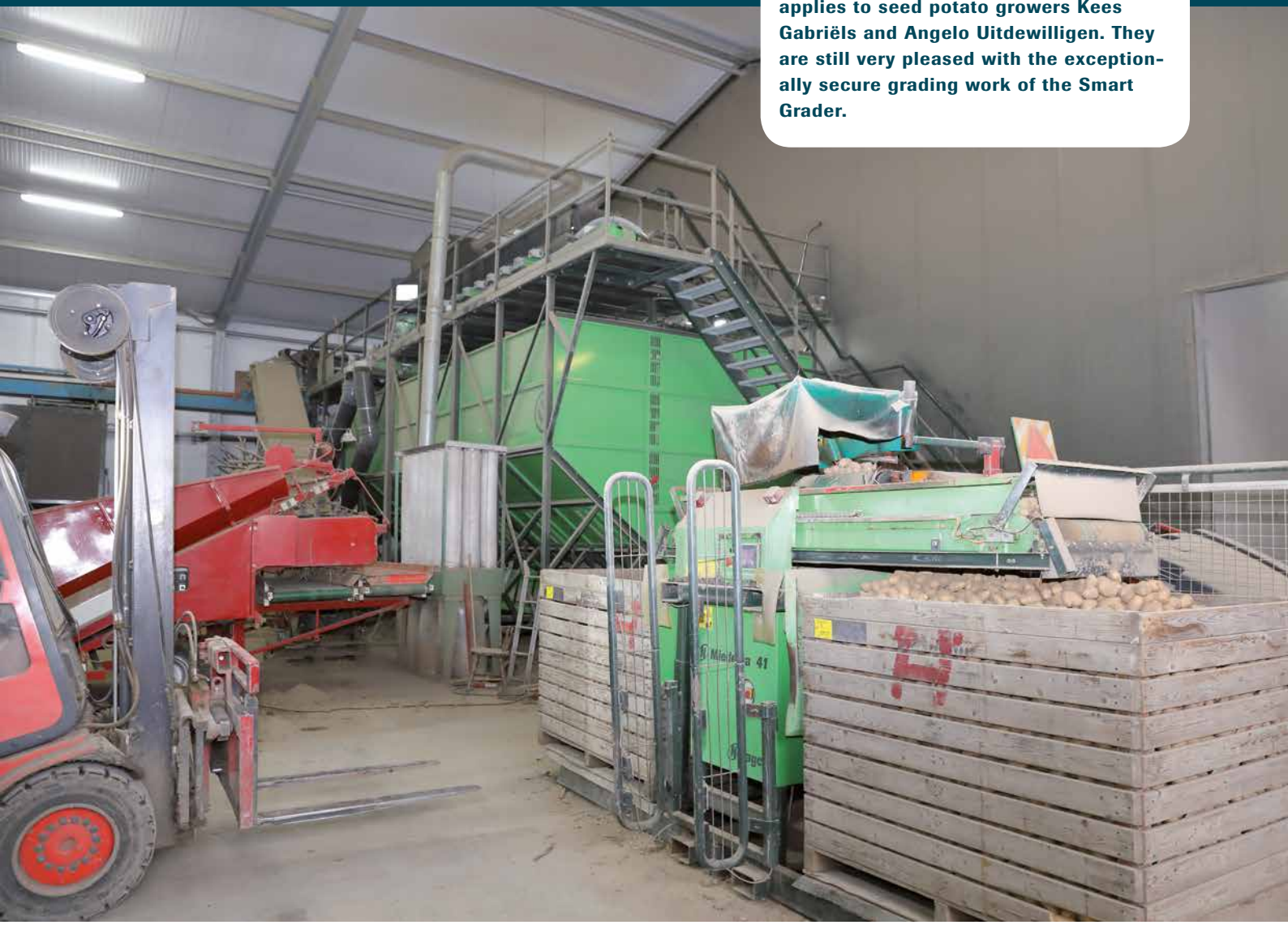
Ten years of Smart Grader practical experience: ‘grading much more seed’

In the summer of 2018, Dewulf of Roeselare (Belgium) sold the Miedema Smart Grader activities to GeJo Grading Services BV from the village of Luttelgeest. The service, spare parts supply and production remained guaranteed thanks to Gerard Blok and Jos Broeders, two entrepreneurs who have been involved in the development and sales of the Smart Grader technology for more than 10 years. This made the owners of the electronic potato grading machines, of which fourteen had been sold up to then, breathe a sigh of relief. This also applies to seed potato growers Kees Gabriëls and Angelo Uitdewilligen. They are still very pleased with the exceptionally secure grading work of the Smart Grader.



