



Groasis Technology compared to *drip irrigation* in orchards

note: this model does not take into account the full cost of a project, just the differences between using Groasis Waterboxes and drip irrigation.

This document is a template with assumptions
Please ensure that the assumptions are correct for your specific project

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Remarks
Groasis Technology in comparison with drip irrigation
The project duration is 50 years as treeprojects (vines, olives,avocados, dates, etc.) always are longterm projects
All costs independent from use of Groasis waterboxx or drip irrigation that are equal have not been accounted in this document, so this document does not show all costs of tree plantations
As an example: the cost for a warehouse is not calculated, as for both systems one needs a warehouse
This means that this document cannot be used as a template for tree planting calculations. It focuses only on the financial differences caused by the use of the Groasis Technology compared to drip irrigation

Note: if column C in tab 'assumptions' states 1/0, complete calculation tab lines as following: Yes = 1, No = 0



Input	unit	single value
PROJECT GENERICS		
Project duration	years	50
Project size	ha	650
Number of trees per hectare	trees/ha	500
Cost of land (at start of project)	EUR/ha	-
Value of land of drygrowing (at end of project)	EUR/ha	20.000
Value of land of drip irrigated (at end of project)	EUR/ha	5.000
inflation rate (cost only)	%	3%
starting year		2011
PROJECT PREPARATION		
costs of reversed osmosis plant	EUR/m	-
how many hectares per reversed osmosis plant	ha/r.o.p.	650
costs of digging grooves for main tube per meter	EUR/m	1
meters groove per ha	m/ha	100
costs of main tube per meter incl. connection to electric valves	EUR/m	10
drip irrigation tube costs per meter	EUR/m	1,25
number of tubes per hectare	tubes/ha	20
length of tubes per ha	m/ha	2.000
liters of water per tree per year	l/tree/yr	1.500
price of water per liter	EUR/l	0,002
price of pump(s) incl. installation for 650 ha	EUR	25.000
electricity network per 650 ha incl. installation	EUR	65.000
electric valves incl. installation per ha	EUR/ha	250
rows per electric valve per ha	rows/valve/ha	5
rows per ha	rows/ha	20
computer system incl. tools	EUR	40.000
hectares per computer	ha/computer	650
size of water pump(s)	kW	75
water pump costprice per kW	EUR/kW	0,10
pump hours per year for 500ha	hrs/yr	2.000
Tractor hours to install drip irrigation per ha	hrs/ha	2
capillary drill cost	EUR	35.000
costs of spraying machine	EUR	50.000
Asset replacement info		
drip irrigation tube life	yrs	12,5
drip irrigation tubes to be replaced in years		13, 26, 38
electric valve life	yrs	12,5
electric valves to be replaced in years		13, 26, 38
water pump life	yrs	25
pump to be replaced in years		26
computer system life	yrs	25
computersystems to be replaced in years		26
main tube system life	yrs	50
main tube system to be replaced in years		-
Number of planting holes per capillary drill over life time	holes/drill	1.000.000
Number of planting holes in project	holes	325.000
Number of additional capillary drills needed	drills	0
number of hectares of use of spraying machine	ha	50.000
number of hectares spraying over project duration with waterboxx	ha	325.000
number of hectares spraying over project duration with drip irrigation	ha	650.000
number of spraying machine needed over project lifetime (waterboxx)	machines	7
number of spraying machine needed over project lifetime (drip irrigation)	machines	13
PROJECT PLANTING		
life time of planting with waterboxx	yrs	50
number of replanting with waterboxx over project lifetime		-
life time of planting with drip irrigation	yrs	25
number of replanting with drip irrigation over project lifetime		1
tractor cost incl. driver for drilling planting holes	EUR/hr	50
planting holes per hour		120
costs per man hour	EUR/hr	4
planting minutes per tree including assembling waterboxx	min/tree	8
planting minutes per tree drip irrigation	min/tree	6
man hours to install drip irrigation tubes per row	hr/row	2
man hours to install electric valves per row	hr/row	1
minutes per tree removing waterboxx after one year	min/tree	4
Groasis waterbox ownership model		purchase



Input	unit	single value
Costs of waterboxx (incl. transport)	EUR/box	12
Residual value of waterbox	%	90%
Number of years to use the waterboxx	yrs	10
planting material selected for project		seed
costs of planting material for waterboxx from seed	EUR/seed	0,20
costs of planting material for waterboxx from cutling	EUR/cutling	0,30
costs of planting material for waterboxx from cutling plus graft	EUR/cutling+graft	1,00
costs of planting material for drip irrigation from seed	EUR/seed	0,75
costs of planting material for drip irrigation from cutling	EUR/cutling	1,00
costs of planting material for drip irrigation from cutling plus graft	EUR/cutling+graft	2,00
first time planting with waterboxx	year	1
first time planting with drip irrigation	year	1
amount of water put in waterboxx after planting	l/waterboxx	50

ANNUAL MAINTENANCE

man hours of maintenance of drip irrigation tubes	hr/ha/yr	10
Cost of fungicide to control root diseases	EUR/kg	25
fungicide to control root diseases with waterboxx	kg/ha/yr	-
fungicide to control root diseases with drip irrigation	kg/ha/yr	20
Cost of fungicide to control leaf diseases	EUR/kg	25
fungicide to control leaf diseases with waterboxx	kg/ha/yr	10
fungicide to control leaf diseases with drip irrigation	kg/ha/yr	20
fertilizer requirements (drip irrigation only)	kg/ha/yr	500
Cost of fertilizer	EUR/kg	0,5
mycorrhizae and organic fertilizer requirements (waterboxx only)	kg/ha/yr	10
Cost of mycorrhizae and organic fertilizer	EUR/kg	25
tractor hours of treating funguses of leaves	hours/ha/treatment	1
fungus treatments per year with waterboxx		10
fungus treatments per year with drip irrigation		20

