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# The precise potato

## Adoption of precision agriculture technologies


What's the best way to improve the sustainability as well as the yield of agriculture? Precision agriculture is a promising set of technological innovations. It refers to the adjustment of tillage and crop care to smaller and smaller units in space and time. Every plant receives specified treatment, based on observing, measuring and responding to variability in crops. A range of technologies are used to this end, including ICT, GPS and sensor technology.

The implementation of precision agriculture lags behind expectations. A group of Groningen potato farmers, organized in aGroFuture, aims to identify and overcome the barriers for precision agriculture in seed potato cultivation. Lieke de Groot, bachelor student Industrial Engineering and Management, assessed the potential and the expectations in the field. She designed a decision tool for the adoption of single precision agriculture technologies.

## Groningen is not America

A key factor in the barriers is in the focus. Currently the focus of precision agriculture is on resource costs savings (which is a main factor in e.g. the USA). In the Netherlands the farmland is the major expense, changing the focus to yield increase. According to the farmers who Lieke interviewed, the advantages of the technologies are not proven (yet) from this point of view.
Furthermore the general expectations towards precision agriculture are a key factor: the peak of the hype is over and the technology has to overcome the trough of disillusionment to come to realistic perspectives (Figure 1).

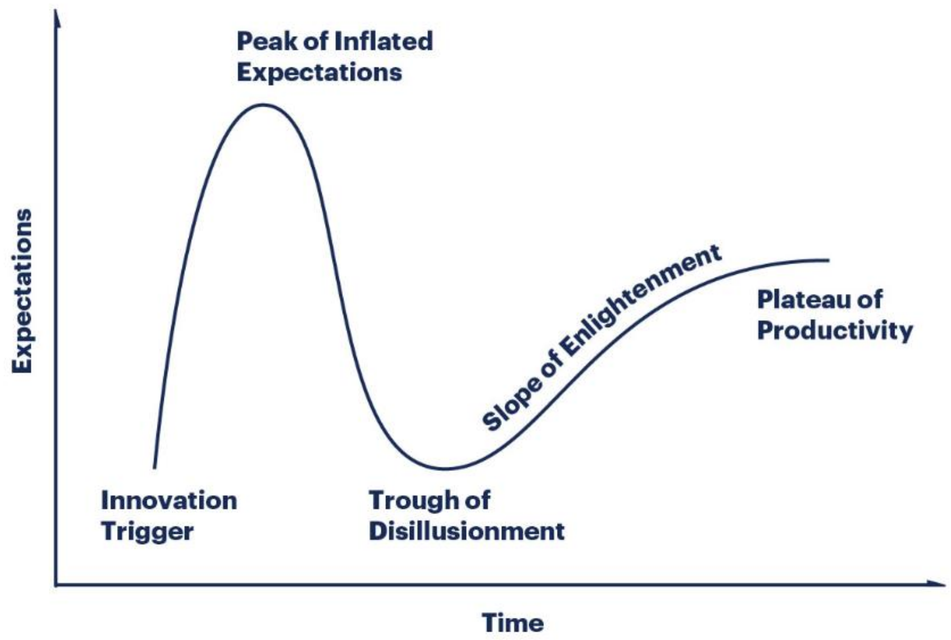


Figure 1 Gartner's Hype Cycle (O'Leary, 2008)

## How to decide

The decision tool allows the farmers to select a matrix of potential technologies that fits his/her farm best. Five key performance indicators are identified, with priority for yield increase. Quality also has a high rate in the specialized seed potato sector. Figure 2 presents as an example the matrix for the scenario of variable field conditions and variable acidity (on the micro level). The technologies with green score lines score sufficient.

| KPI | Rate | Controlled Traffic Farming | Variable dosing of lime | Variable planting differences | Variable dosing of crop protection products | Variable dosing of fertilization | Yield Mapping |
|---|---|---|---|---|---|---|---|
| Yield | 5 | + | + | + | ? | ? | + |
| Quality | 4 | + - | + | + | + | ? | + - |
| Convenience | 4 | + + | + - | - | + - | + - | + - |
| Costs | 3 | + - | + | + | ? | - - | ? |
| Sustainability | 2,5 | + + | + - | + - | + + | + + | + - |
| | | | | | | | |
| Total score | | 38.75 | 30 | 20 | 22.5 | -8,5 | 12,5 |

Figure 2 Matrix for the scenario of variable field conditions and variable acidity.

Note that the key performance indicators are rated according to the priorities of the farmers. Other stakeholders might have other priorities, e.g. sustainability, which can be implemented in the tool.