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It is a fresh morning in January. The outside temperature gauge in the car indicates barely 5 degrees Celcius on arrival at the farm of seed potato grower Kees Gabriëls of Zevenbergen and a strong breeze is blowing. Cap and scarf on and so on to the appointment. The monotonous sound of a grading machine and the diesel engine of a forklift truck-in-action reveal behind which barn door the farmer might be. When entering the space behind it, it's immediately noticeable that it isn't much warmer here than outside. High in a corner where the grading machines are placed above a row of storage bunkers, we find Gabriëls. With cap on and in a thick winter coat, he's using the control monitor to fine-tune the grading machine by a few pluses and minuses a little more precisely towards the potatoes that are currently rolling under the cameras. These are Spuntas from a colleague and they have a high amount of pox on them. In order to 'save' as many tubers from this lot as possible and because the demand for good seed is high and grading work pays off - good Spuntas in the 35/45 sizes currently bring in over 70 euros per 100 kilograms – he's processing as many exportable potatoes as possible.

Gentle and cool treatment

And yes, indeed, this is what happens at 5 degrees Celsius in a cooled space in which the outside temperature is the same as that in the storage units, Gabriëls explains a little later at the kitchen table. 'This definitely isn't a reciprocating grader? We're getting blue from the cold, but the potatoes don't, he laughs. 'NAK inspectors always have this special look: this can't be good. But after two seasons, each with around 2,000 tons of cooled grading, they are now convinced that it can't be bad, even when we're processing the extra-sensitive Spuntas. That's because the seed potatoes are getting a gentle treatment in the Smart Grader', the seed potato grower explains. 'They only roll backwards and forwards a little bit and the drop height is negligible during the entire grading process. That's very different from the bashes that long tubers in particular, like the Spunta, receive in the sieves of the reciprocating grader. But you'll need to grade at a temperature of 12 degrees, otherwise they'll be black and blue in no time.' According to Gabriëls, grading in a cool space offers several advantages. There's hardly any temperature change when you move the seed potatoes from their storage to the grading area and back again. This prevents any potential condensation and any extra stimulus for germination.

> 'This isn't a reciprocating grader, is it? We're getting blue from the cold, but the potatoes don't'

Especially now that the seed's germinating so easily this season, the vitality and quality of the planting stock is maintained. Another thing is that, naturally, you save energy costs. Just calculate the cost of warming up to the grading temperature and then perhaps cooling them down again should the seed not be delivered straight after grading. Incidentally, he hasn't yet calculated the saving himself, just as he hasn't yet figured out the profitability of the investment. 'I've been growing seed potatoes for many years, Spunta the longest. The area is about 25 hectares and I always grade the harvest myself.'

More exact in size

Until the arrival of the Smart Grader, Gabriëls also needed additional personnel to inspect the product. This changed in 2013. 'I met with a representative from Miedema that year. I'm not averse to novelties and I like a challenge. The representative was able to convince me of the advantages of electronic grading and its effectiveness. I thought that was worth the investment of 200,000 euros. I've never regretted that decision for a moment. Especially as the grader offered even more advantages than the representative had listed. I've already mentioned the advantage of grading in a cool space,

'As a seed potato grower, you have about one hundred grading days at your disposal, with which you can grade a total of about 100 hectares on your own with one Smart Grader', Kees Gabriëls experiences this as a big advantage.

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BEDRIJFSGEGEVENS VOF GABRIËLS
Kees Gabriëls, together with his wife Michelle, form the Gabriëls van den Broeke General Partnership. They run an arable farm in Zevenbergen with a total surface area of 77 hectares, which includes owned and leased land. The products in the cropping plan are 25 hectares of seed potatoes and, additionally, seed onions, onion sets, winter carrots, chicory pens, sugar beet and cereals. The seed potato varieties that the Partnership grows for trading company HZPC are Spunta, Sunita and Mondeal. Planting and harvesting is carried out by a fellow farmer, the other mechanisation activities are done in-house, and include storage and grading.

