SUSTAINABLE STORAGE OF GRAINS
BY IMPLEMENTING A NOVEL PROTECTANT
AND A VERSATILE APPLICATION TECHNOLOGY

# D4.13. Co-Creation Workshops – October 2025
# novIGRain

| Co-Creation Workshops – October 2025 | |
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| Dissemination Level | |
|---|---|
| **X** | **PU = Public** |
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| | **CO = Confidential, only for members of the consortium (including the EC)** |

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# 1 Introduction

The focus of the novIGRain project is on the development of 3 innovations in the field of grain storage management:

- The development of a novel product that can be applied as a ULV (ultra-low volume);
- The development of a novel application technology that should make it feasible to apply multiple insecticides at the same time;
- The development of tools and manuals for doing proper grain storage management taking into account the possible resistance of insects to substances applied. These will be based on research on insect resistance done within the novIGRain project (in combination with literature studies).

Within the novIGRain project “co-creation workshops” were included to assure that the innovation will be developed according to the stakeholders’ needs to assure a good market uptake when the project will be over. Throughout the project, a number of different Co-Creation workshops organised in 3 regions (being: France, Germany and Hungary). The provisioned timing of the workshops is:

- March-May 2021
- September-November 2023
- September 2024
- October 2025

## 1.1 Goal of Co-Creation Workshop in 2025

Building on the feedback from the previous workshop rounds, consortium meetings and suggestions from reviewers, the main aim of the workshop in 2025 was to expand the reach and go beyond the experts that were drawn to the earlier workshops. Since in previous years the workshops attracted grain storage experts, pest control operators and researchers, in 2025 the main idea of the workshop was instead of attracting participants join them in an already established large event that attracts wide range of specialists associated with biocontrol, plant and grain protection. As such the workshop in 2025 did not take the form of the workshop but rather was an effort to most efficiently engage and interact with a broad group relevant stakeholders in the large conference format. To achieve that the following goals were set out:

As a result, the 2025 workshop took the form of a strategic engagement within this broader conference setting, rather than a traditional workshop. This approach was chosen to maximise interaction with a wider group of relevant stakeholders. The following objectives were set:

1) **Raise awareness** of NovIGRain’s purpose, its relevance, and the challenges it seeks to address in stored grain protection.
2) **Engage with key stakeholders** who had not previously been involved, including investors, policymakers, major chemical manufacturers, and agricultural cooperatives.
3) **Gather feedback**, both qualitative and quantitative, on the potential business models developed within NovIGRain for the new insecticide.

# 2 ABIM 2025

The Annual Biocontrol Industry Meeting (ABIM 2025) served as a leading global platform for advancing biological plant protection and sustainable agriculture. The event took place in Basel, Switzerland, from 20 to 22 October 2025, bringing together innovators, researchers, and industry leaders to shape the future of biocontrol. Although the conference did not specifically focus on stored

grain protection, the experience of the project partners shows that ABIM participants possess a broad range of expertise, including areas relevant to NovIGRain. Furthermore, the diverse perspectives of experts in the wider field, combined with the conference's appeal to policymakers, make it an excellent setting for the NovIGRain workshop.

ABIM 2025 highlighted the latest developments in biological crop protection, showcasing cutting edge research, novel technologies, and practical solutions for integrated pest management (IPM). The programme focused on environmentally responsible alternatives to chemical pesticides, strategies to enhance biodiversity, and approaches to meet the growing demand for sustainable food production. Key topics included regulatory frameworks, market trends, and the role of biocontrol in addressing global challenges such as climate change, pesticide restrictions, and soil health.

The conference provided a dynamic forum for stakeholders across the biocontrol value chain including manufacturers, distributors, researchers, policymakers, and growers to exchange knowledge, foster partnerships, and explore innovations that balance ecological sustainability with economic viability. Overall, this setting of ABIM 2025 offered access to stakeholders relevant to NovIGRain who had not yet been approached by the project. Moreover, the diversity of expertise and the commercial mindset of the participants proved particularly valuable for assessing the viability of potential new business models for a novel insecticide.

# 3 Engagement Strategy

To ensure effective engagement with participants at ABIM 2025, a combination of interviews and three carefully designed posters was used.

