Herd expansion

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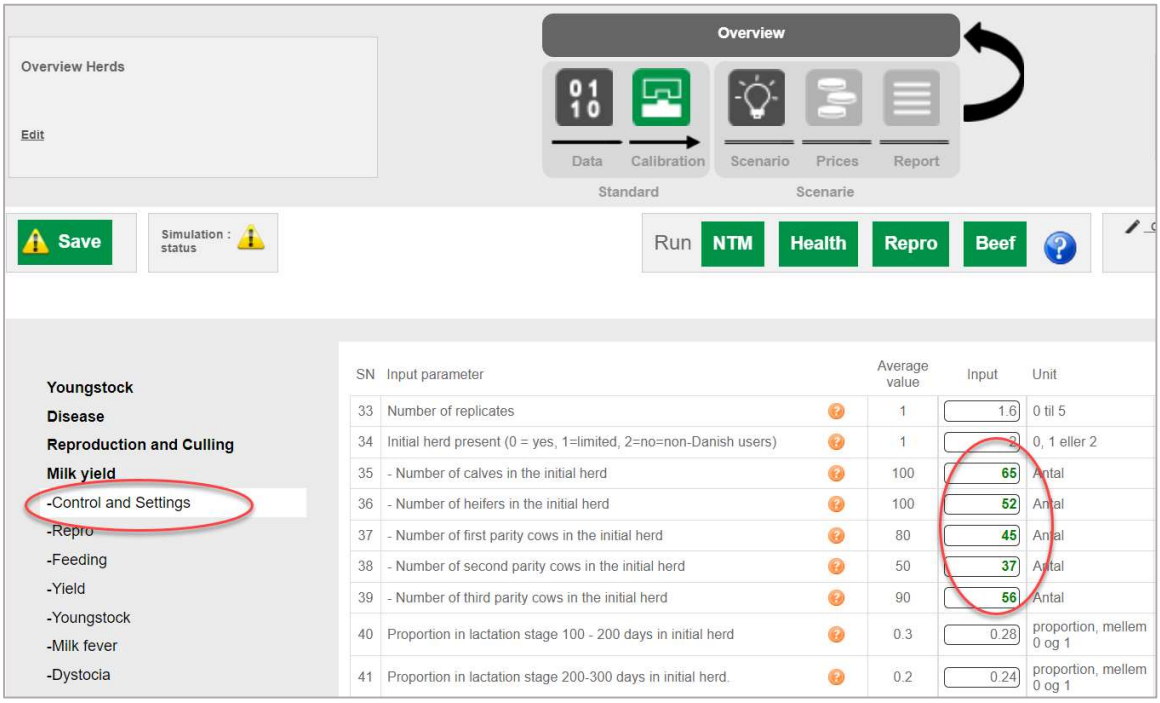
How much Gross Margin (dækningsbidrag) can we generate when expanding our herd? How fast will we be able to increase in cow-number? Will we expand faster when using sexed semen?

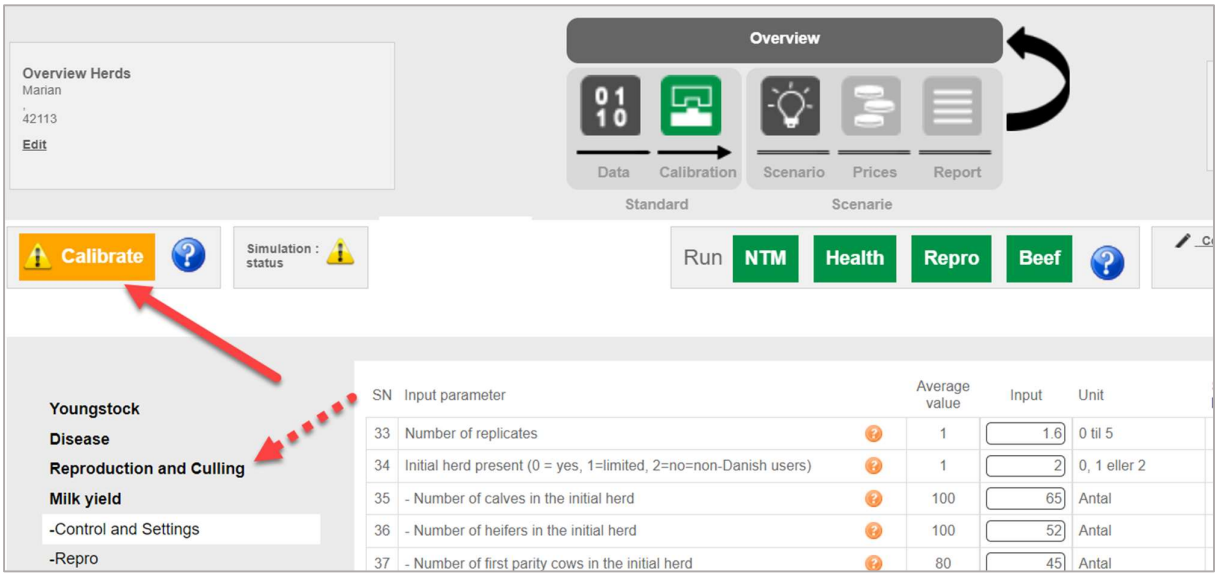
1) **You create your herd like you always do, but only when simulating a herd-expansion, you have to enter how many calves and heifers the herd has today. If you want to know how fast you can go from 134 to 180 cows, it is very important to know if you have 60 or 80 heifers today or if you have a very old (many third parity cows) or many young cows (many first parity cows).**

   Below: Enter how many calves, heifers, first parity, second parity and third parity cows you have today!

   Click on "Save"