BEDRIJFSGEGEVENS VOF UITDEWILLIGEN
The arable farm of the Uitdewilligen family is a General Partnership with the brothers Angelo and Patrick and their parents Anton and Marian as partners. In total, the Partnership cultivates 130 hectares of arable land, of which 60 hectares are owned and 70 hectares leased. Seed potato cultivation is the most important activity with a total surface area of 100 hectares. Moreover, they also cultivate sugar beet, winter wheat and silage maize on the farm. Uitdewilligen sells the seed potatoes to three different trading companies: Stet Holland, Agroplant and Den Hartigh. The varieties that the family business grows are Miranda, Connect, Torza, Belinni, Spunta, Ramos, VR808, Triplo and Spunta. For some of their activities, the Partnership cooperates with fellow-seed potato grower Daniël Dekker.

but that's not all. The Smart Grader sorts long, big seed like a Spunta much more accurately than a reciprocating grader. As a result, it's possible to stay within the size with a much smaller margin and to grade more precisely in the size. So an extra 15 percent is feasible. Calculate that with today's prices. But even in a year like the previous one, the more precise grading work pays off. The ware oversize yielded only 3 eurocents per kilogram, while the seed was 33 eurocents. That's a difference of 30 eurocents for an x percentage of more accurate work.'

Grading for third parties as an extra.
And there's more, continues Gabriëls. 'We're now sitting at the kitchen table with a cup of coffee, while the Smart Grader continues to run quietly. If nothing happens, 'he points to his smartphone where he can follow the operations of the grader, 'then we can still chat for a bit longer. I usually start grading at the end of October. I turn on the machine at 8 a.m. and sometimes I only turn it off again at 10 p.m. On average, I grade around 35 tons a day, but the maximum capacity is much higher. If you could and wanted to, you can easily grade a

Angelo Uitdewilligen proudly shows his smartphone, on which he can follow and, if necessary, adjust the operations of the grading machine. 'I can now grade all the seed potatoes on my own and I don't have to be there all the time.'

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CALCULATION BY KOELHUIS BERGMANS COMPARING SMART GRADER AND NON-ELECTRONIC GRA

Koelhuis Bergmans from the village of Wijnaldum is also a Smart Grader user and carries out grading operations for third parties. For (potential) customers, in contrast to the growers visited in the article, they have made an extensive calculation in which the benefits of the electronic grading machine are shown in euros. The starting point for Bergman's calculation is a lot of 200 tons of Spunta class S with 20 percent scab above scab scale 2. The estimate of the size distribution of the lot and the financial potential are shown in the table below.

Table of size distribution and financial potential

Inventory	Kg	Prijs / 100 kg	Euros
28-35	10.000	€ 35,00	€ 3.500
35-45	60.000	€ 30,00	€ 18.000
45-55	90.000	€ 28,00	€ 25.200
>55	40.000	€ 5,00	€ 2.000
Totaal	**200.000**		**€ 48.700**

There are two grading options. Option 1 is standard grading, the lot is inspected three times to get the main size NAK-worthy. The oversize is not inspected due to the limited financial potential. Option 2 relates to grading with the Smart Grader. The lot is graded into two quality classes, to be delivered with less than a mark 2.5 for scab and a rating of 2. The basic assumption is that the Smart Grader provides a 10 percent improved size grading. All sizes are inspected and delivered. The following tables are the result of both options.

hectare yield a day if there are not too many abnormalities in the yield. As a seed potato grower, you have about one hundred grading days at your disposal, with which you can grade a total of about 100 hectares on your own with one Smart Grader. If the loading and unloading is arranged – I can store up to three hours supply in it – then I can do some other work in between or take a break. Only 10 percent of the total grading volume within a season requires additional manpower, just like now when we are grading a lot with many defects. Besides a high proportion of pox, there are quite a few half-tubers and the Smart Grader doesn't get them all out. This grading for third parties is also an extra bonus with which Gabriëls can earn back his investment. Fellow farmers often knock on his door with an irregular lot of seed that

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ADING INSTALLATION

Table Yield

Standard				*Smart Grader*			
Size	**Kilos**	**Price/100 kg**	**Euros**	**Size**	**Kilos**	**Price/100 kg**	**Euros**
28-35	7,000	35.00	2,450	28-35	8,000	35.00	2,800
35-45	44,000	30.00	13,200	35-45	46,000	30.00	13,800
45-55	63,000	28.00	17,640	45-55	68,000	28,00	19,040
35-55*	27,000	14.00	3,780				
>55**	48,000	1.25	600	>55***	29,000	5.00	1,450
**	38,000	1.25	475	**	22,000	1.25	275
Total	**200,000**		**34,365**		**200,000**		**40,870**