HARVESTING

duration of non productivity after replanting with waterboxx	yrs	6
duration of non productivity after replanting with drip irrigation	yrs	4
duration of non productivity with waterboxx over project lifetime	yrs	6
duration of non productivity with drip irrigation over project lifetime	yrs	8
duration of productivity with waterboxx over project lifetime	yrs	44
duration of productivity with drip irrigation over project lifetime	yrs	42
harvestable production with waterboxx	kg/ha/yr	4.000
harvestable production with drip irrigation	kg/ha/yr	6.000
harvesting costs	EUR/kg	0,20
harvest revenue with waterboxx (Y=1)	EUR/kg	2,20
harvest revenue with drip irrigation (Y=1)	EUR/kg	2,00
inflation rate of revenues	%	1,00%

FINANCIAL STRUCTURE

Cost of capital	%	7%
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Key Indicators		Waterboxx	Drip Irrigation
Net Present Value (NPV)	million EUR	39,03	23,97
Internal Rate of Return (IRR)	%	32,1%	26,8%
Capital employed	million EUR	(0,47)	(3,40)
Financing need	million EUR	(5,53)	(11,31)
Payback (break even)	years	6	5
Water requirements over project lifetime	million liters	16,25	24.375,00

Net present value (NPV) is the total present value of a time series of cash flows; it measures the excess or shortfall of cash flows, in present value terms, once financing charges are met. NPV is an indicator of how much value an investment or project adds for the investor; it is an indicator of the value or magnitude of an investment.

The internal rate of return (IRR) is a rate of return used to measure and compare the profitability of investments. The internal rate of return on an investment is the annualized effective compounded return rate that can be earned on the invested capital; it is the interest rate at which the costs of the investment lead to the benefits of the investment. This means that all gains from the investment are inherent to the time value of money and that the investment has a zero net present value at this interest rate. IRR is an indicator of the efficiency, quality, or yield of an investment.

Capital employed represents the capital investment necessary for the project.

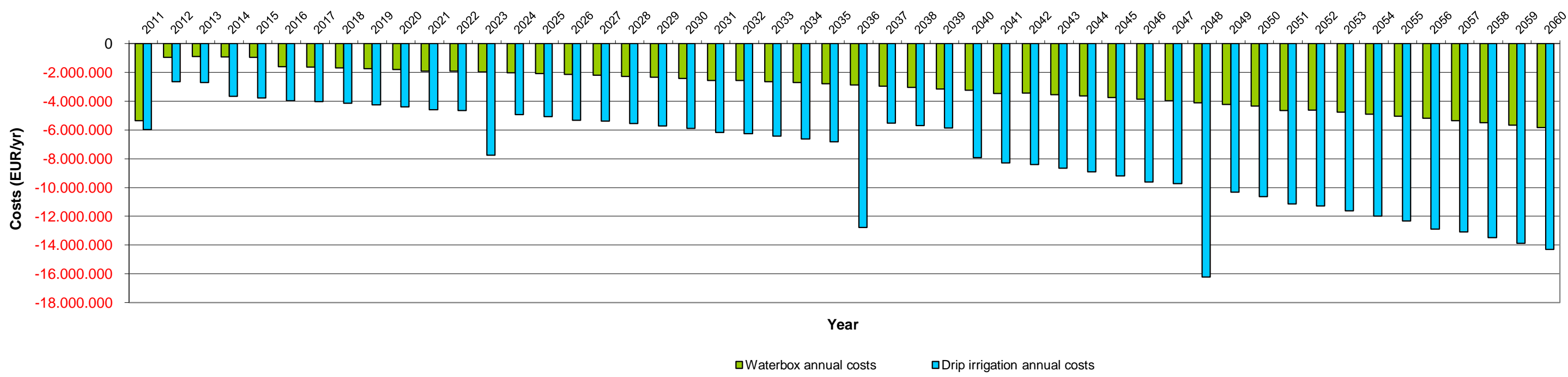
Maximum project finance needed during project duration

Payback period refers to the period of time required for the return on an investment to "repay" the sum of the original investment (capital employed).

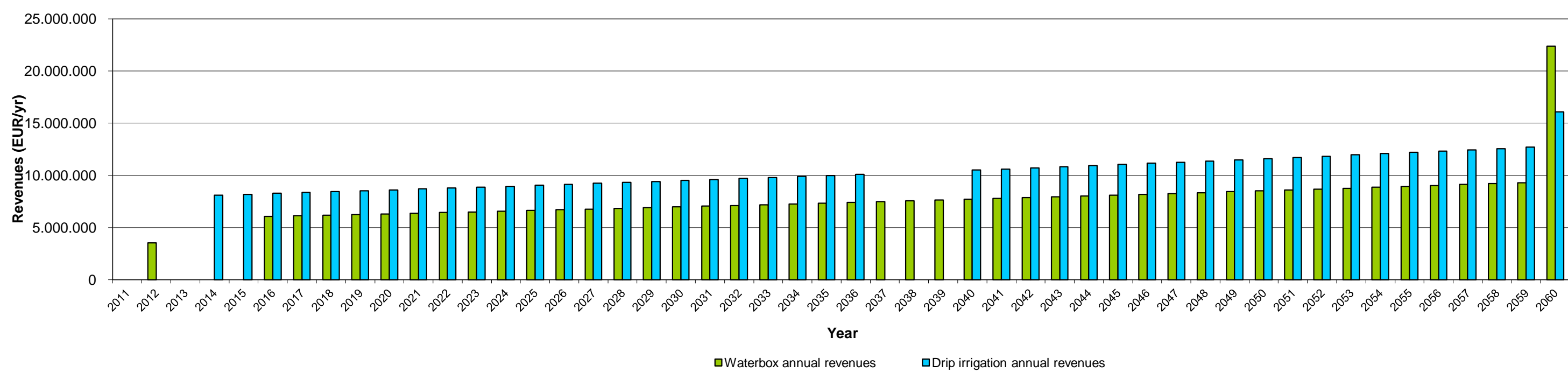
Total water requirements - Waterboxx filled in year 1 only, drip irrigation has regular water supply to trees

