Feasibility study on establishing a Horticultural Knowledge Center in Uzbekistan

Results and actions for next stage

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Introduction

- Objectives:
  - Concept of Horticultural Knowledge Center (outline)
  - Estimation of necessary investments
  - Identify next steps on the way to a feasible center

- Starting points
  - World Horti Center Westland: model for Uzbekistan?
  - From inspiration to proposal

Results

Concept of HKC (Horticultural Knowledge Center)

DEMO/show + OFFICES	PRODUCTION FACILITY
Tashkent City	In 5-10 km
Demo/Garden center	Greenhouse plastic 1 ha
0.5 ha	Greenhouse Venlo 1 ha

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Production and demo facility (1)

Why production facility?

- Open for training. No commercial greenhouses are open to trainings (avoiding risk factor)
- Large greenhouse compartments are required (to train practical skills). Trainings in demo / research compartments is limited.
- Focused on revenues.

Why production facility of 2 types?

- Plastic: more familiar in Uzbekistan (98% are plastic covered greenhouses; 95% are grown in soil). To make switch from soil to substrate and from plastic to glasshouse
- Venlo Glass Greenhouse: to meet future demand and trend towards high-tech globally. Proof of concept. Energy-saving solutions are possible.
- Possibility to compare plastic and glasshouse.

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Production and demo facility (2)

Why Demo/Garden facility in the city?

- Open to general public. Easy access by public transport.
- Multiple functionality like flower shop, shop of own produce, laboratory for nutrient analysis.
- Meeting place.
- Show case.

Assessment of investments – approach (1)

Tashkent region PRODUCTION facility 2 ha

- Commercial greenhouse production open to trainings (2 ha)
  - Production and sale of produce
  - Work is done by permanent staff
  - Work is done by students / trainees (lower yields allowed)

PLASTIC OR AND GLASS

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Assessment of investments – approach (2)

Tashkent Demo/Garden center 0.5 ha

- 1/6 of area of the Worl Horti Center in Naaldwijk
- 4 x 200 m2 compartments for research projects (e.g.cucumber, tomato, sweet peppers, indoor greens)
- Shop area selling own produce (vegetables)
- Meeting place for investors & Consultations
- Project office "Horticultural projects"
- Classroom (with computers)

- Journal office "Horticulture and Greenhouses of Uzbekistan" and web-site team
- Potential hosting for head quarters "Greenhouse Association of Uzbekistan"
- Office Agro-portal (and App)
- Laboratory for sampling the irrigation water, nutrient analysis
- Events area

Assumptions for Production facility

	Plastic multitunnel		*Glasshouse (Venlo)*
greenhouse type	multitunnel		Venlo type
	1.0 ha		1.0 ha
insect nets	no insect nets		yes
screen: energy	no screen		yes
CO2 application	no CO2		yes
fogging system	no fogging		yes
recirculation drainwater	no water circulation		yes
heating: gasboiler	yes		yes
cocospeat slabs in gutter	yes		yes
drip irrigation and fertigation	yes		yes
rainwater bassin	yes		yes
crop protection techniques	yes		yes
railpipes	yes		yes
sorting and packaging	on location		on location
purification of drainwater	no		no
heat storage	no		no
lighting	no		no
ventilation	butterfly		continues ridge

Experiences World Horti Center Westland

- Development process:
  - Development period from idea to realization: 7 years
  - Construction period: 10 months
  - Development costs EUR [redacted] mio (> EUR 25 mio)
- Total investment of WHC is roughly EUR [redacted] mio:
  - School: EUR [redacted] mio (43%) (financed by state (cheap))
  - Permanent trade fair: EUR [redacted] mio (29%) (financed by bank, bond financing and intrest fee loan from municipality for 5 years)
  - Research Facility: EUR [redacted] mio (29%) (financed by equity + bank)
- The concept requires a very intensive management and will only result in a (small) operational profit by 100% occupancy