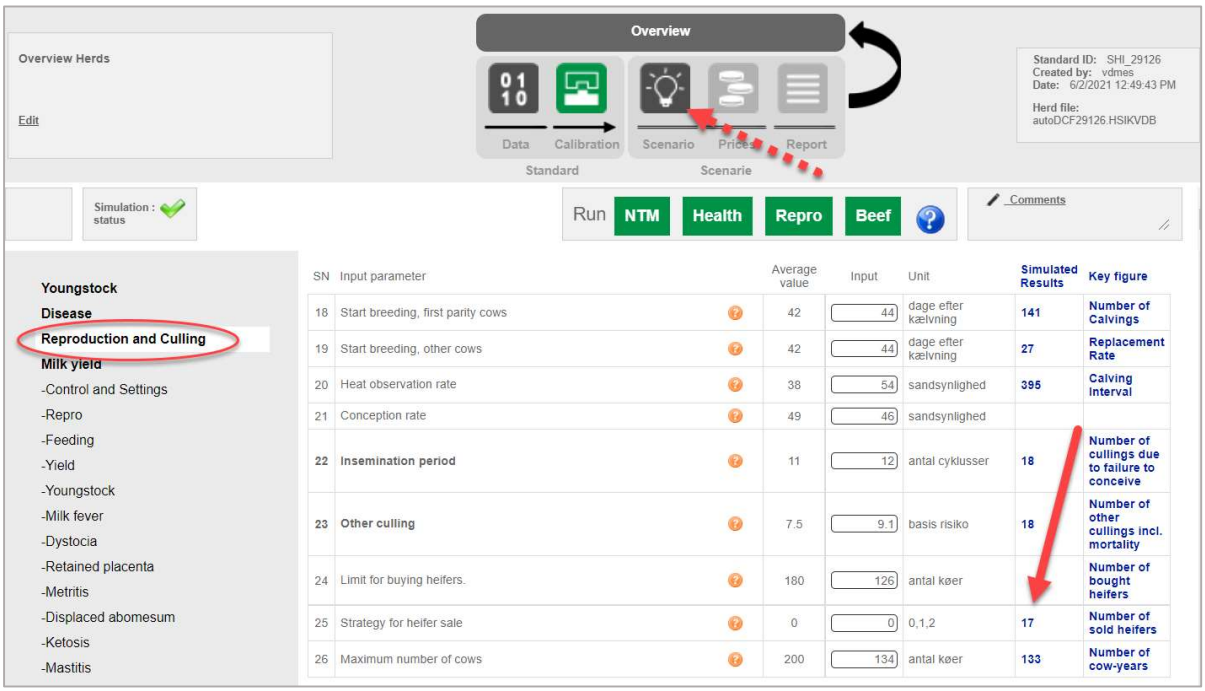


2) **Click on "Calibrate" and go into the category "Reproduction and culling (dotted arrow)"**

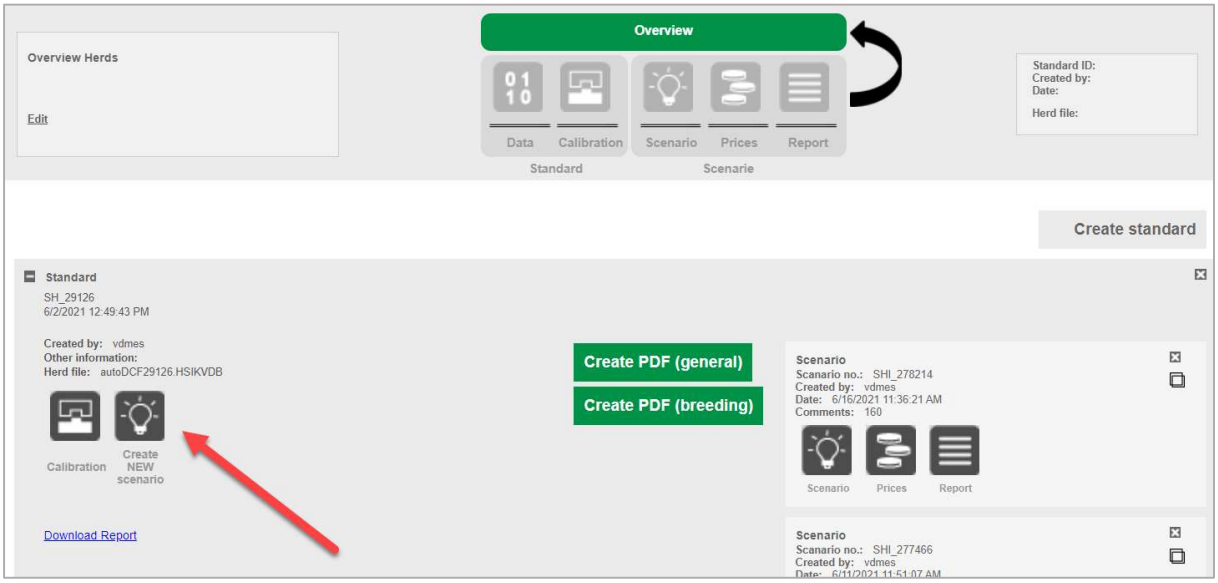


Here you can see that this herd, in a situation with constant herd-size (Maximum number of cows is 134), can generate a surplus of 17 heifers every year. So there is "expansion capacity". In case the herd would have 2-3 sold heifers, you could already now see, that it wouldn't be interesting to study herd expansion with own youngstock.

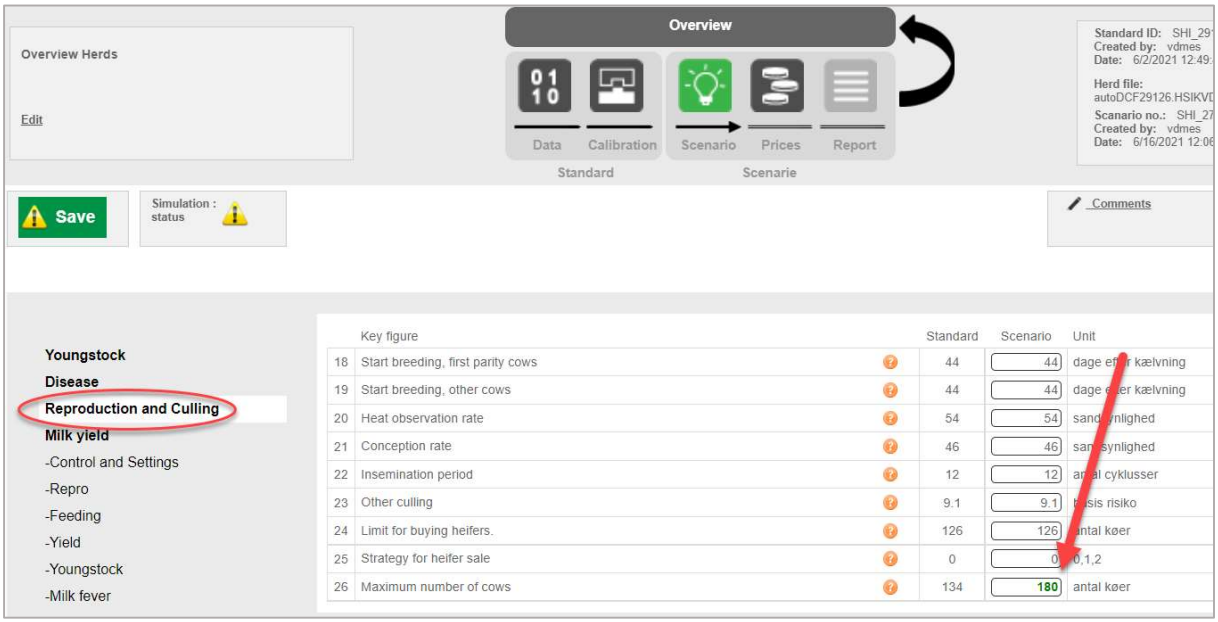
3) Click on Scenario (dotted arrow) to create a scenario in which you are going to simulate herd expansion.