Key charts

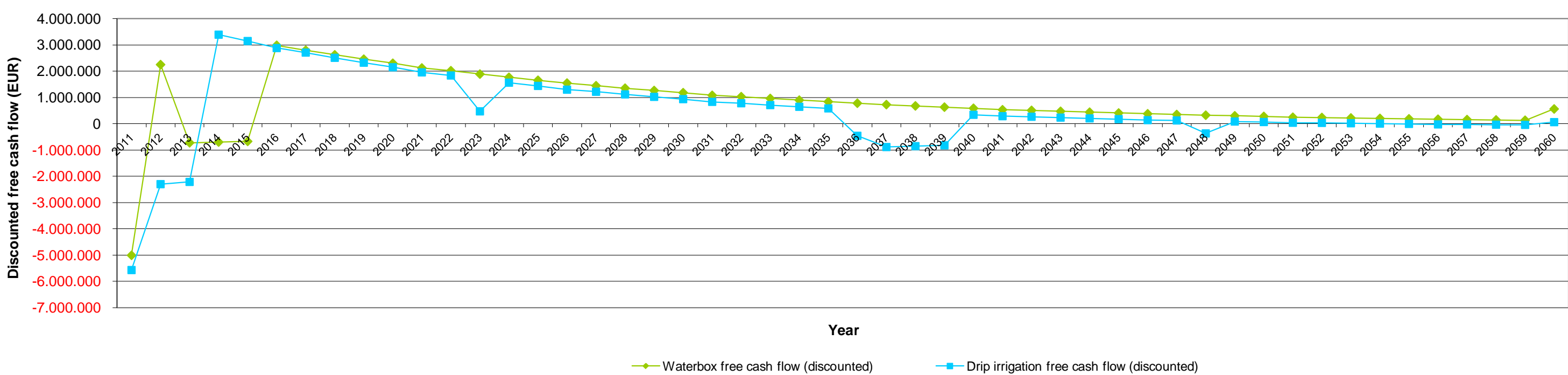
Comparison of annual costs



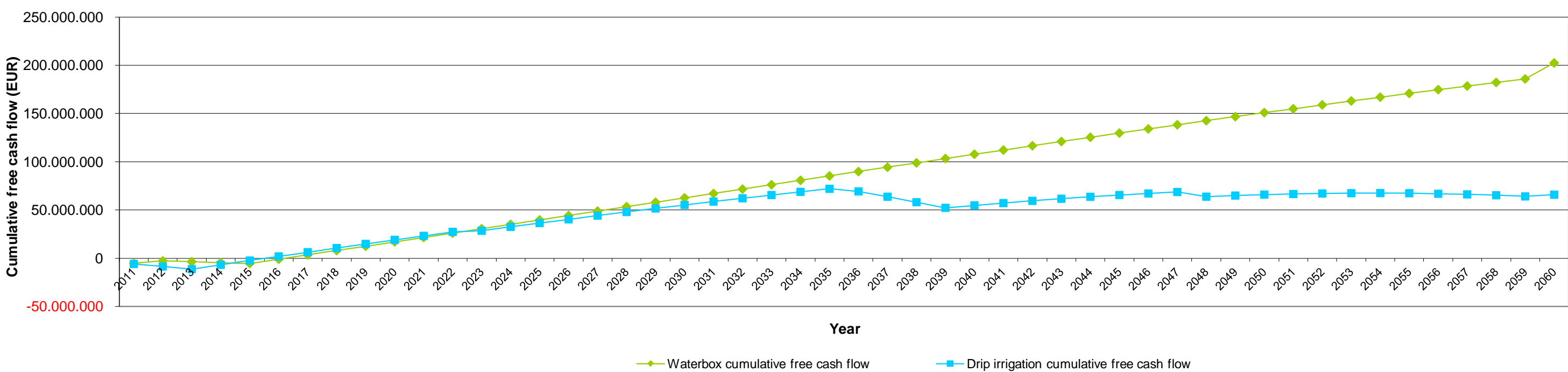
Comparison of annual revenues



Comparison of discounted free cash flow



Comparison of cumulative free cash flow





Groasis Technology SCENARIO

			1,030	1,061	1,093	1,126	1,159	1,194	1,230	1,267	1,305	1,344	1,384	1,426	1,469	1,513
annual inflation (revenues)			1,010	1,020	1,030	1,041	1,051	1,062	1,072	1,083	1,094	1,105	1,116	1,127	1,138	1,149
project active yes/no			1	1	1	1	1	1	1	1	1	1	1	1	1	1
year of operation			1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Units	Total	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cash flow																
PROJECT PREPARATION COSTS																
costs of land purchase	EUR	-	0													
capillary drill cost	EUR	36.050	36.050													
spraying machine cost	EUR	51.500	51.500													
capillary drill replaced? Yes/No			0	0	0	0	0	0	0	0	0	0	0	0	0	0
replacement of capillary drill	EUR	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
spraying machine replaced? Yes/No			0	0	0	0	0	0	0	0	0	0	1	0	0	0
replacement of spraying machine	EUR	455.225	0	0	0	0	0	0	0	0	0	0	69.212	0	0	0
PROJECT PLANTING COSTS																
waterboxx planting? Yes/No			1	0	0	0	0	0	0	0	0	0	0	0	0	0
tractor cost incl. driver for planting holes	EUR	139.479	139.479	0	0	0	0	0	0	0	0	0	0	0	0	0
tree planting cost including assembling waterboxx	EUR	178.533	178.533	0	0	0	0	0	0	0	0	0	0	0	0	0
Costs of waterboxx	EUR	4.017.000	4.017.000	0	0	0	0	0	0	0	0	0	0	0	0	0
costs of planting material for waterboxx	EUR	66.950	66.950	0	0	0	0	0	0	0	0	0	0	0	0	0
price of water for initial water in boxes	EUR	33.475	33.475	0	0	0	0	0	0	0	0	0	0	0	0	0
waterboxx removal? Yes/No			0	1	0	0	0	0	0	0	0	0	0	0	0	0
cost of removing waterboxx after one year	EUR	91.945	0	91.945	0	0	0	0	0	0	0	0	0	0	0	0
ANNUAL MAINTENANCE COSTS																
Cost of fungicide to control leaf diseases	EUR	37.758.751	334.750	344.793	355.136	365.790	376.764	388.067	399.709	411.700	424.051	436.773	449.876	463.372	477.273	491.592
Cost of mycorrhizae	EUR	18.879.376	167.375	172.396	177.568	182.895	188.382	194.033	199.855	205.850	212.026	218.386	224.938	231.686	238.637	245.796
Cost of tractor for treating funguses of leaves	EUR	37.758.751	334.750	344.793	355.136	365.790	376.764	388.067	399.709	411.700	424.051	436.773	449.876	463.372	477.273	491.592
HARVESTING COSTS																
Harvesting? Yes/No			0	0	0	0	0	1	1	1	1	1	1	1	1	1
harvesting costs	EUR	57.570.429	0	0	0	0	0	620.907	639.534	658.720	678.482	698.837	719.802	741.396	763.638	786.547
TOTAL COSTS	EUR	- 157.037.465	-5.359.863	-953.926	-887.841	-914.476	-941.910	-1.591.075	-1.638.807	-1.687.971	-1.738.610	-1.790.769	-1.913.703	-1.899.826	-1.956.821	-2.015.526
REVENUES																
sale of used capillary drill	EUR	21.000	0	21.000	0	0	0	0	0	0	0	0	0	0	0	0
sale of used waterboxxes (if purchase option selected)	EUR	3.510.000	0	3.510.000	0	0	0	0	0	0	0	0	0	0	0	0
harvest revenue with waterboxx	EUR	342.947.170	0	0	0	0	6.071.895	6.132.614	6.193.940	6.255.880	6.318.439	6.381.623	6.445.439	6.509.894	6.574.992	
project end land value	EUR	13.000.000														
TOTAL REVENUES	EUR	359.478.170	0	3.531.000	0	0	0	6.071.895	6.132.614	6.193.940	6.255.880	6.318.439	6.381.623	6.445.439	6.509.894	6.574.992