Firstly, three posters were developed to communicate the purpose and progress of the NovIGRain project:

1. **Project Overview Poster**. This poster summarised the project's core objectives, key focus areas, and methodologies. It also provided an update on current progress and outlined the expected outcomes by the end of the project.
2. **Business Models Poster**. The second poster presented the potential business models for the new insecticide identified within the project. It also shared initial evaluation results from internal NovIGRain experts, offering insights into the commercial viability of these models.
3. **Interactive Feedback Poster**. The third poster was designed as an interactive canvas, inviting participants to share their opinions on each shortlisted business model. Using stickers, attendees rated each model on a scale from "very bad" to "very good". This activity aimed to encourage stakeholder engagement and gather broader perspectives on the proposed models. The feedback collected provided valuable context for comparing stakeholder views with those of internal and external experts who participated in a related survey.

These activities contributed directly to the development of Deliverable D4.10: Business Models. The interactive format also helped attract more participants and sparked wider conversations around biocontrol, grain protection product development, and strategic decision-making in this field.

In addition to the poster sessions, the United Experts team explored the conference exhibition, which featured a wide range of companies from major chemical producers such as Janssen, Bayer, and Corteva, to emerging startups and research spin-offs. This provided an opportunity to identify relevant stakeholders and conduct one-on-one interviews. These discussions focused on business experiences related to launching new products, offering valuable insights that could support the market introduction of NovIGRain innovations.

# 4 Collected Data and Outcomes of Co-Creation Workshop

## 4.1 Conversations and Qualitive Feedback

During ABIM 2025, in total the conference attracted up to 2000 participants out of which around 40-50 participants from across the pest control and crop protection sector actively engaged in informal and semi-structured discussions about NovIGRain. Most of those approached were not directly familiar with post-harvest insecticides or their current challenges, which confirmed that the event successfully broadened NovIGRain's outreach beyond its traditional expert network. Those with relevant background knowledge were mainly based in France, Switzerland, Germany, Belgium, and the Netherlands; however, participants from other regions were also keen to learn about grain storage and share their impressions.

The resulting discussions raised the interest in the project which is reflected in the social media statistics with over 6 times of normal level of engagement in NovIGRain LinkedIn page. For more details on social media statistics refer to the corresponding attachment to this report.

Participants showed particular curiosity about the nature and status of the active substance, frequently asking whether it was already available on the market, when commercialisation might be expected, and how the product would be applied. Several attendees initially assumed NovIGRain was a start-up, illustrating how novel and distinctive the project's concept appeared within the wider crop protection community.

There was recurring interest in understanding the target users and coverage along the grain storage chain, as well as whether the project incorporated integrated pest management (IPM) principles. Another common theme was frustration with lengthy regulatory processes, widely regarded as a barrier to innovation. Several participants expressed the view that policy-making often lacks sufficient understanding of practical business and research realities. This concern was accompanied by calls for clearer, faster pathways for biocontrol product approval.

In general, attendees recognised that all shortlisted business models could have a place in the market, though expected revenue potential and implementation challenges would differ significantly. Large biochemical producers noted that introducing new products requires a tailored approach for each market. Typically, producers rely on their most trusted distributors for initial test shipments and then gradually expand to a wider market if the product proves successful. The distributor's role is particularly important in educating potential customers about the product's mode of action and application, ensuring its value is fully appreciated by the market.

The event also attracted interest from potential investors, who saw promise in the novel approach and were keen to stay informed about the project's progress.

## 4.2 Poster Interactions

### 4.2.1 General Poster Feedback and Reactions

The three NovIGRain posters (Project Overview, Business Models, and Interactive Feedback) served as effective conversation starters. Many participants engaged with the Business Models poster in particular, where short explanations by the team encouraged attendees to share their opinions. The interactive sticker activity drew attention and created a steady flow of visitors throughout the poster sessions.

Poster interactions revealed a wide range of opinions and impressions regarding the proposed business models. While certain trends emerged, there were also notable outliers that differed significantly from the general views. Perceptions varied not only by region but also by the nature of participants' activities and their level of involvement in biocontrol and grain protection.

Models 1 and 4 were generally considered the most likely to succeed because they align closely with established business practices, making them more feasible. In contrast, Model 6 generated the most discussion and was appreciated for its integrative and forward-thinking approach.