4) Click on "Create new scenario"



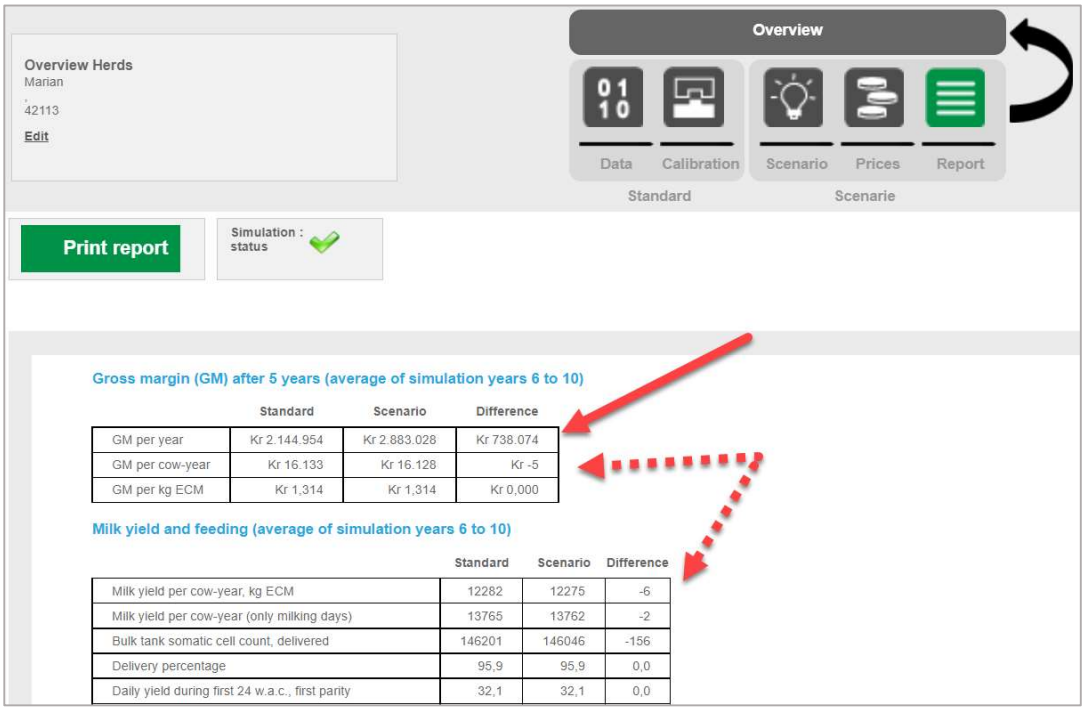
5) Increase the "Maximum number of cows" to (for example) 180.
Click on "save and run"



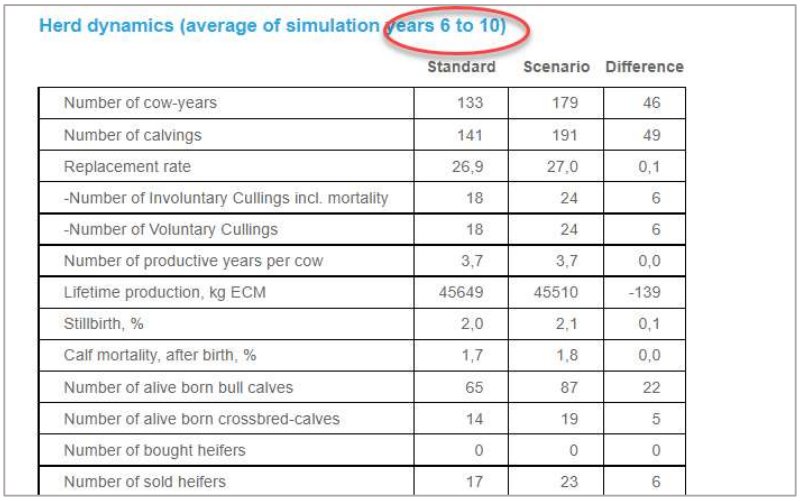
6) **In the Report you see that the Gross Margin per year of the farm is much higher (solid arrow),** because you have more cows.

The Gross Margin per cow and also the milk yield per cow is the same (dotted arrow) because we didn't change milk yield or disease risk.

In this situation the Gross Margin on cow-level is a tiny bit lower, but that is not significant. Sometimes the results an cow-level can be a lot lower when we simulate a very big increase in cow-number; during and also after the expansion, the herd doesn't have enough heifers for culling which reduces milk yield per cow-year.

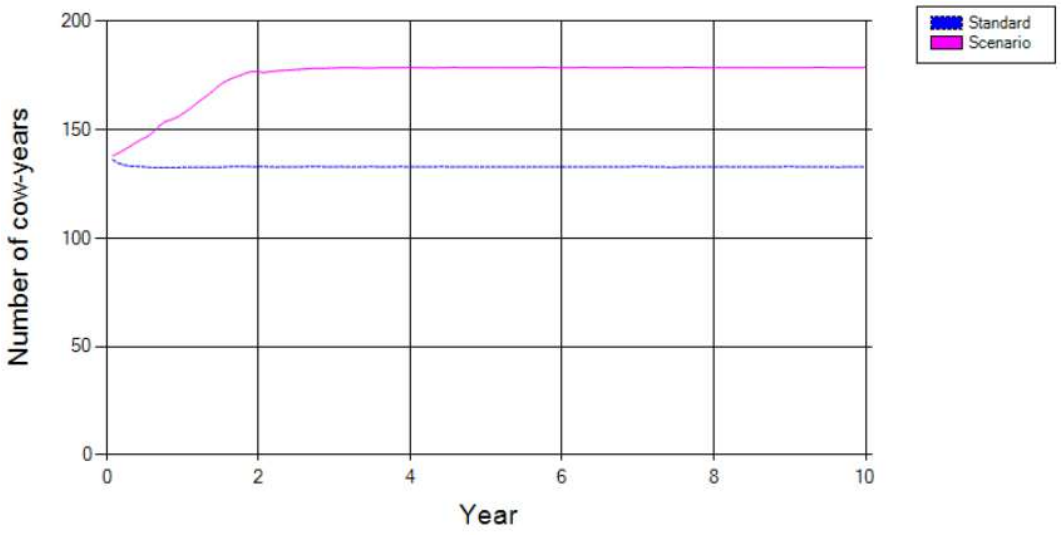


Scroll down in the report. This table shows that there is more of everything: more cows, calvings and sold heifers. But this is the long term situation; years 6 to 10.



	Standard	Scenario	Difference
Number of cow-years	133	179	46
Number of calvings	141	191	49
Replacement rate	26,9	27,0	0,1
-Number of Involuntary Cullings incl. mortality	18	24	6
-Number of Voluntary Cullings	18	24	6
Number of productive years per cow	3,7	3,7	0,0
Lifetime production, kg ECM	45649	45510	-139
Stillbirth, %	2,0	2,1	0,1
Calf mortality, after birth, %	1,7	1,8	0,0
Number of alive born bull calves	65	87	22
Number of alive born crossbred-calves	14	19	5
Number of bought heifers	0	0	0
Number of sold heifers	17	23	6