Key
* valuation 2
** ware
*** animal feed

Table Expenses

	Standard			*Smart Grader*			
Kilos	**Price/100 kg**		**Euros**	**Kilos**	**Price/100 kg**		**Euros**
Supply/delivery	200,000	500		Supply/delivery	200,000	0.25	500.00
Grading	200,000	1.20	2,400	Grading	200,000	2.50	5,000.00
Inspection hours 1x	110	24.00	2,640				
Re-inspection	130,000	0.50	650	Re-inspection	178,000	0.50	890.00
Inspection hours 2x	90	24.00	2,160	Inspection hours 1x	80	24.00	1,920.00
Re-inspection	114,000	0.50	570				
Inspection hours 3x	70	24.00	1,680				
Total			**10,600**	**Total**			**8,310.00**

The yield of the Smart Grader is considerably higher, because 56 percent more potatoes can be delivered. For treated potatoes, the difference will be even greater, because there won't be any fermentation costs. In addition to the difference in yield, there's also a difference in the costs.

Table Balance

Standard		**Smart Grader**	**Difference**	
Yield	€ 34,365.00	Yield	€ 40,870.00	+19%
Grading costs	€ 10,600.00	Grading costs	€ 8,310.00	- 22%
Balance	€ 23,765.00	Balance	€ 32,560.00	+37%
Costs/100 kg delivered	€ 9.30	Costs/100 kg delivered	€ 4.67	- 50%
Inspection hrs/1,000 kg delivered	2.4	Inspection hrs/1,000 kg delivered	0.4	- 81%
Delivered weight	114,000	Delivered weight	178,000	+56%

Not only is 56 percent more delivered with the Smart Grader, the costs are also lower. Thanks to optical grading, a surplus value in the balance is created of 37 percent.

their own grader can't deal with. This could be a lot that has a high degree of Rhizoctonia or common scabies, or with problematic sizes and/or shapes. Two years ago, there were a few lots with growth cracks and last year another lot of Lady Anna. 'Like Spunta, there were long tubers that couldn't be properly graded with their own grading installation. And I once graded a lot of ware potatoes with 40 percent of wire worm damage. This works well with the Smart Grader, which easily picks out the grub holes in each affected tuber. This resulted in another 200 tons of saleable potatoes for 4 cents extra, which meant that the farmer wasn't left with a completely rejected lot.'

Complete with bunker installation

In the far southwest of the Netherlands, about 100 kilometres from Steenbergen, the seed potato business of the Uitdewilligen family is located in the Zeeland-Flemish village of Biervliet. Just like his colleague Gabriëls, he also has about five years of practical experience with the Smart Grader. Another similarity between the two is that they made no calculation before the purchase. 'At one point, a representative came to the farm to tell us that he still had a nice grading machine on offer', says Angelo Uitdewilligen. 'It was all the way up in the north of the country in the shed of a colleague. So we went to have a look. Both the extensive possibilities of electronic grading plus the complete bunker installation and also the price which totalled just over 250,000 euros appealed to us. Alternatives were reciprocating graders on bunkers with a large capacity that needed extra manpower, which would also require a substantial investment. The Smart Grader also includes eight outlets, placed on bunkers, allowing the machine to continue for a long time without great effort. About 50 tons of graded product can be stored and we can fill up approximately 60 tons of stock to keep the machine working through the night, too', the seed potato grower argues. 'This is, in our view, the only way to do justice to the machine. You have to look at it this way. At that time, we had a really old jump grader running in the shed. Over the previous years, an increasing volume of long-oval varieties such as Spunta had passed through that machine. Everyone knows about the shortcomings of the jump grader when it comes to elongated tubers. A grader that can process them more accurately and so more in the desired size, seemed worth a challenge. That was actually the most important incentive to go ahead with the investment.' But there was another important reason and that was the fact that Angelo's parents were already in the

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process of retiring from the family business. 'At a certain point I'll be the only one here who's grading 100 hectares of seed potatoes, as we don't have any extra personnel. His brother Patrick is also part of the company, but he also works as a salesman at a mechanisation company in the region and he's not involved in the grading activities because of that job. Further reasons are: grading more potatoes in the right sizes, less inspection work and the ability to grade problematic lots with major defects and deliver according to NAK standards. We try to grow as many elongated varieties as possible, because these offer the greatest advantage for the Smart Grader.'

