

Climate & Agriculture Project Northern Netherlands

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Climate & Agriculture Northern Netherlands



Ing. Peter Prins

- Chairman Project Group Climate & Agriculture
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Agriculture in Northern Netherlands



Major international position agribusiness

- Seed potatoes (26.000 ha)
export to South/East Europe, North Africa, Middle East, Bangladesh
- Dairy husbandry (430.000 dairy cows)



Climate Change and Agriculture



Reasons for farmers' organisation to start project:

- Widen farmers' perspectives through sustainable development
- Development knowledge, taking into account long time scale for e.g. breeding new varieties



Project Climate Change and Agriculture



- Focus on adaptation at farm level
- Farmers strongly involved
- Collaboration science (Wageningen UR), consultants (Grontmij) and practice
- Contributions from businesses/chain parties
- Together with local government



Objectives



- Identify bottlenecks and challenges for the sector
- Draw up adaptation strategies
- Draw up action plan per sub area



Climate Change and Agriculture



Climate facts, starting points

- Higher temperatures (summer and winter)
- Long periods of drought
- Heavy precipitation

Accept uncertainties



Method



- Selection existing and new crops
- At which moments vulnerable to weather extremes?
- Changing frequency weather extremes?
- Consequences for crops
- Possible adaptation measures



Crop / product selection



Traditional:

1. Seed potatoes
2. Grass
3. Winter wheat
4. Starch potato
5. Onion
6. Winter carrot
7. Sugar beet
8. Lily

Energy:

9. Willow
10. Oilseed rape

New crops:

11. Sunflower
12. Artichoke
13. Grape
14. Fruit tree (stone fruit)

Glasshouse horticulture:

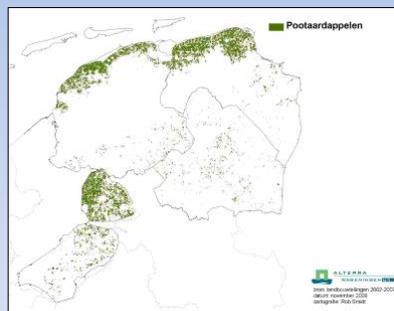
- I. Tomato /
cucumber

Products:

- A. Dairy cows
- B. Free-range
chicken/pork



Seed potatoes



Area in 2008

Northern Netherlands:	23 600 ha
Groningen:	8 200 ha
Friesland:	6 500 ha
Drenthe:	1000 ha
Flevoland:	8 000 ha

Characteristics of cultivation

Planting:	March-April
Harvest:	July - Sept
Yield:	33 000 kg/ha
Rows at 75 cm.	



Climate events with direct impact on crops



Climate factor	Period	Impact on crop	Damage %	Indicated damage €
Heavy precipitation	May - Sept.	Tuber rot	25 - 75%	- € 5 000 per ha
Heat wave	July - Sept.	Secondary tuber growth	25 - 75%	- € 5 000 per ha
High day temperature (3 weeks) and high precipitation	July - Sept.	Erwinia	10 - 50%	- € 3 000 per ha
High temperature (> 40 C, 2 days)	June - Aug	Leaf death	100%	- € 7 000 per ha
Wet period (> 4 weeks, every day rain)	May - Aug	Plant protection is impossible	50 - 100%	- € 7 000 per ha
Frost (-2 C), 2 days	May - July	Tuber freezing	25 - 75%	- € 5 000 per ha
Warm winter (>10 C)	Dec - March	Storage	25 - 75%	- € 5 000 per ha



Climate factors with indirect impact



- High temperature and high humidity will cause new pests and diseases
- Higher sea level will increase salination
- Flooding



W +

Changing climate events (2026 - 2055) indicated damage (= maximum costs measures)



Climate factor	Month												Management costs (k€/ha)	Investment (1000€/ha)	
	J	F	M	A	M	J	J	A	S	O	N	D			
Heavy precipitation					0	0	0	-1	+1					0,5 - 0,7	10 - 15
Heat wave							+12	+12	+3					3 - 5	60 - 100
High temp and rain							+6	+6	+2					1 - 2	20 - 35
Very high temp (>40 C)						0	0	0						-	-
Wet period (> 4 weeks, every day rain)					-2	-4	-5	-3						-	-
Frost (-2 C), 2 days				0	0	0								-	-
Warm winter	+2	+3	+8										+1	1 - 3	20 - 60



Potential damage due to increase in heat waves



- Extra heat waves until 2040 : 1 / YEAR
- Damage per heat wave 50% crop loss
- Yield per ha approx. € 8.000,=



Heat wave measures



Measures are aimed at:

- Reduction of heat penetration (shade netting)
- Cooling of crops (misting)
- Cooling of rows (trickle irrigation)
- Insulation of potatoes (wider rows)
- Reducing heat sensitivity of the potato (crop improvement)



Heat wave measures



- Trickle irrigation



» Costs € 800 – € 1000 per ha/year



Heat wave measures



- Wide rows

» Costs € 0.- per ha/year



Heat wave measures



- Crop improvement



» Cost several million Euros

» For approx. 26.000 ha seed potatoes per year
in hotspot



Conclusions heat wave measures



- Wide rows and crop improvement will definitely repay themselves
- Trickle irrigation roughly equals the cost
- Farmers choice: "first try a different variety"



Pests and diseases



- Damage hard to calculate
- Crop improvement generally considered as most appropriate measure
- Knowledge gap (e.g. aphids)



Other crops



- Sustainable soil management (structure, organic matter) important
- Green manure crops are binding extra CO₂
- Water management crucial
- Stimulation innovation economical water use and local water storage
- Breeding required (less water sensitive, salt tolerance)



Dairy husbandry



- Healthy cow decreases vulnerability of a holding (research housing, feeding)
- Grassland management is important adaptation measure (fertilisation, mowing, variety choice)
- Peat pastures: complicated problem
more to be achieved via finetuning water management?



Conclusions (1)



- Awareness among farmers and agricultural advisors is growing
- Information will be playing a role in investment decisions
- Farmers have a natural adaptation ability
- Governments can facilitate adaptations (e.g. water management)
- Climate resilient food production demands adequate scientific research



Conclusions (2)



- Strong cooperation between practice and science ensures knowledge transfer and attainable solutions
- Programmatic approach required for coherence (adaptation and mitigation)
- Farmers' Organisations can link!