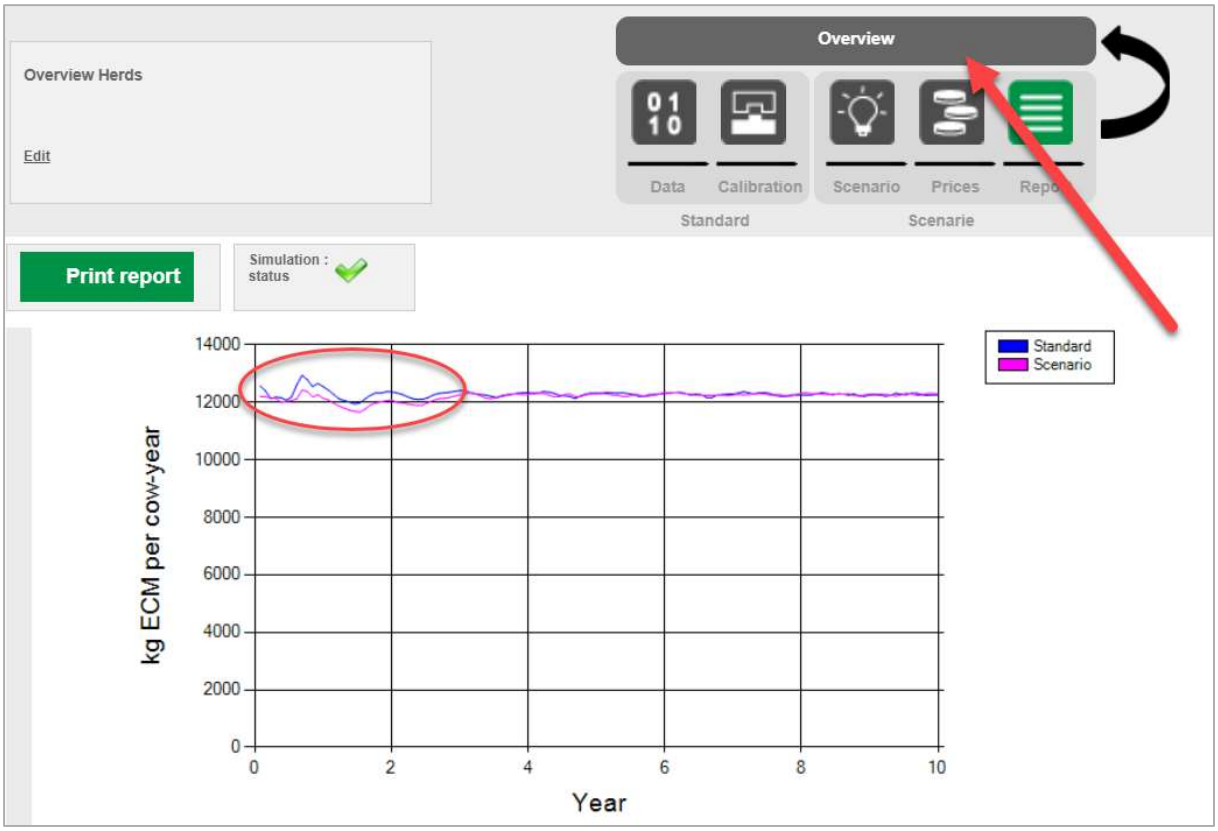
Scroll down in the report. See below: it takes 2 years for the herd to expand to 180 cows.



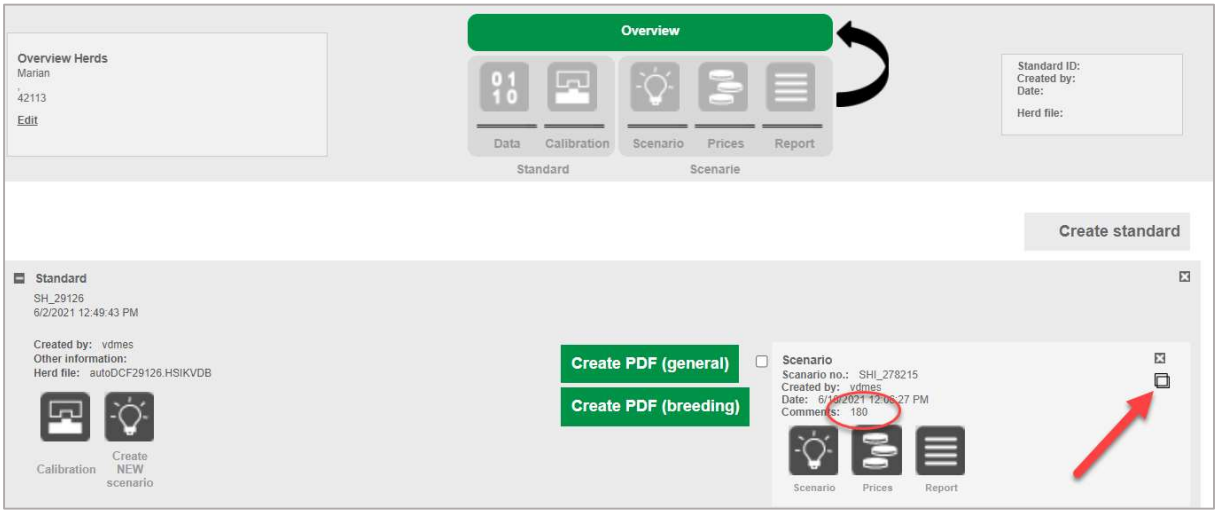
Scroll more down: you can see that the milk production is lower while the herd expands (circle below); more young cows and less culling of older cows, until the new cow-number is reached.

What if we also use sexed semen? Will that go faster?

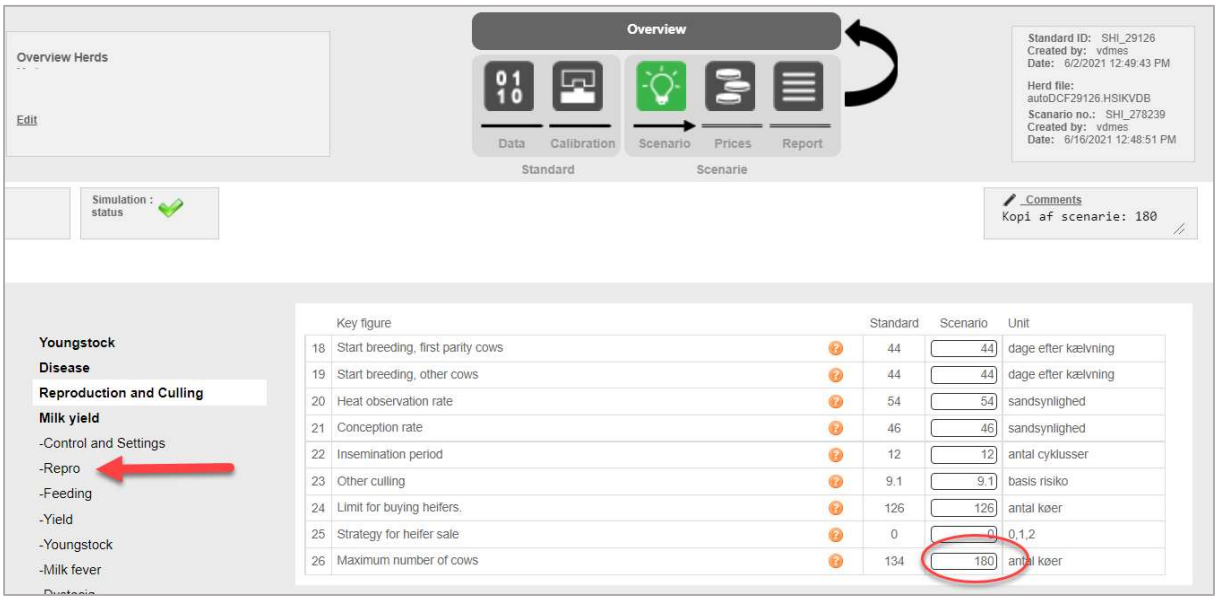
7) **Click on Overview in the top (red arrow).**