Participants' ratings and comments provided valuable qualitative insights that complemented internal expert assessments. These exchanges helped identify which business model features resonated most strongly with the broader grain protection community, providing valuable input for D4.10 Business Models.

### 4.2.2 Participant Input on Interactive Poster

The input visualised in Figure 1 shows how participants rated the six proposed business models along a scale from "Bad" to "Good." Each dot represents an individual response, and colours indicate the respondent's region (Northern, Central, Southern, Western, Eastern Europe, or outside Europe).

- Blue – Northern Europe
- Orange – Central Europe
- Red – Southern Europe
- Yellow – Western Europe
- Green – Eastern Europe
- Black – Outside Europe




Figure 1. Participants' responses on Interactive Poster

The key insights from the participants' responses are as follows:

- Models 1 and 4 received the most positive ratings, with most dots positioned towards the "Good" end of the scale. This suggests these models are widely perceived as practical and feasible.
- Model 6 attracted significant attention and discussion, but ratings were mixed, ranging from "Bad" to "Average" with only a few near "Good." This reflects interest in its forward-thinking approach but also concerns about complexity and implementation.
- Models 2 and 5 showed more dispersed ratings, with several responses in the "Bad" and "Average" zones. These models may be seen as less conventional or harder to implement.

A more detailed analysis and review of the results will be provided in D4.10 Business Models, including a comparison of opinions between ABIM participants and internal and external experts of NovIGRain.

### 4.3 General Conclusions

Engagement at ABIM 2025 confirmed the relevance of NovIGRain's objectives and provided actionable insights for future development. The event successfully extended outreach beyond the traditional expert network, creating awareness among new stakeholder groups and generating interest from both industry and investors.

Discussions highlighted strong curiosity about the project's concept and its alignment with sustainability and IPM principles, while also exposing persistent concerns around regulatory complexity. These findings underline the importance of clear communication on product status and strategic positioning within a forward-thinking value proposition.

Feedback on business models revealed a preference for approaches that build on established practices, while also recognising the appeal of integrative solutions despite perceived implementation challenges. This diversity of views, combined with the presence of outliers, suggests that flexibility and adaptability will be critical in shaping market entry strategy for NovIGRain's innovations.

Overall, the insights gathered will inform the refinement of Deliverable D4.10 and guide decisions on stakeholder engagement, partnership development, and communication priorities, ensuring NovIGRain remains aligned with both market expectations and innovation goals.

# 5 Confidentiality / GDPR

During the workshop in 2025 no sensitive or company specific data was shared, only general comments.

# 6 Attachments

- Photos from ABIM 2025
- Social Media Statistics (LinkedIn)
- Posters


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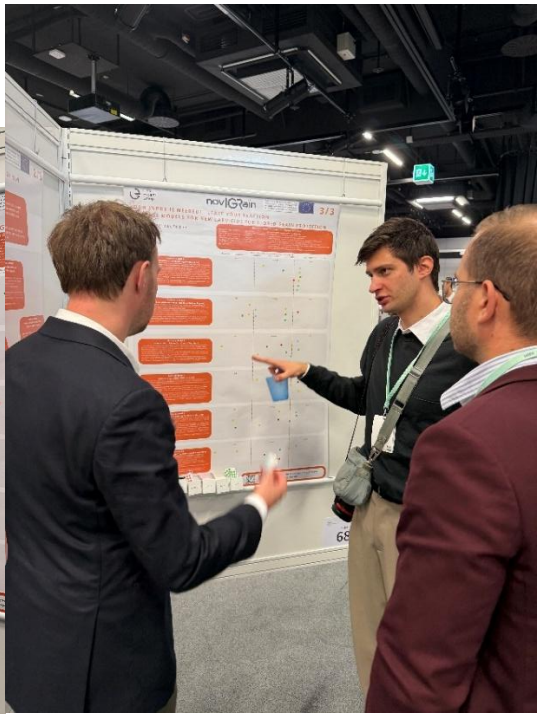

