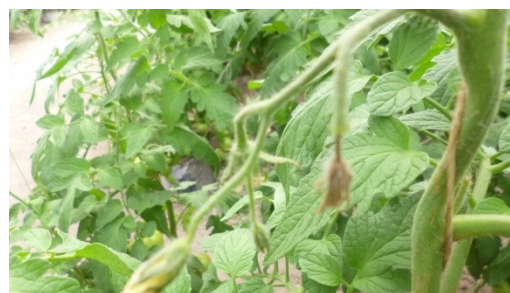
At the Mavas Group many problems with white fly and mildew appear. This is due to several days that there were no workers for crop maintenance some weeks ago. At present they are spraying four chemicals combined every two days, and that seems to help a little. Due to mildew leaves are cut back to eight leaves per plant, while about six clusters are there.



Figure 12 50% leaves cut due to mildew

- Visited Wednesday 29 April: Musaler greenhouse, Ararat region

This grower has one hectare of tomato cultivation in soil in a plastic house. The crop has a good colour, is vegetative but shows problems at some places with brown spots. The spots start at leaves or fruits and seem to move towards the stem. Fruit abortion of mature fruits happens as well, fruits are not colouring in time (after 4 months). Advice is given to work on hygiene, and samples are taken to have a brief examination of either suspected appearance of bacteria or fungus.



Conclusions discussion with director of CARD, team and PUM at 27 April:

- Gagik Sardaryan is content with the project so far and looking forward to continued collaboration with GreenQ in a next project and MoU. For the next project a proposal of 75 K€ is sent to Nuffic for a grant, outcome is expected early June.
- For the Memorandum of Understanding (MoU) the idea is, as put by Mr. Gagik Sardaryan: *“The main idea was that GreenQ has offices in many big markets. Armenia is small market for GreenQ but there is big potential for investments in coming years. GreenQ may not be interested opening its office in Armenia but instead there might be possibility to work through CARD. This was the main idea of behind MoU. And an MoU would be also one of the nice outcome of our joint project.”*
- Again is emphasised that exposure of the three young consultants to the work field for a longer time would be greatly appreciated. In the Nuffic format this does not fit very well, as a minimum number of seven staff is required to be trained. Both sides will try to find a suitable solution for this.
- At present a big investor (Franck Muller, Armenian living in Switzerland) is interested in obtaining a position in Armenian horticulture. At present he thinks of 10 ha, but knowing the philanthropic nature of the investor Gagik Sardaryan explained about a setting like Agriport A7 where infrastructure, greenhouses and all necessary supplies and logistics are offered. Gagik will visit Agriport A7 with the investor, also visiting GreenQ during this trip. Added by the trainer of GreenQ is the example of the lease construction in Ethiopia by Sher, which includes also schools, hospital etcetera having a major impact at the welfare of the local society.
- Luit Kelfkens of PUM explains the progress CARD has made over the last four years. CARD is grateful to PUM for having them in contact with so many valuable companies in the Netherlands. Luit on the other hand has seen great professionalization of the organisation and the foundation of farmer service centres. At present the concept of FSC is likely to be rolled out over Turkey as well through a USAID funding. CARD and PUM have an MoU which is renewed every year and specific topics for that year are indicated. For the next MoU, to be signed 27 April, the concept of the Dutch Topigs is one of the topics to be explored.
- The university of Yerevan wants to start a Horticulture faculty and is looking for development of curriculum for this. A discussion of the trainer of GreenQ with the chair of the faculty will take place on 28 April.

Meeting with Dr. Andreas Melikyan, Head of Chair of Crop production and Vegetable breeding of State Agrarian University of Armenia at 28 April 2015

Now that protected horticulture in Armenia is growing, and export chances are good (especially to Russia and Dubai) the government ordered the university to start a curriculum in greenhouse horticulture. The chair Crop production and Vegetable breeding at present contains the five specialisations Agronomy, Selection and genetics, Crop protection, Ecology and Forestry. Protected horticulture will be the new addition.

The curriculum is five years (280 credits for 4,8 years) and each academic year consists of two semesters of 17 weeks each.

The program for horticulture starts with two years of basic knowledge (e.g. languages, agro chemistry, engineering etc.), and as of year 3 specialisation for protected horticulture will start.

During the study students will be exposed to the work field like:

First year: each semester 1 week

Second year: first semester 1 week, second semester 2 weeks, etc

At present the university is looking for cooperation to develop the curriculum. Although the specialisation (year 3) only starts in 2017, the curriculum outline as to be approved by the ministry before the start of the first year in September 2015.

Based on this information (also website www.anau.am) and experience of the trainer we will check whether DLV GreenQ can be involved in the development of the curriculum, together with HAS University of Applied Sciences and/or Wageningen UR. Discussed is that the future graduates are mainly focussed on farm management and consultancy, which makes HAS the more suitable partner in this, but the scientific part cannot be forgotten. Role for DLV GreenQ would be to train the lecturers in modern greenhouse horticulture, using latest technology. Also students can have practical trainings at the Improvement Centre and/or internships.

The possibilities are discussed upon return of the trainer in Bleiswijk.

Overall conclusions and recommendations:

- Good progress is visible in capacity building of CARD in modern greenhouse cultivation. The consultants are eager to learn and understand offered information at a quick pace. The level of English is good, a special remark can be made that both Hakob and Ara made a big progress in the seven weeks between visit 1 and 2. The consultants can be confident that they have the basic knowledge to provide solutions to problems at growers.
- Despite the good progress, further improvement of knowledge is advised for the consultants and CARD as organisation for the part of protected horticulture. That is why a second project (phase 2) is applied for. Main topics identified to be dealt with in that phase are young plant production, improve skills on using climate computer (Priva) and preparing nutrient solutions (practical workshop in greenhouse)
- The plastic houses at Darakert FSC are used as demonstration and trial greenhouses. They are well taken care of, as far as time allows the consultants to do so. Input of labour may be advised in order to have the crop properly cared for and no redundant extra influences brought in the trails.

Materials delivered during project:

PowerPoints of GreenQ:

- Plant = factory
- Intro Greenhouse Climate
- Pests Predators beneficial and more
- Substrates, roots, nutrients, EC, irrigation for fruit vegetables

Books:

- G. Timmerman et al; Computerised Environmental Control in Greenhouses; 2014. ISBN 978-9075627060 (two copies, first mission)
- G. Welbaum; Vegetable production and practices; 2015. ISBN: 978-1780645346 (one copy)
- R. Wills; Postharvest; 2007. ISBN 978-1845932275 (one copy)
- E. Heuvelink et al; In Greenhouses; 2015. ISBN 978-9082332506 (two copies, to be send soon)
- Various Agrodoc booklets with simple horticulture advices.

Other material:

- Three mini-greenhouses (arriving around 1 May)
- Grafting clips