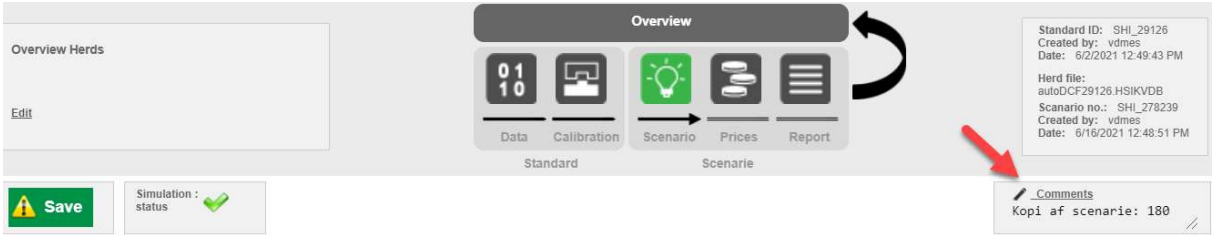
8) **Copy this scenario (red arrow): we want to <u>add on</u> to this scenario.**



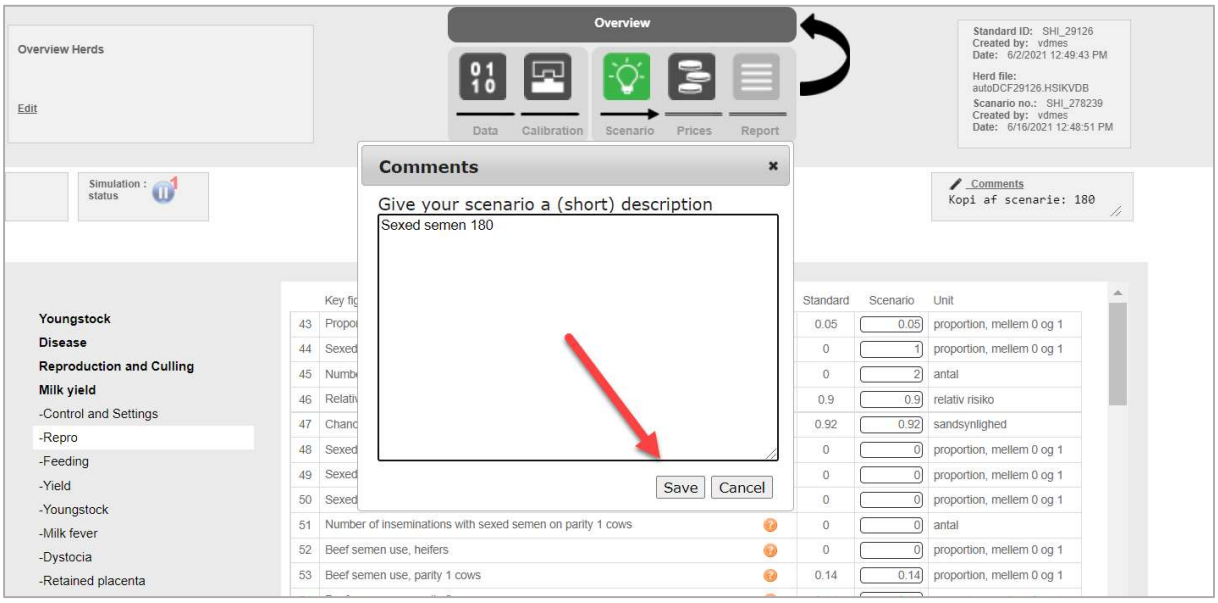
9) **We don't need to specify the "maximum number of cows" again (see circle below, it's still there, because we copied the first scenario). Enter the category "-Repro" (Red arrow)**



10) **Specify that you will inseminate ALL heifers (1) with sexed semen at a maximum of 2 insemination (read the question marks behind the parameters) and click on "Save". Make sure you change the name of the scenario (Red arrow)**



…and call it something like "sexed semen 180"

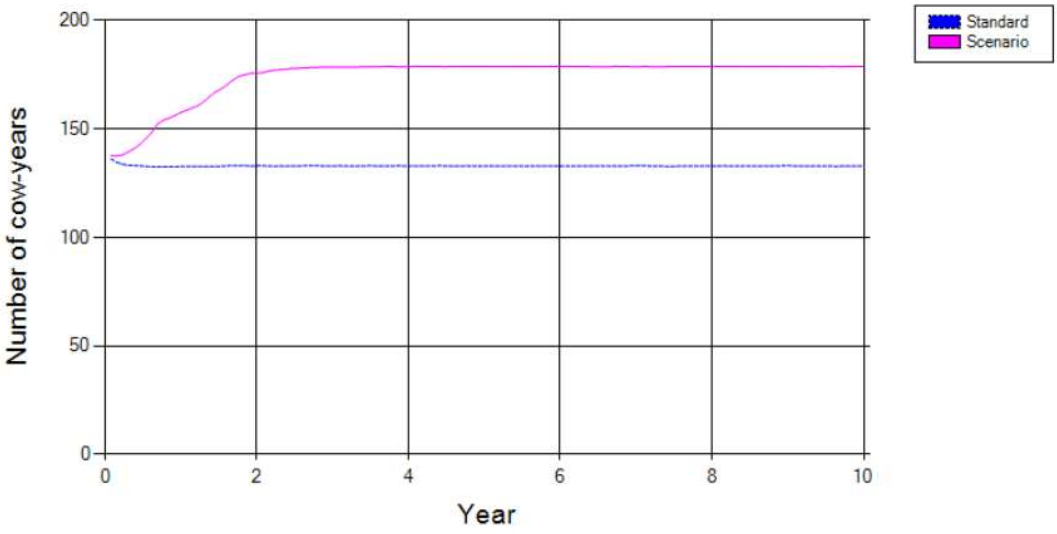


11) **The number of cows also increased after 6 to 10 years with 46, but the number of sold heifers is a lot higher now (the difference is 20, instead of 6 (see page 4)), because of the sexed semen.**

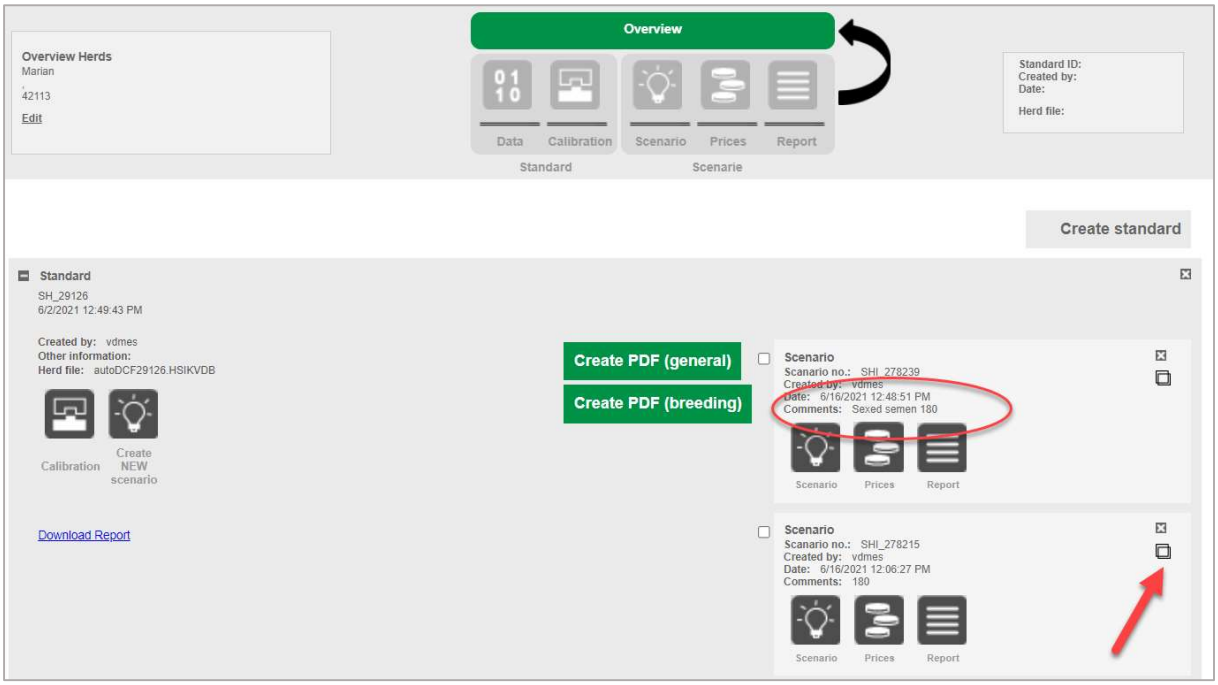
Herd dynamics (average of simulation years 6 to 10)