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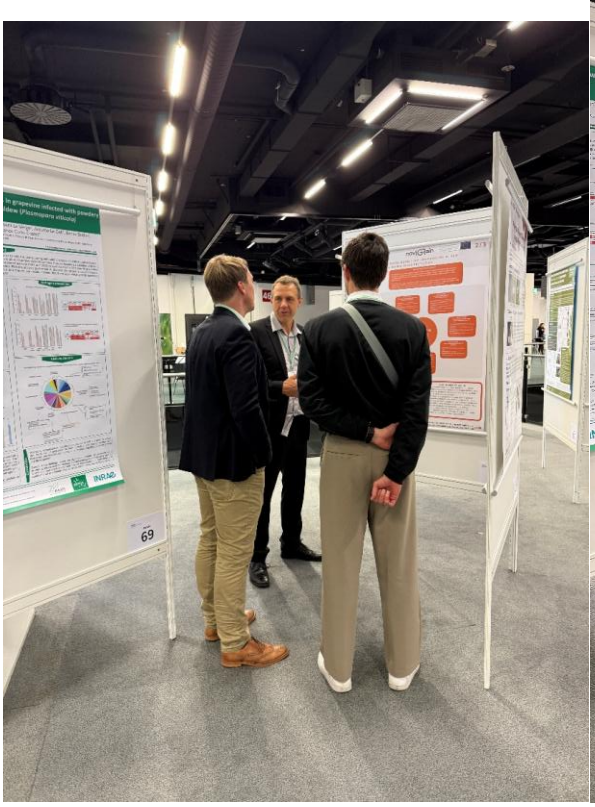

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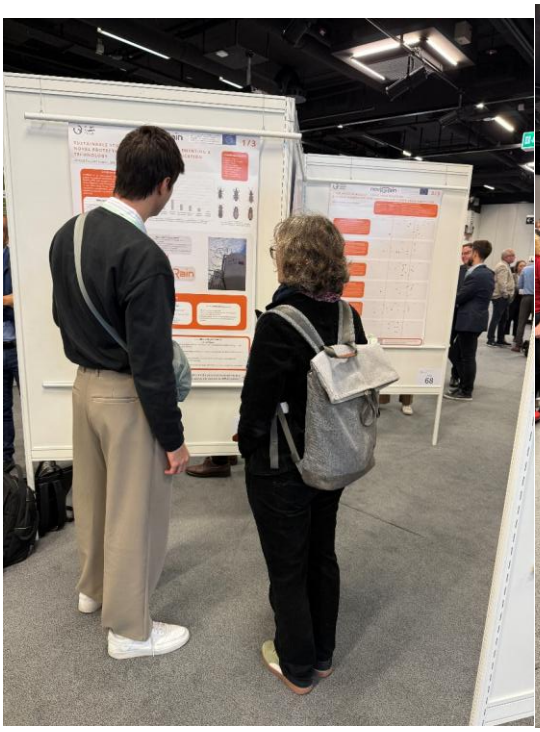