FREE CASH FLOW	EUR	202.440.705	-5.359.863	2.577.074	-887.841	-914.476	-941.910	4.480.821	4.493.807	4.505.969	4.517.269	4.527.670	4.467.920	4.545.613	4.553.072	4.559.467
DISCOUNTED FREE CASH FLOW	EUR	39.031.069	-5.009.217	2.250.916	-724.742	-697.649	-671.569	2.985.760	2.798.517	2.622.515	2.457.095	2.301.638	2.122.676	2.018.306	1.889.363	1.768.240
CUMULATIVE FREE CASH FLOW	EUR	202.440.705	-5.359.863	-2.782.788	-3.670.629	-4.585.105	-5.527.015	-1.046.195	3.447.613	7.953.582	12.470.851	16.998.521	21.466.441	26.012.054	30.565.126	35.124.593

1,558	1,605	1,653	1,702	1,754	1,860	1,916	1,974	2,033	2,094	2,157	2,221	2,288	2,357	2,427	2,500	2,575	2,652
1,161	1,173	1,184	1,196	1,208	1,232	1,245	1,257	1,270	1,282	1,295	1,308	1,321	1,335	1,348	1,361	1,375	1,389
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	93.015	0	0	0	0	0	0	0	0	0	125.004	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

506.339	521.530	537.175	553.291	569.889	586.986	604.596	622.734	641.416	660.658	680.478	700.892	721.919	743.576	765.884	788.860	812.526	836.902	862.009
253.170	260.765	268.588	276.645	284.945	293.493	302.298	311.367	320.708	330.329	340.239	350.446	360.959	371.788	382.942	394.430	406.263	418.451	431.004
506.339	521.530	537.175	553.291	569.889	586.986	604.596	622.734	641.416	660.658	680.478	700.892	721.919	743.576	765.884	788.860	812.526	836.902	862.009

810.143	834.447	859.481	885.265	911.823	939.178	967.353	996.374	1,026.265	1,057.053	1,088.765	1,121.427	1,155.070	1,189.722	1,225.414	1,262.176	1,300.042	1,339.043	1,379.214
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-2,075.992	-2,138.271	-2,202.419	-2,268.492	-2,336.547	-2,406.643	-2,571.857	-2,553.208	-2,629.804	-2,708.698	-2,789.959	-2,873.658	-2,959.868	-3,048.664	-3,140.124	-3,234.327	-3,456.361	-3,431.298	-3,534.237
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6,640.742	6,707.150	6,774.221	6,841.964	6,910.383	6,979.487	7,049.282	7,119.775	7,190.972	7,262.882	7,335.511	7,408.866	7,482.955	7,557.784	7,633.362	7,709.696	7,786.793	7,864.661	7,943.307

6,640.742	6,707.150	6,774.221	6,841.964	6,910.383	6,979.487	7,049.282	7,119.775	7,190.972	7,262.882	7,335.511	7,408.866	7,482.955	7,557.784	7,633.362	7,709.696	7,786.793	7,864.661	7,943.307
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4,564.751	4,568.879	4,571.802	4,573.472	4,573.836	4,572.844	4,477.425	4,566.567	4,561.168	4,554.184	4,545.552	4,535.208	4,523.087	4,509.121	4,493.239	4,475.369	4,330.432	4,433.363	4,409.071
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1,654.476	1,547.637	1,447.315	1,353.125	1,264.704	1,181.710	1,081.357	1,030.734	962.164	897.842	837.514	780.942	727.902	678.182	631.582	587.916	531.660	508.689	472.805
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39,689.344	44,258.222	48,830.024	53,403.496	57,977.332	62,550.176	67,027.600	71,594.167	76,155.336	80,709.520	85,255.072	89,790.280	94,313.367	98,822.488	#####	#####	#####	#####	#####
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2,732	2,814	2,898	2,985	3,075	3,167	3,262	3,360	3,461	3,565	3,671	3,782	3,895	4,012	4,132	4,256	4,384
1,403	1,417	1,431	1,445	1,460	1,474	1,489	1,504	1,519	1,534	1,549	1,565	1,580	1,596	1,612	1,628	1,645
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50
2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060