	Standard	Scenario	Difference
Number of cow-years	133	179	46
Number of calvings	141	192	51
Replacement rate	26,9	27,7	0,8
-Number of Involuntary Cullings incl. mortality	18	24	6
-Number of Voluntary Cullings	18	26	8
Number of productive years per cow	3,7	3,6	-0,1
Lifetime production, kg ECM	45649	44327	-1323
Stillbirth, %	2,0	2,0	-0,1
Calf mortality, after birth, %	1,7	1,8	0,0
Number of alive born bull calves	65	72	7
Number of alive born crossbred-calves	14	19	5
Number of bought heifers	0	0	0
Number of sold heifers	17	37	20

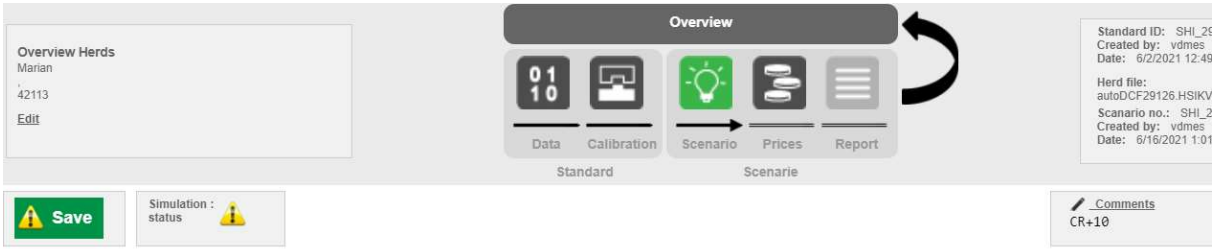
12) **Scroll down to the timeline for "cow-years. What do you see? Any difference compared to the first scenario? No!** in case you can expand the herd in 2 years, using sexed semen doesn't make herd expansion go faster: it takes 9 months plus 2 years before the use of sexed semen results in more heifers.



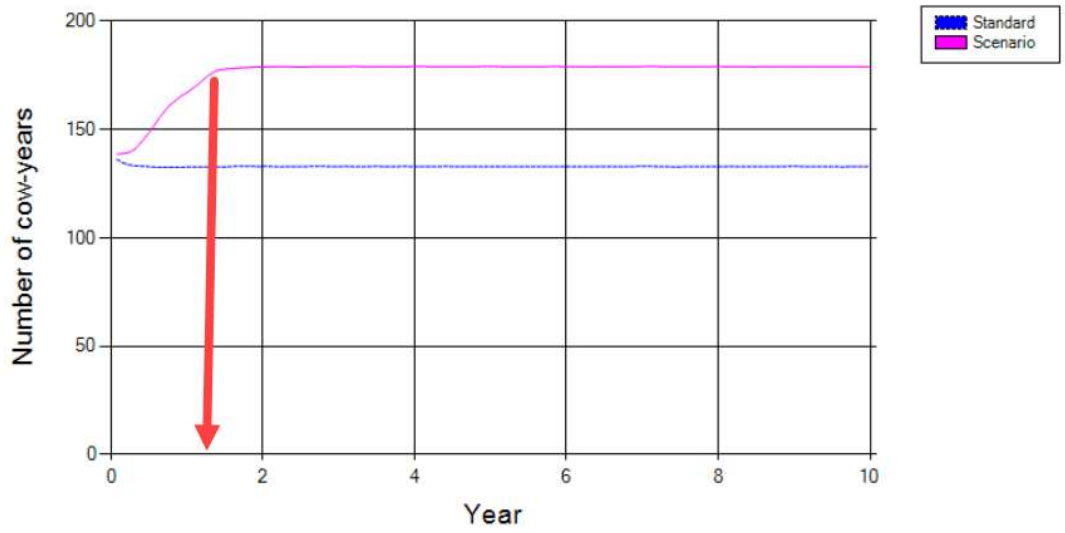
13) **What if we reduce the culling risk of the cow's? Go back to the overview (see step 7, page 5) and copy the first scenario again (red arrow). The second scenario is now *above* the first scenario (circle).**



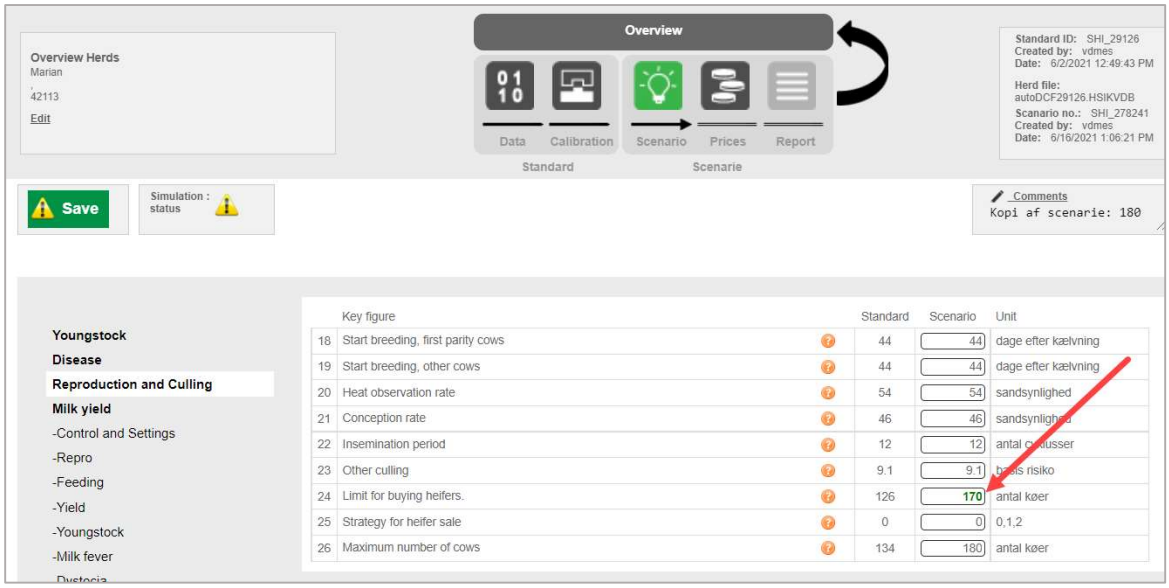
14) **Create this scenario and change the name of the scenario to "cull-5"**