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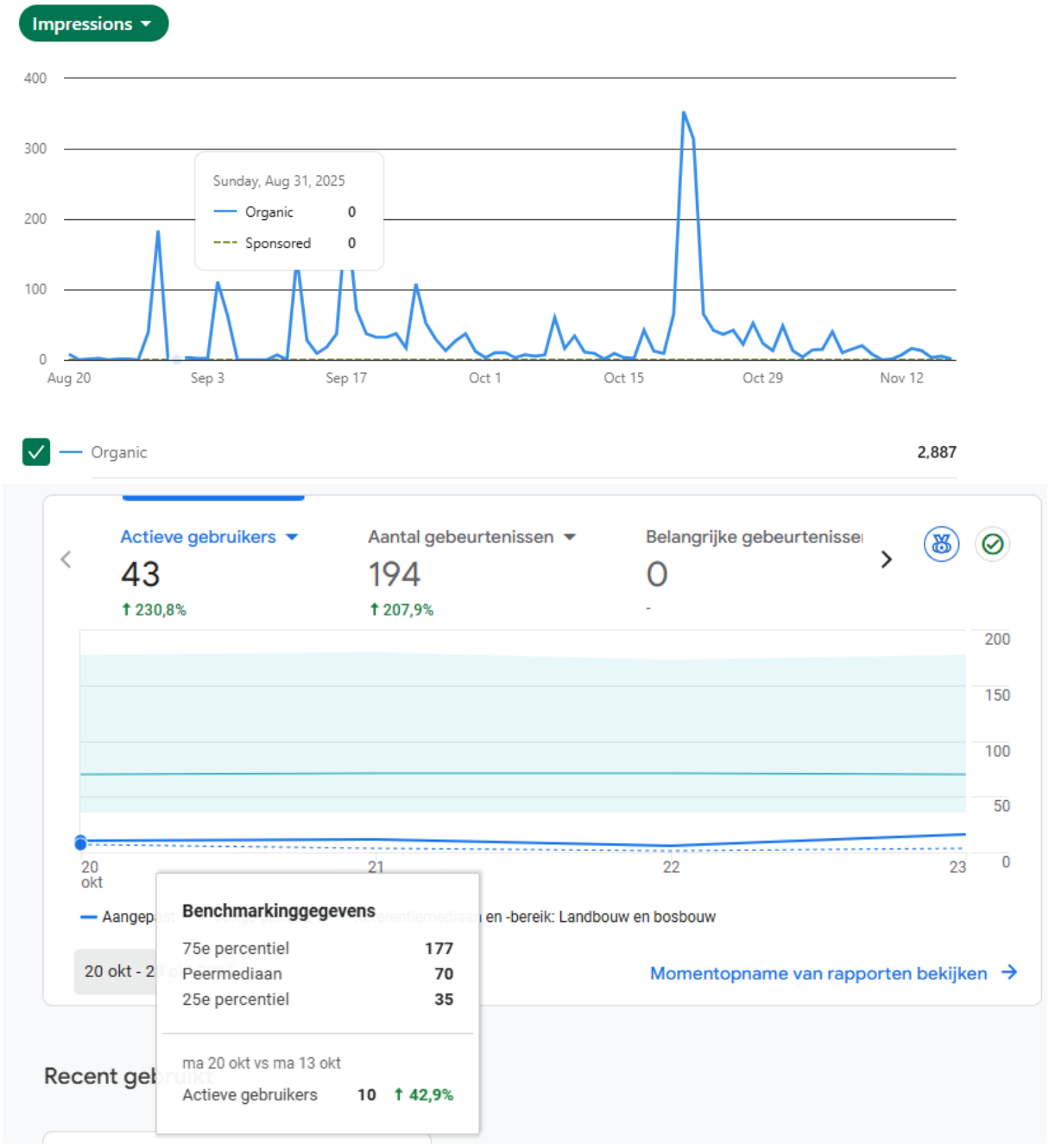

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BUSINESS MODELS FOR NEW LARVICIDE FOR STORED GRAIN PROTECTION
United Experts Group, Belgium
Guide - How to Score Business Models
For more information, check our website and follow project developments via LinkedIn

