

Plant Observer & Diagnostic System | Financial Statements

The Plant Observer & Diagnostic System (PODS) is a WEB-based DSS (decision support system), providing tactical plant protection management with pest and disease prediction based on plant forecasting models.

A short structural overview of the PODS can be found in these documents: [\[1\]](#), [\[2\]](#).

The cost-benefit analysis below contains tables with data accuracy larger than 5 %. The analysis is being concentrated on significant financial components only, such as system development costs and the hardware elements of the terrestrial network.

System Development Costs

The PODS is essentially a (complex and highly sophisticated) software system, therefore the main cost component is the labour cost. AgrobyteX prefers freelancers instead of hiring permanent employees; this explains the relative higher salaries. It does not pay to use inadequately or partial skilled labour.

The following table gives an overview about the allocation of amounts collected:

monthly personnel costs	PM	SwArch, Sys Eng, CEO	SeniorSw, P.P.E, TechWR, El.Eng	SwExp	Sw Tester	Admin
EUR	7,000	6,000	5,000	4,000	3,000	2,500
HUF	2,556,120	2,190,960	1,825,800	1,460,640	1,095,480	912,900
salary brutto	2,180,000	1,880,000	1,560,000	1,250,000	936,000	780,000
salary netto	1,450,000	1,250,000	1,037,000	831,250	622,440	518,700

Role	monthly personal cost	weekly personal cost	duration [week]	sum
CEO	6,000	€1385	52	€72,006
Admin	2,500	€577	52	€30,002
PM	7,000	€1616	52	€84,006
El. Eng.	5,000	€1154	16	€18,463
Sys. Eng.	6,000	€1385	35	€48,465
Sw. Arch.	6,000	€1385	56	€77,544
P.P.E.	5,000	€1154	52	€60,005
Sen.sw.exp.	5,000	€1154	60	€69,236
Sw.exp.	4,000	€923	60	€55,389
Sw.tester	3,000	€692	68	€47,081
Techn.Wr.	5,000	€1154	12	€13,847
Overall Labour Costs				€576,044
				HUF 210,348,341

4.333 week/month

Server rental cost (522 EUR/month managed server)	HUF 2,287,362
Rent for premises and other office expenditure	HUF 12,000,000
Terrestrial sensor network (OEM) for development	HUF 5,000,000
material costs (hw + sw tools)	HUF 12,000,000
indirect costs	HUF 8,000,000
Overall Development Costs	HUF 249,635,703
	€683,634

The most important rapeseed crop volume and price data are summarized in the table below:

Production and Price Data in Hungary	
Rapeseed arable area (HU/2019)	300,000 ha
Avg. rapeseed crop yield	3 t/ha
Avg. rapeseed price	390 €/t
Avg. rapeseed price	1,170 €/ha

Developing and marketing new product double fair returns are needed: not only the product's customers should be convinced with the outcome of the product, but also the investors who finance the initial developing of the product, must be satisfied.

The following table shows the costs and benefit from the grower's viewpoint. The grower's costs are composed from two items:

- (1) refunding the deployed terrestrial sensor-network on the arable area (2.78 €/ha/month), and
- (2) the service cost of the PODS (2.20 €/ha/month)

The grower's yearly total cost is well predictable: sum of them, multiplied with 12, namely 59.73 €/ha/year. This value is 5.11 % of the avg. specific yearly crop price (1,170 €/ha).

Using PODS a min. 25 % crop volumen increment compensates these costs, so the avg. benefit of the grower's is 232.77 €/ha/year. That means **58,192 € clear profit** on an avg. 250 ha cultivated rapeseed arable area:

Grower's Nonrecurrent Expenditures and Service Costs	
Cost of weather station	800 €/pcs
Number of weather station/ha	0.125 pcs/ha
Cost of weather station	100 €/ha
Duration of trade credit for weather stations	3 year
Amortization of weather stations' costs	2.78 €/ha/month
PODS service costs	2.20 €/ha/month
Total costs of PODS	59.73 €/ha/year
Total costs of PODS in % of avg crop price	5.11 %
Min. crop volume increment in % using PODS	25.00 %
Avg. grower's benefit	232.77 €/ha/year
Avg. grower's in benefit in %	19.89 %/ha/year
Avg. rapeseed arable area	250 ha
Avg. grower's benefit on avg rapeseed arable area	58,192 €

Advantages commonly attributed to automation include higher production rates and increased productivity, more efficient use of materials, better product quality, improved safety, shorter workweeks for labour, and reduced factory lead times. This applies with regard to the agriculture, as well.

These semi-hidden factors are difficult or simply not able to quantify, anyway, they are always present and are effective continuously.

Of course, it is an important basic requirement the return of investment, as well. The payback time depends on the grower's financial burden and the volume of the arable area where the PODS is used, what is reasonable. In case of 10,000 ha is the time needed to pay back the total costs (development costs and the cost of terrestrial sensor network) is smaller than 3 years.

This document does not contain detailed cash flow analysis, nevertheless, it seems to be evident, that a continuous financial operation is extensively quaranted (the system development is a nonrecurrent expenditure, so the second return cycle should not contain the costs of that).

Fair Return of the PODS Development Costs and Profitability

PODS estimated development cost 683,634 €

Total costs (weather stations + development costs)	Income/year	Return [years]
5,000 ha 1,183,634 €	298,667 €	4.0
10,000 ha 1,683,634 €	597,333 €	2.8
20,000 ha 2,683,634 €	1,194,667 €	2.2
30,000 ha 3,683,634 €	1,792,000 €	2.1

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