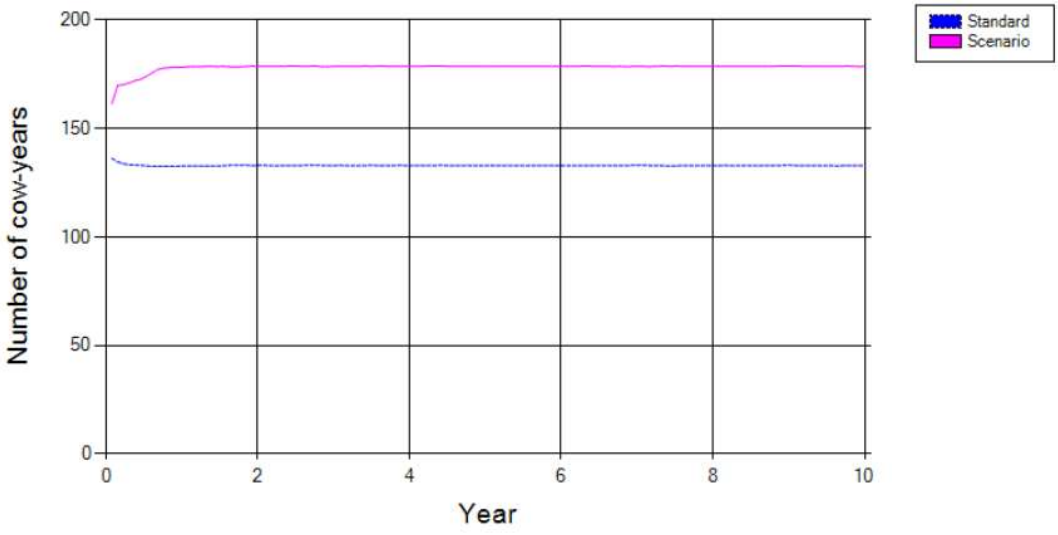
15) **Now you can see that expansion goes faster.**



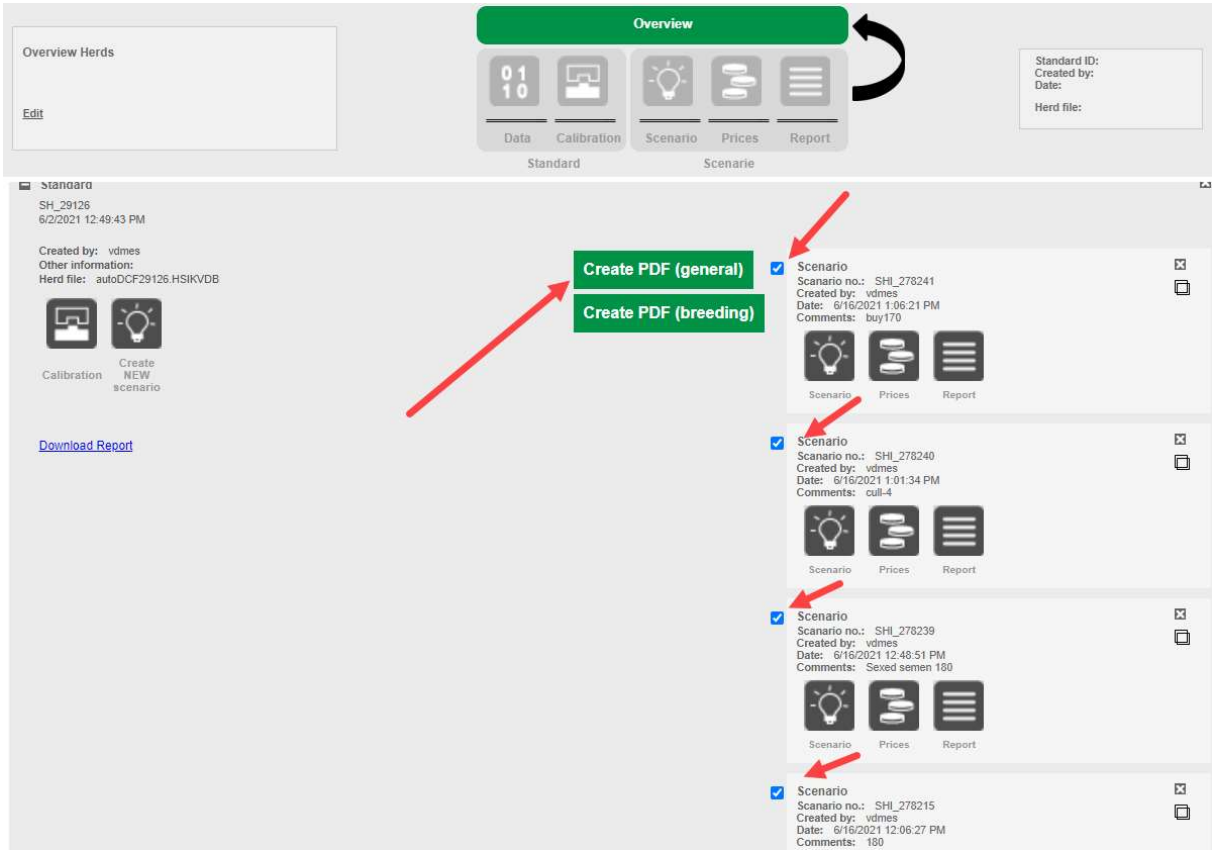
16) **What if we buy heifers?** Change the "Limit for buying heifers to 170". This means that the model will always make sure that the herd has at least 170 heifers. On the first day of simulation this results in the herd buying 37 heifers (because the herd has 133 cows today and heifers are bought until the herd has 170 cows (37+133=170)).



17) This goes a lot faster!



18) Make a summary of the 4 scenarios. See below. Put a tick mark in all the boxed next to the scenario and click on "Create PDF".



19) The bar chart shows the result for years 6 to 10. The scenario for "buy170" is the same for year 6 to 10; the long-term situation is the same. The table shows the same results as the ones presented on the previous pages; this PDF is just a summary of the same scenario.

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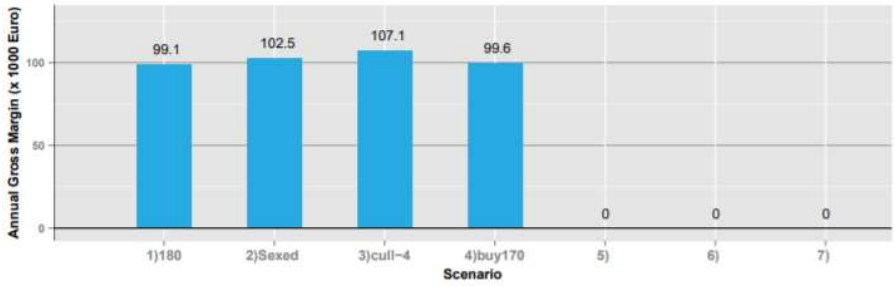
16th June 2021

Economics of management changes Herd ID: 42113

The bar chart shows changes in Gross Margin (GM) per year for up to 7 scenarios compared to the Standard (status quo).



