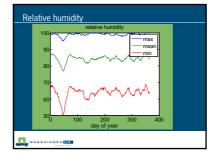
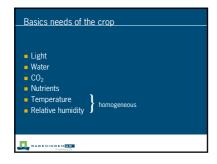
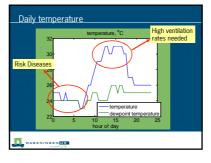
GREENHOUSE DESIGN FOR MALAYSIAN CONDITIONS

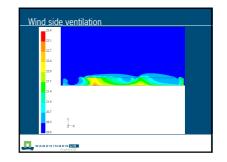
Luuk Runia Dr. Ir. Jouke Campen, Anne Elings.

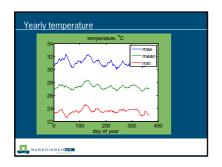


24.0	
23.6	
23.2	
22.8	
22.4	
22.0	
21.6	
21.2	
20.8	
20.4	¥
20.0	2-2



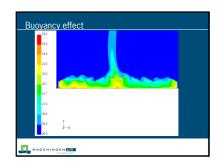






Climate restrains

Outside temperature is within limits but the greenhouse has to be ventilated extensively
Evaporative cooling is done by the crop



10/3/2011

Single greenhousesWind 3m/s				
Configuration	3 m/s	No	817 810 813	
	wind	wind	813 114	
single greenhouses	31.3	33.5	8.7	L.
	31.4	33.6	91	
	31.3	33.6	- 11	ababab.
multi-span	32.1	33.8	141	
Multi-span			14	
			827	
Wind 3 m/s			114	A CONTRACTOR OF A CONTRACTOR OFTA CONTRACTOR O
			14.1	

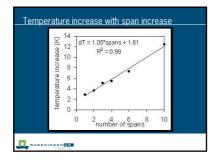
Covering material

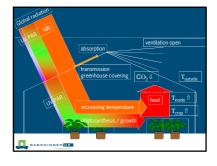
Light transmissivity

- Spectral reflectance → keep UV en NIR radiation out
- Haze properties → Making direct radiation diffuse
- Durability

• Wind conditions \rightarrow Strength of the material









Effects on temperature

- Greenhouse design
- Crop evaporation
 Wind

- Absorption of solar radiation (floor and crop)
- Covering material

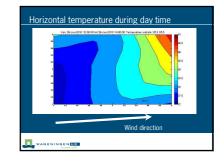
Fertigation and irrigation

- Greenhouse 1:
 Recirculation
 Drain meter, tensio meter and at light meter at pump house.
 Drain water will be in a underground tank a pumped back to pump house to be used and mused in the next irrigation.
 Greenhouse 2:
 Minimum drain.
 Greenhouse 3:
 As greenhouse 3:
 But, before every irrigation the water will be pumped through the system (to flush previous warm irrigation water).

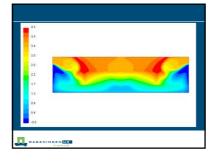


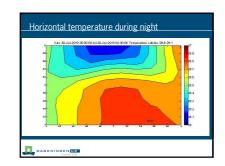




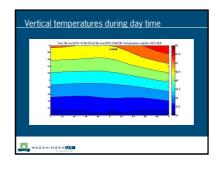


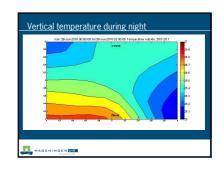












10/3/2011

















Conclusi

With this structure max differences in and outside temperatures is max 3 degrees. Bee can be used for pollination in this kind of structure Usage of chemicals is reduced by 70% in this structure Reducing the usage of fertilizers by irrigating according to demand 30-40% Producing A quality fruit double the amount as compare to the other structures in our test area Flushing hot water from the system before irrigating increases the health and strength of the plants

10/3/2011