0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
0	0	0	0	0	0	0	167.995	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

887.869	914.505	941.940	970.199	999.305	1.029.284	1.060.162	1.091.967	1.124.726	1.158.468	1.193.222	1.229.019	1.265.889	1.303.866	1.342.982	1.383.271	1.424.769
443.935	457.253	470.970	485.099	499.652	514.642	530.081	545.984	562.363	579.234	596.611	614.509	632.945	651.933	671.491	691.636	712.385
887.869	914.505	941.940	970.199	999.305	1.029.284	1.060.162	1.091.967	1.124.726	1.158.468	1.193.222	1.229.019	1.265.889	1.303.866	1.342.982	1.383.271	1.424.769

1.420.591	1.463.208	1.507.105	1.552.318	1.598.887	1.646.854	1.696.260	1.747.147	1.799.562	1.853.549	1.909.155	1.966.430	2.025.423	2.086.185	2.148.771	2.213.234	2.279.631
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-3.640.264	-3.749.472	-3.861.956	-3.977.815	-4.097.149	-4.220.063	-4.346.665	-4.645.060	-4.611.377	-4.749.719	-4.892.210	-5.038.976	-5.190.146	-5.345.850	-5.506.226	-5.671.412	-5.841.555
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0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8.022.740	8.102.968	8.183.997	8.265.837	8.348.496	8.431.981	8.516.301	8.601.464	8.687.478	8.774.353	8.862.097	8.950.717	9.040.225	9.130.627	9.221.933	9.314.152	9.407.294
																13.000.000

8.022.740	8.102.968	8.183.997	8.265.837	8.348.496	8.431.981	8.516.301	8.601.464	8.687.478	8.774.353	8.862.097	8.950.717	9.040.225	9.130.627	9.221.933	9.314.152	22.407.294
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4.382.477	4.353.496	4.322.042	4.288.023	4.251.347	4.211.917	4.169.635	3.956.403	4.076.101	4.024.634	3.969.886	3.911.741	3.850.079	3.784.777	3.715.708	3.642.740	16.565.739
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439.209	407.761	378.332	350.798	325.045	300.963	278.450	246.925	237.753	219.394	202.252	186.252	171.323	157.399	144.418	132.319	562.370
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#####	#####	#####	138.309.997	142.561.344	146.773.261	150.942.897	154.899.300	158.975.401	163.000.035	166.969.922	170.881.663	174.731.741	178.516.518	182.232.226	185.874.966	202.440.705
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DRIP IRRIGATION SCENARIO

		1,0300	1,0609	1,0927	1,1255	1,1593	1,1941	1,2299	1,2668	1,3048	1,3439	1,3842	1,4258	1,4685	1,5126	
annual inflation (revenues)		1,010	1,020	1,030	1,041	1,051	1,062	1,072	1,083	1,094	1,105	1,116	1,127	1,138	1,149	
project active yes/no		1	1	1	1	1	1	1	1	1	1	1	1	1	1	
year of operation		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
Cash flow	Units	Total	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
PROJECT PREPARATION COSTS																
costs of land purchase	EUR	-	0													
costs of reversed osmosis plant	EUR	-	0													
costs of digging grooves	EUR	66.950	66.950													
costs of main tubes	EUR	669.500	669.500													
drip irrigation tube costs	EUR	1.673.750	1.673.750													
price of pump	EUR	33.475	33.475													
cost of electricity network	EUR	87.035	87.035													
cost of electric valves	EUR	167.375	167.375													
computer system incl. tools	EUR	41.200	41.200													
Tractor hours to install drip irrigation	EUR	66.950	66.950													
costs of spraying machine	EUR	51.500	51.500													
Drip irrigation tubes replaced? Yes/No			0	0	0	0	0	0	0	0	0	0	0	0	1	0
Cost for replacement of drip irrigation tubes	EUR	12.019.636	0	0	0	0	0	0	0	0	0	0	0	0	2.634.549	0
Electrical valves replaced? Yes/No			0	0	0	0	0	0	0	0	0	0	0	0	1	0
Cost for replacement of electric valves	EUR	1.437.130	0	0	0	0	0	0	0	0	0	0	0	0	315.000	0
Pumps replaced? Yes/No			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost for replacement of pumps	EUR	70.089	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Computer system replaced? Yes/No			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost for replacement of computersystems	EUR	86.264	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Main tube system replaced? Yes/No			0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cost for replacement of main tube system	EUR	-	0	0	0	0	0	0	0	0	0	0	0	0	0	0
spraying machine replaced? Yes/No			0	0	0	0	0	1	0	0	0	0	1	0	0	0
Cost for replacement of spraying machine	EUR	1.042.659	0	0	0	0	0	59.703	0	0	0	0	69.212	0	0	0
PROJECT PLANTING COSTS																
Planting? Yes/No			1	0	0	0	0	0	0	0	0	0	0	0	0	0
tree planting cost drip irrigation	EUR	414.257	133.900	0	0	0	0	0	0	0	0	0	0	0	0	0
man hours to install drip irrigation tubes	EUR	331.405	107.120	0	0	0	0	0	0	0	0	0	0	0	0	0
man hours to install electric valves	EUR	165.703	53.560	0	0	0	0	0	0	0	0	0	0	0	0	0
costs of planting material for drip irrigation	EUR	776.732	251.063	0	0	0	0	0	0	0	0	0	0	0	0	0
ANNUAL MAINTENANCE COSTS																
price of water for drip irrigation	EUR	113.276.254	1.004.250	1.034.378	1.065.409	1.097.371	1.130.292	1.164.201	1.199.127	1.235.101	1.272.154	1.310.318	1.349.628	1.390.117	1.431.820	1.474.775
cost of electricity for pump	EUR	2.265.525	20.085	20.688	21.308	21.947	22.606	23.284	23.983	24.702	25.443	26.206	26.993	27.802	28.636	29.495
cost of maintenance of drip irrigation tubes	EUR	3.020.700	26.780	27.583	28.411	29.263	30.141	31.045	31.977	32.936	33.924	34.942	35.990	37.070	38.182	39.327
Cost of fungicide to control root diseases	EUR	37.758.751	334.750	344.793	355.136	365.790	376.764	388.067	399.709	411.700	424.051	436.773	449.876	463.372	477.273	491.592
Cost of fungicide to control leaf diseases	EUR	37.758.751	334.750	344.793	355.136	365.790	376.764	388.067	399.709	411.700	424.051	436.773	449.876	463.372	477.273	491.592
Cost of fertilizer	EUR	18.879.376	167.375	172.396	177.568	182.895	188.382	194.033	199.855	205.850	212.026	218.386	224.938	231.686	238.637	245.796
Cost of tractor for treating funguses of leaves	EUR	75.517.503	669.500	689.585	710.273	731.581	753.528	776.134	799.418	823.401	848.103	873.546	899.752	926.745	954.547	983.183
HARVESTING COSTS																
Harvesting? Yes/No			0	0	0	1	1	1	1	1	1	1	1	1	1	1
harvesting costs	EUR	82.782.464	0	0	0	877.897	904.234	931.361	959.302	988.081	1.017.723	1.048.255	1.079.702	1.112.093	1.145.456	1.179.820
TOTAL COSTS	EUR	- 390.460.934	-5.960.868	-2.634.215	-2.713.241	-3.672.535	-3.782.711	-3.955.895	-4.013.078	-4.133.471	-4.257.475	-4.385.199	-4.585.967	-4.652.258	-7.741.375	-4.935.580
REVENUES																
harvest revenue with drip irrigation	EUR	453.050.592	0	0	0	8.116.711	8.197.878	8.279.857	8.362.656	8.446.282	8.530.745	8.616.053	8.702.213	8.789.235	8.877.128	8.965.899
project end land value	EUR	3.250.000														
TOTAL REVENUES	EUR	456.300.592	0	0	0	8.116.711	8.197.878	8.279.857	8.362.656	8.446.282	8.530.745	8.616.053	8.702.213	8.789.235	8.877.128	8.965.899
FREE CASH FLOW	EUR	65.839.659	-5.960.868	-2.634.215	-2.713.241	4.444.176	4.415.167	4.323.962	4.349.577	4.312.812	4.273.270	4.230.853	4.116.246	4.136.977	1.135.752	4.030.319
DISCOUNTED FREE CASH FLOW	EUR	23.974.682	-5.570.904	-2.300.825	-2.214.813	3.390.441	3.147.953	2.881.238	2.708.698	2.510.096	2.324.376	2.150.751	1.955.599	1.836.867	471.297	1.563.027
CUMULATIVE FREE CASH FLOW	EUR	65.839.659	-5.960.868	-8.595.082	-11.308.323	-6.864.147	-2.448.980	1.874.982	6.224.559	10.537.371	14.810.641	19.041.494	23.157.740	27.294.718	28.430.470	32.460.789