Understanding and fun are part of it

When the Smart Grader arrived, the jump grader wasn't immediately chucked out, Uitdewilligen says. 'To get some experience with the Smart Grader, we first ran a year with the old and the new machine, which wasn't such a bad decision. We also had to get used to electronic grading. Apart from the fact that there were a few technical shortcomings, which were neatly resolved, we had to learn to discover the many possibilities of the technology. How to set the machine as accurately as possible for the various parameters such as length and external defects. You need to have both understanding and fun in the process. I've made it into a sport to set the grader as accurately as possible.' And that's proved to be quite a success. 'We now grade 15 to 20 percent more for size than with the jump grader. You can calculate what that yields on 100 hectares of seed potatoes with an average yield of 45 tons per hectare.' Only this year, that calculation doesn't work. The crops in the Zeeland-Flanders region in the Netherlands were hit hardest by drought in the past summer. 'This season's yields per hectare are a third lower', says Uitdewilligen. Prices compensate for some of it, but that's relatively limited. 'We only have 4 hectares of free Spunta, the rest is in the pools of Stet Holland and Den Hartigh.'

GEJO GRADING SERVICES DEMONSTRATES NEW SMART GRADER EVOLUTION AT ITS OWN LOCATION

GeJo Grading Services of Luttelgeest is a company that was founded in 2009 by Gerard Blok (l) and Jos Broeders.

GeJo Grading Services of Luttelgeest is a company that was founded in 2009 by Gerard Blok and Jos Broeders. The company's head office is the Blok tree nursery in the village of Luttelgeest. Ever since the development of the Smart Grader which, at the time, took place at Miedema in Winsum, Broeders has been closely associated with the grading technology and has remained involved as a consultant in sales and services under the banner of both Miedema and Dewulf from the Belgian village of Roeselare. Last summer, Dewulf decided to stop the sale of machinery and found GeJo Grading Services willing to take over. Until then, the production of the grading machinery always took place in Winsum and, according to GeJo, this will continue to be the case. Blok and Broeders have recently set up a demo machine at the Luttelgeest site to introduce interested parties to the possibilities of electronic grading. Here, seed potato growers can bring along their own seed potatoes and experience for themselves what options the machine has to offer. This is the latest model with a new logo and a slightly different colour scheme in red/black. The name of the machine is Smart Grader Evolution. This new model incorporates all the practical aspects that experience has shown still required improvement. These include even better cameras and associated lighting. Also, a double air pressure system for the ejection of tubers has been installed. The single blower is for small tubers, and the system doubles the air pressure when bigger tubers pass through. Furthermore, the machine is completely digitally operated. The control panel has disappeared and all settings are now run via monitor, tablet, smartphone or PC. When investing in the Smart Grader, it is possible for entrepreneurs to make use of the Vamil and Mia tax and environmental investment deduction schemes.

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'In some seed potato lots, the scab percentage is so high that it's impossible to inspect them by hand. Then you can still sift 20 to 30 percent of export-worthy tubers from one of your colleague's lots,' says Angelo Uitdewilligen.

For 100 hectares of grading work

The fact that not all years are the same and have their own problems can also benefit the seed potato grower, namely contract work. 'This year scabies is a problem. In some seed potato lots, the percentage is so high that it's impossible to inspect them by hand. But the Smart Grader can do it. Then you can still sift 20 to 30 percent of export-worthy tubers out of one of your colleague's lots. For example, Uitdewilligen also used the Smart Grader to grade a lot of Bintjes with a very high percentage of bottlenecks, a form of abnormal tubers. 'You just couldn't inspect them by hand.' All in all, the seed potato grower now has grading work for 100 hectares of seed potatoes from his own crop and also some tons of contract work. This means that the Smart Grader may even run 24/7 for some periods. And up to 60 tons of seed potatoes a day may pass under the cameras. Uitdewilligen proudly shows his smartphone, on which he can follow and, if necessary, adjust the operations of the grading machine. 'I can now grade all the seed potatoes on my own and I don't have to be there all the time. Occasionally, I adjust a few settings and see that there's enough material for the Smart Grader to run for a few more hours.' And if he can't figure out a setting or a malfunction, he'll be in touch with Jos Broeders in no time. 'I can always contact him and he can also see spot malfunctions by remote control, and analyse and adjust machine settings if necessary. In that respect, I am very happy that Jos and his mate will continue with their service and sales, because we are very pleased with the Smart Grader and we hope to stay that way for many years to come.

'This means that the Smart Grader may even run 24/7 for some periods'

Leo Hanse