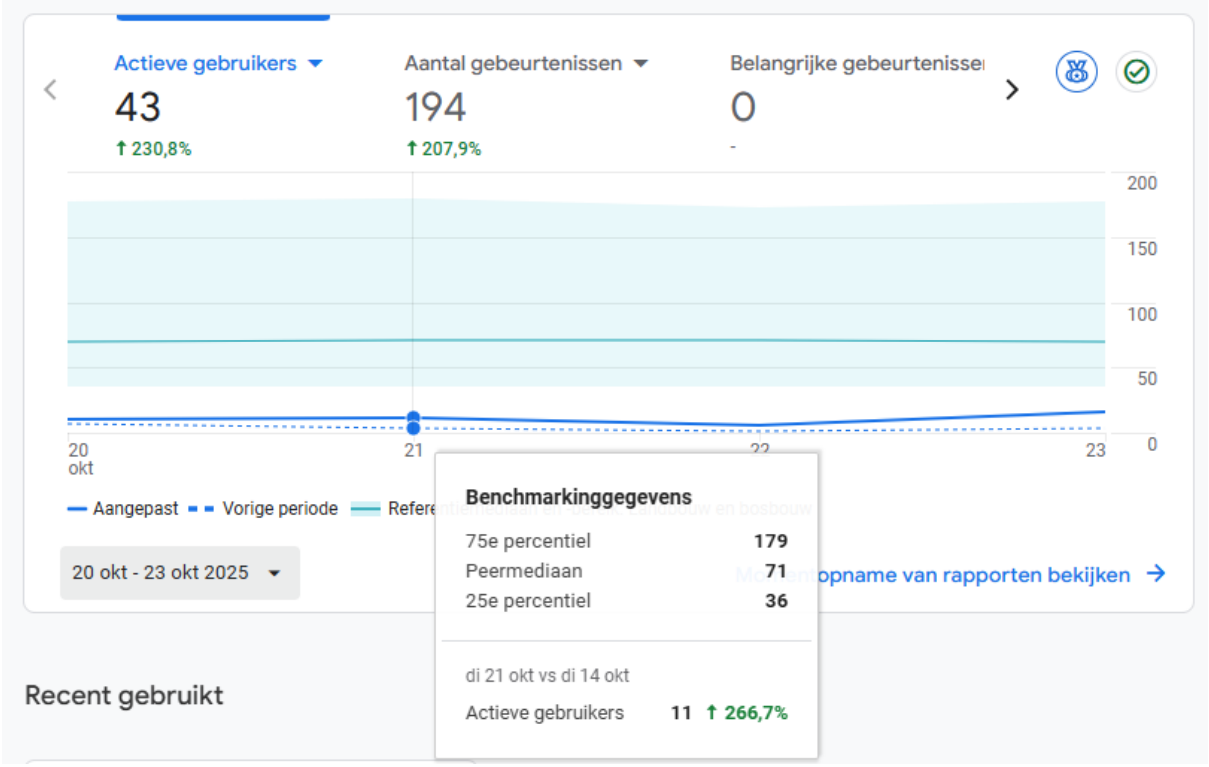

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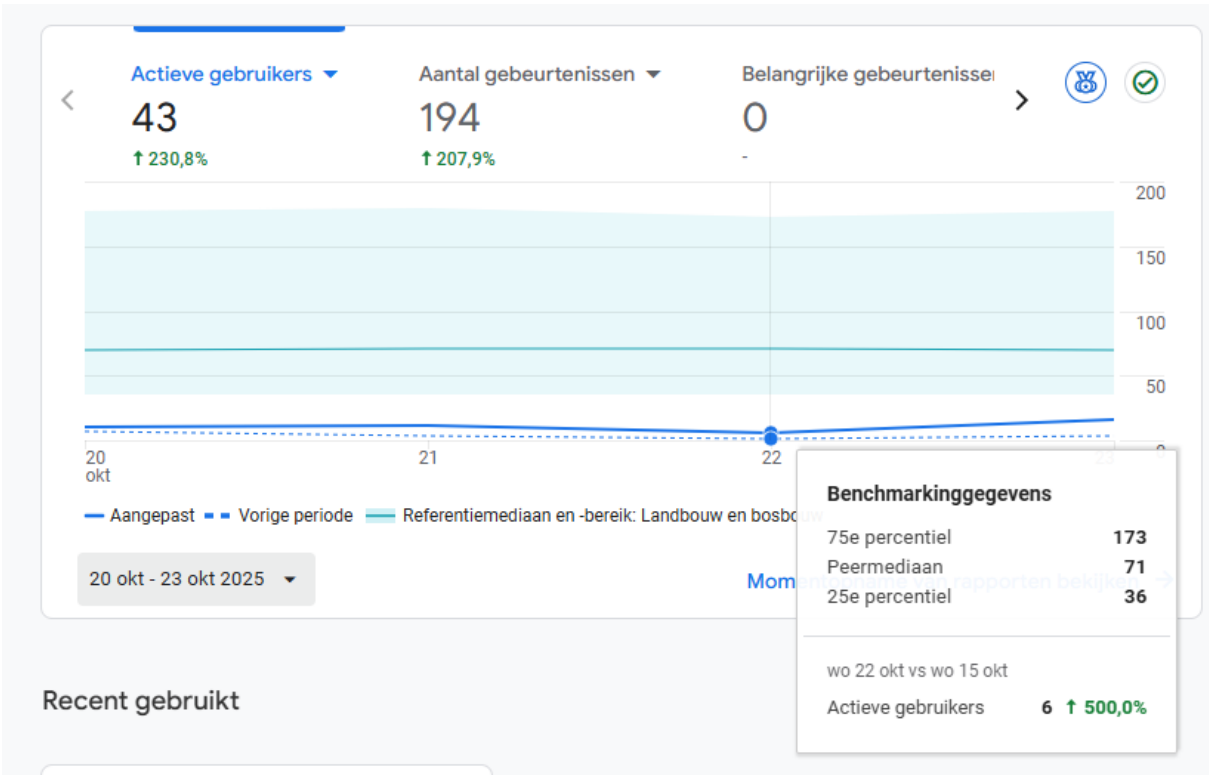