1,5580	1,6047	1,6528	7024	1,7535	1,8603	1,9161	1,9736	2,0328	2,0938	2,1566	2,2213	2,2879	2,3566	2,4273	2,5001	2,5751	2,6523	2,7319	2,8139	2,8983	
1,161	1,173	1,184	,196	1,208	1,220	1,232	1,245	1,257	1,270	1,282	1,295	1,308	1,321	1,335	1,348	1,361	1,375	1,389	1,403	1,417	1,431
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1



15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046

0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	3.868.925	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	462.589	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	70.089	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	86.264	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1	0	0	0	0	1
0	80.235	0	0	0	0	93.015	0	0	0	0	107.830	0	0	0	0	125.004	0	0	0	0	144.914

0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	280.357	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	224.285	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	112.143	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	525.669	0	0	0	0	0	0	0	0	0	0

1.519.018	1.564.589	1.611.526	1.659.872	1.709.668	1.760.958	1.813.787	1.868.201	1.924.247	1.981.974	2.041.433	2.102.676	2.165.757	2.230.729	2.297.651	2.366.581	2.437.578	2.510.706	2.586.027	2.663.608	2.743.516	2.825.821
30.380	31.292	32.231	33.197	34.193	35.219	36.276	37.364	38.485	39.639	40.829	42.054	43.315	44.615	45.953	47.332	48.752	50.214	51.721	53.272	54.870	56.516
40.507	41.722	42.974	44.263	45.591	46.959	48.368	49.819	51.313	52.853	54.438	56.071	57.754	59.486	61.271	63.109	65.002	66.952	68.961	71.030	73.160	75.355
506.339	521.530	537.175	553.291	569.889	586.986	604.596	622.734	641.416	660.658	680.478	700.892	721.919	743.576	765.884	788.860	812.526	836.902	862.009	887.869	914.505	941.940
506.339	521.530	537.175	553.291	569.889	586.986	604.596	622.734	641.416	660.658	680.478	700.892	721.919	743.576	765.884	788.860	812.526	836.902	862.009	887.869	914.505	941.940
253.170	260.765	268.588	276.645	284.945	293.493	302.298	311.367	320.708	330.329	340.239	350.446	360.959	371.788	382.942	394.430	406.263	418.451	431.004	443.935	457.253	470.970
1.012.679	1.043.059	1.074.351	1.106.581	1.139.779	1.173.972	1.209.191	1.245.467	1.282.831	1.321.316	1.360.956	1.401.784	1.443.838	1.487.153	1.531.768	1.577.721	1.625.052	1.673.804	1.724.018	1.775.738	1.829.011	1.883.881

1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1	1	1	1	1	1	1
1.215.215	1.251.671	1.289.221	1.327.898	1.367.735	1.408.767	1.451.030	1.494.561	1.539.397	1.585.579	1.633.147	1.682.141	0	0	0	1.893.265	1.950.063	2.008.565	2.068.821	2.130.886	2.194.813	2.260.657