Investments – comparison of options

	units	low-tech greenhouse	mid-tech greenhouse	high-tech greenhouse, no lighting	High Tech Research
Investment	euro / m2	5-10	30-50	80-100	1000
Operational costs	euro / m2	2-5	10-25*	12-45	200
Electricity use	kWh / m2 / year			5-10	50
Yield tomato fresh (beef, tross)	kg / m2 / year	10-20	25-40	60-75	90

Remarks

- Yield increases as technology level increases
- Investments and related costs for high-tech production are clearly higher than for mid-tech and low-tech, but will also lead to higher revenues and probably to higher net financial results
- Adapted (higher) knowledge level is a condition for realizing in the possibilities of high-tech production and largely determines profitability
- The potential of innovative cover materials (to achieve a higher light transmission and/or energy savings) largely depends on the difference between extra revenues and extra costs and therefore determines the investment capacity

Training on practical skills for greenhouse cultivation

- Workers/labour
    - Compartments of at least 2000 m2 to offer trainings
    - Twisting, Pruning, clipping, lowering, deleafing, harvesting
- Agronomic management (needs to be able to link the skills in one person):
    - Crop protection
    - Greenhouse climate control
    - Fertigation
    - Crop planning and management
    - Post-harvest
- Glasshouse Business Development (e.g. Investment Tool Software)
- Research trials

Investment scenarios
Dimension of demo and glasshouse facility

Scenario 1: Payback
Plastic 1 ha : 7-8 years
Venlo 1 ha: 6-7 years
Demo: not profitable

Scenario 2: Payback
Plastic 1 ha : 7-8 years
Venlo 4 ha: 5 years
Demo: not profitable

	Estimated investment	Estimated investment alternative (more expensive Demo)
0.5 ha Demo Tashkent City	€ 3,686,000	€ 6,286,000
1 ha plastic tomato crop hydroponics	€ 586,800	€ 586,800
1 ha greenhouse Venlo tomato	€ 1,613,450	€ 1,613,450
Research & Development (incl. training, agronomic supervision)	€ 2,000,000	€ 2,000,000
Total	**€ 7,886,250**	**€ 10,486,250**
0.5 ha Demo Tashkent City	€ 3,686,000	€ 6,286,000
1 ha plastic tomato crop hydroponics	€ 586,800	€ 586,800
4 ha greenhouse Venlo tomato	€ 5,069,400	€ 5,069,400
Research & Development (incl. training, agronomic supervision)	€ 2,000,000	€ 2,000,000
Total	**€ 11,342,200**	**€ 13,942,200**

Demo component : is the most unknown and requires more research

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Alternative for plastic greenhouse (Uzbek example)

3 different compartments in Plastic greenhouse to account for local conditions:

- 3000 m2 GROWING IN SOIL NO heating, august – mid December, harvesting 6 weeks (6 kg / m2)
- 3000 m2 GROWING IN SOIL WITH heating, august – mid December, harvesting 10 weeks (10 kg / m2)
- 3000 m3 GROWING OUT OF SOIL, WITH HEATING, NL technology – analogy example " Chirchik" (25 kg / m2)
- Slight increase in total investment expected

Next steps

- Is the concept acceptable? Fit it to the Uzbekistan situation?
  - Need for training and education
  - Need for showing of innovative products and technologies
- UZ Funding possibilities? More or less a precondition.
- Discussion in The Netherlands whether concept is aligned
  - Dutch Greenhouse Delta is willing to help by facilitating a meeting with the DGD partners
  - WHC Westland is willing to cooperate
  - Main question: Is there a business case!
- Detailed design of production & demo facility and business plan would be a logical first step in the next stage

Specific questions and remarks

- Is there sufficient support from the Uzbek horticultural sector and government to initiate and maintain a HKC?
  - Committment (public and private)
  - Funding (initial and on the long run)
- Good coordination of practical wishes, education and research
- Provide services related to the horticultural development
  - Workshops, events, etc.
- The WHC Westland is not a blue print for success!

Thank you for your attention

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