Technical results from the simulation

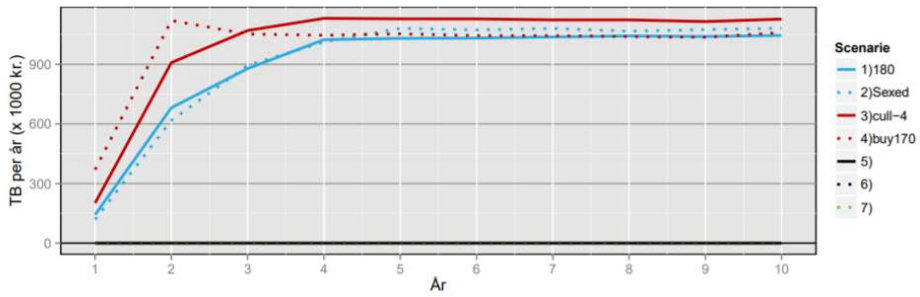
	Standard	1)180	2)Sexed	3)cull-4	4)buy170	5)	6)	7)
Cow-years	133	46	46	46	46	0	0	0
Calvings	141	49	51	44	50	0	0	0
Replacement rate	27	0	1	-4	0	0	0	0
ECM/cow-year	12282	-6	8	90	-1	0	0	0
Sold heifers	17	6	20	11	6	0	0	0
Youngstock	128	45	81	38	45	0	0	0
Need for labor*	85.3	27.9	33.2	27.0	27.9	0.0	0.0	0.0

* Hours per week. Estimated time use, based on a Danish project on time-registration on dairy farms (www.seges.dk).

But the development of Margin per year is quite different. In the "buy170" scenario the increase in Gross margin (TB) is a lot faster. This is important since the farmer already has invested in the stable-capacity.

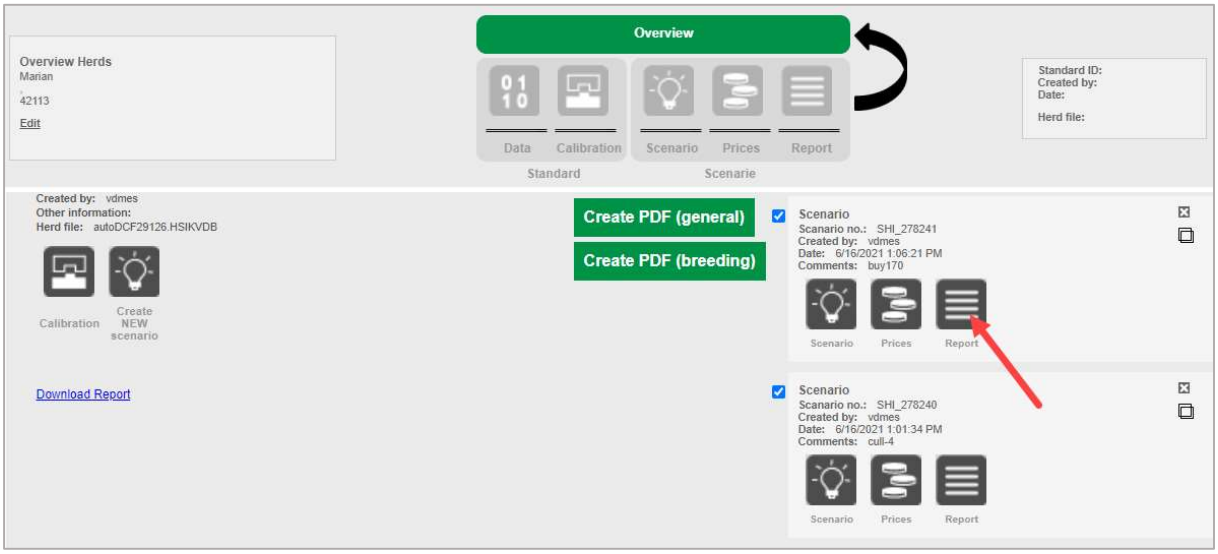
Utveckling av förändringen i TB per år

Nivån i åren 6 till 10 i figuren nedan överensstämmer med stapeldiagrammet.

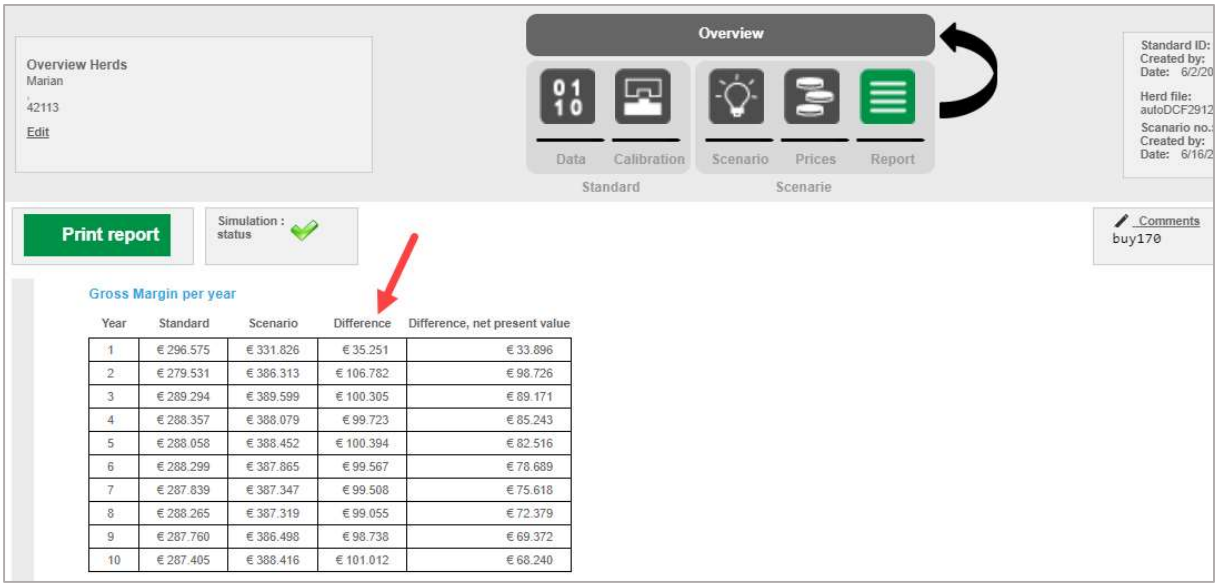


We do NOT include that there is a risk of introducing disease into the herd, when buying heifers from another farm! That is a risk you have to assess in discussion with the farmer.

20) **If you want to know precisely how much the margin is different in the first years, you have to go back in the single reports. See below:**



Scroll down



Year	Standard	Scenario	Difference	Difference, net present value
1	€ 296.575	€ 331.826	€ 35.251	€ 33.896
2	€ 279.531	€ 386.313	€ 106.782	€ 98.726
3	€ 289.294	€ 389.599	€ 100.305	€ 89.171
4	€ 288.357	€ 388.079	€ 99.723	€ 85.243
5	€ 288.058	€ 388.452	€ 100.394	€ 82.516
6	€ 288.299	€ 387.865	€ 99.567	€ 78.689
7	€ 287.839	€ 387.347	€ 99.508	€ 75.618
8	€ 288.265	€ 387.319	€ 99.055	€ 72.379
9	€ 287.760	€ 386.498	€ 98.738	€ 69.372
10	€ 287.405	€ 388.416	€ 101.012	€ 68.240

“Net present value” is today's value of a future stream of payments (Wikipedia): today’s value of money that you receive in the future.