-5.083.648	-5.316.392	-5.393.242	-5.555.039	-5.721.690	-5.893.341	-6.163.156	-6.252.245	-6.439.813	-6.633.007	-6.831.997	-12.775.108	-5.515.461	-5.680.924	-5.851.352	-7.920.157	-8.282.766	-8.402.495	-8.654.570	-8.914.207	-9.181.633	-9.601.996
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9.055.558	9.146.113	9.237.575	9.329.950	9.423.250	9.517.482	9.612.657	9.708.784	9.805.872	9.903.930	10.002.970	10.102.999	0	0	0	10.513.222	10.618.354	10.724.537	10.831.783	10.940.100	11.049.501	11.159.997
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9.055.558	9.146.113	9.237.575	9.329.950	9.423.250	9.517.482	9.612.657	9.708.784	9.805.872	9.903.930	10.002.970	10.102.999	0	0	0	10.513.222	10.618.354	10.724.537	10.831.783	10.940.100	11.049.501	11.159.997
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3.971.910	3.829.721	3.844.333	3.774.911	3.701.560	3.624.141	3.449.501	3.456.538	3.366.059	3.270.923	3.170.972	-2.672.108	-5.515.461	-5.680.924	-5.851.352	2.593.064	2.335.588	2.322.042	2.177.213	2.025.894	1.867.868	1.558.000
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1.439.603	1.297.259	1.217.017	1.116.860	1.023.512	936.547	833.100	780.186	710.060	644.851	584.249	-460.125	-887.605	-854.424	-822.483	340.643	286.747	266.434	233.473	203.034	174.950	136.380
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36.432.699	40.262.420	44.106.753	47.881.664	51.583.223	55.207.365	58.656.866	62.113.404	65.479.463	68.750.386	71.921.358	69.249.250	63.733.789	58.052.865	52.201.513	54.794.577	57.130.164	59.452.207	61.629.420	63.655.313	65.523.181	67.081.182
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2,9852	3,0748	3,1670	3,2620	3,3599	3,4607	3,5645	3,6715	3,7816	3,8950	4,0119	4,1323	4,2562	4,3839
1,445	1,460	1,474	1,489	1,504	1,519	1,534	1,549	1,565	1,580	1,596	1,612	1,628	1,645
1	1	1	1	1	1	1	1	1	1	1	1	1	1
37	38	39	40	41	42	43	44	45	46	47	48	49	50
2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060

0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	5.516.162	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	659.541	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	1	0	0	0	0	1	0	0	0	0
0	0	0	0	167.995	0	0	0	0	194.752	0	0	0	0

0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.910.596	2.997.914	3.087.851	3.180.487	3.275.901	3.374.178	3.475.404	3.579.666	3.687.056	3.797.668	3.911.598	4.028.946	4.149.814	4.274.308
58.212	59.958	61.757	63.610	65.518	67.484	69.508	71.593	73.741	75.953	78.232	80.579	82.996	85.486
77.616	79.944	82.343	84.813	87.357	89.978	92.677	95.458	98.321	101.271	104.309	107.439	110.662	113.982
970.199	999.305	1.029.284	1.060.162	1.091.967	1.124.726	1.158.468	1.193.222	1.229.019	1.265.889	1.303.866	1.342.982	1.383.271	1.424.769
970.199	999.305	1.029.284	1.060.162	1.091.967	1.124.726	1.158.468	1.193.222	1.229.019	1.265.889	1.303.866	1.342.982	1.383.271	1.424.769
485.099	499.652	514.642	530.081	545.984	562.363	579.234	596.611	614.509	632.945	651.933	671.491	691.636	712.385
1.940.397	1.998.609	2.058.568	2.120.325	2.183.934	2.249.452	2.316.936	2.386.444	2.458.037	2.531.778	2.607.732	2.685.964	2.766.543	2.849.539

2.328.477	2.398.331	2.470.281	2.544.389	2.620.721	2.699.343	2.780.323	2.863.733	2.949.645	3.038.134	3.129.278	3.223.156	3.319.851	3.419.447
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-9.740.795 -16.208.721 #####

11.271.596	11.384.312	11.498.156	11.613.137	11.729.268	11.846.561	11.965.027	12.084.677	12.205.524	12.327.579	12.450.855	12.575.363	12.701.117	12.828.128
													3.250.000

11.271.596	11.384.312	11.498.156	11.613.137	11.729.268	11.846.561	11.965.027	12.084.677	12.205.524	12.327.579	12.450.855	12.575.363	12.701.117	16.078.128
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1.530.802	-4.824.409	1.164.147	969.108	597.923	554.310	334.009	104.728	-133.823	-576.701	-639.959	-908.174	-1.186.927	1.773.443
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125.233	-368.859	83.184	64.717	37.317	32.332	18.208	5.336	-6.372	-25.662	-26.614	-35.298	-43.114	60.204
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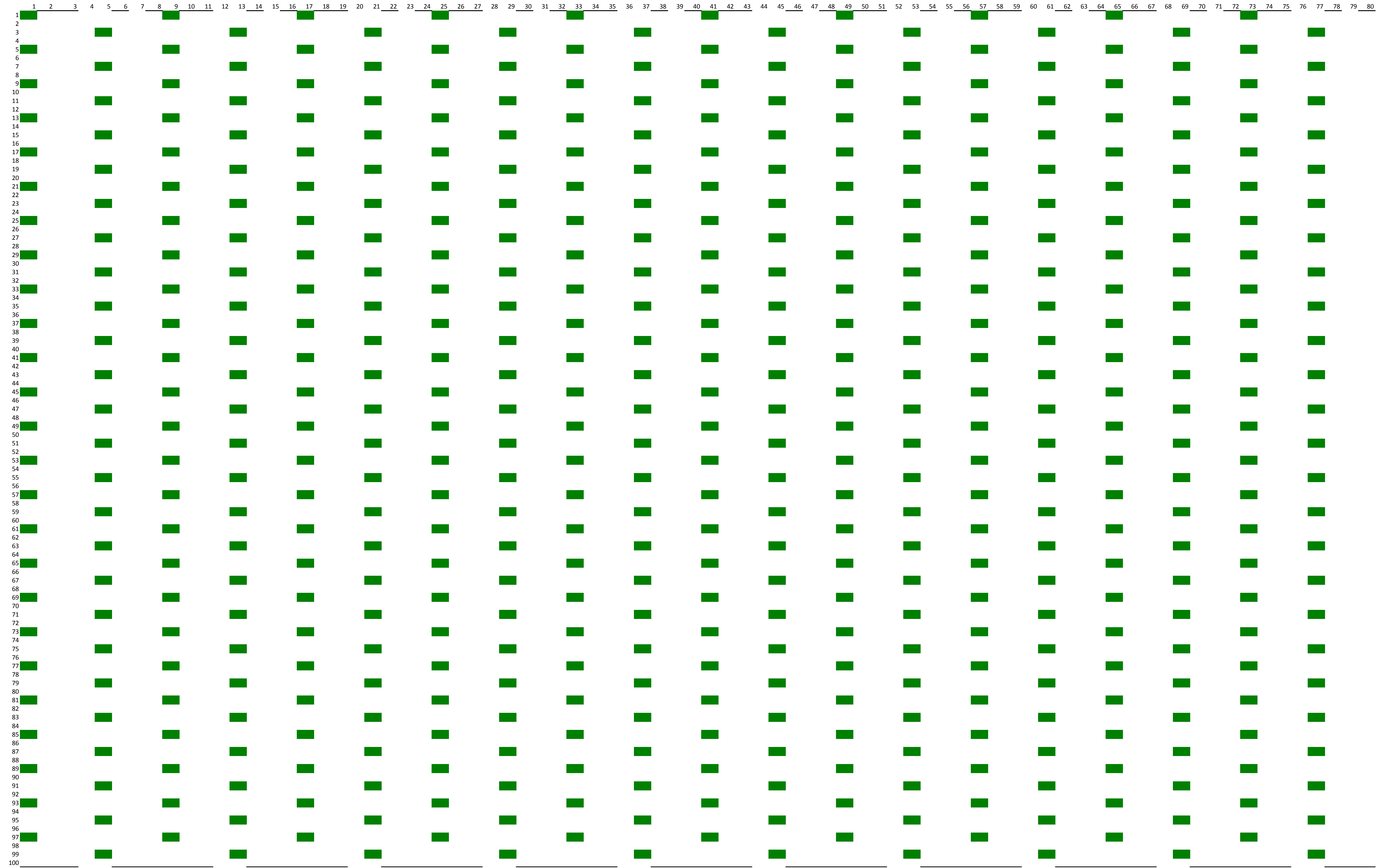
68.611.984	63.787.575	64.951.721	65.920.829	66.518.753	67.073.063	67.407.072	67.511.800	67.377.977	66.801.276	66.161.317	65.253.143	64.066.216	65.839.659
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Risk analysis		
Groasis Technology		Drip irrigation
six year proven technology		thirty five year proven technology
if growing on rocks lower investment in soil		higher investment in soil
if growing on rocks lower interest costs on capital investment in soil		higher capital costs
No inflation of costs risk		inflation of costs risk
no risk of higher costs for energy		risk of higher energy cost
no risk of lack of availability of ground water		risk of lack of groundwater
no risk caused by political decisions		risk of political decisions
no risk on ban on use of groundwater		risk on ban on use of groundwater if cities have lack of water during periods of drought
no risk on brackish water problems		heavy use of drip irrigation may lead to brackish groundwater, already many areas world wide have been left for this reason
no risk on losing crop if use of groundwater is banned		risk of losing crop if irrigation is banned, this might happen with a severe drought when cities get priority. This might happen in the coming 100 years as a cause of climate change
no risk of rising prices of irrigation water		water price per liter will rise considerably, when price rises from 0,002 euro to 0,02 euro per liter (assumptions cell C26) the cost of water rises to 1.1bn euro (calc_dripirrigation cell c42). Drip irrigation production will result in a loss
No risk on soil salination		if irrigation water contains minerals and/or salt, over time the soil will be polluted and also too salted to produce and turn into unusable eternally. This is undoubtedly the case with water from natural sources with high mineral levels, from cleaned sewage water sources of produced from seawater through the reversed osmosis technology. Several formerly fertile zones in California have now been abandoned for this reason. Many cities in the Middle East start to replace the soil where trees are dying as raising the water gift doesn't help anymore. The certain capital loss caused by this reason is unimaginable high and cannot be solved others than by higher water gifts until the conductivity of the soil is higher than that of the roots. Once this level has been reached the plants will die because of draught even if the roots are surrounded by water. See photo.

Other capacities	
Groasis Technology	Drip irrigation
growing on rocks possible	growing on rocks not possible
sustainable - only in the first year water is used between 20 to 100 liters depending from the growing place	not sustainable - plants are eternally irrigated with scarce groundwater or expensive filtered water through reversed osmosis. Trees in cities in Middle East receive daily 60 to 100 liters per day. This is average 2,920,000 liters in 100 years. Vines receive between 800 to 1,400 liters per year per plant. This is average 110,000 liters per plant in 100 years. As soon as water is priced, this way of producing is outdated.
less fungicide use = less risk for personel	high fungicide use = higher risk for personel
higher product quality level	lower product quality level
higher sales price for the product because of better internal and external quality	lower sales price
eco label possible	eco label not possible
less complicated management	complicated management
less crop means less wear of machinery/ less use of energy/ less packing material/ lower transportcosts/ etc. / these differences in lower costs are not taken into account in this template	double crop means double wear of machinery/ double use of energy in warehouses/ double packing material/ double transportcosts/ etc. / these differences in higher costs are not taken into account in this template
less crop means necessity of smaller buildings and smaller refrigidator / these differences in costs are not taken into account	double crop means necessity of bigger buildings and bigger refrigidator / these differences in costs are not taken into account
applying waterboxx can be done with low educated people and as the work itself is light, possibly with females	applying computerized high tech irrigation demands higher educated personel, so less chances for low educated people As applying the technology is heavy work, this work is less appropriate for females

- 25 trees per row
- 20 rows
- 500 trees total

Planting scheme (the grid below represents 1ha, 100m x 100m)



Potential planting scheme for 1 ha