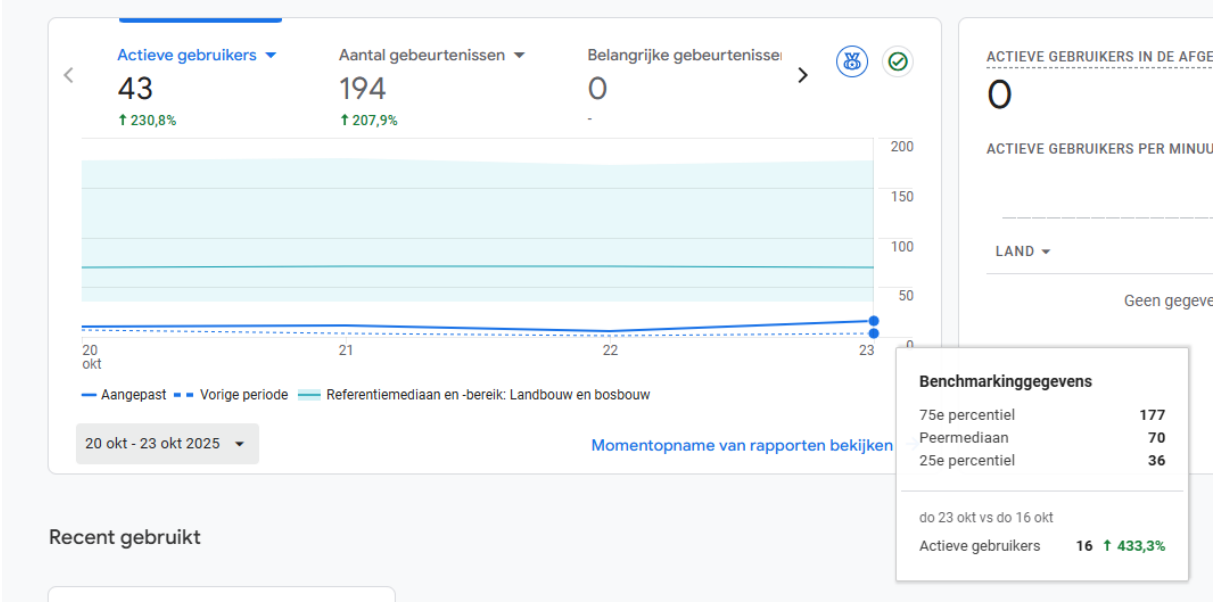

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## Metrics


Impressions
400
300
200
100
0
Sunday, Aug 31, 2025
Organic 0
Sponsored 0
Aug 20
Sep 3
Sep 17
Oct 1
Oct 15
Oct 29
Nov 12
Organic 2,887
Actieve gebruikers
43
↑ 230,8%
Aantal gebeurtenissen
194
↑ 207,9%
Belangrijke gebeurtenisse
0
-
200
150
100
50
0
20 okt
21
22
23
Benchmarkinggegevens
75e percentiel 177
Peermediaan 70
25e percentiel 35
en -bereik: Landbouw en bosbouw
ma 20 okt vs ma 13 okt
Actieve gebruikers 10 ↑ 42,9%
Momentopname van rapporten bekijken
Recent gebruikt


Actieve gebruikers
43
↑ 230,8%
Aantal gebeurtenissen
194
↑ 207,9%
Belangrijke gebeurtenisse
0
-
200
150
100
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20
okt
21
23
Aangepast
Vorige periode
Benchmarkinggegevens
75e percentiel 179
Peermediaan 71
25e percentiel 36
di 21 okt vs di 14 okt
Actieve gebruikers 11 ↑ 266,7%
20 okt - 23 okt 2025
opname van rapporten bekijken
Recent gebruikt


Actieve gebruikers
43
↑ 230,8%
Aantal gebeurtenissen
194
↑ 207,9%
Belangrijke gebeurtenisse
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100
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20
okt
21
22
Aangepast
Vorige periode
Referentiemediaan en -bereik: Landbouw en bosbo
Benchmarkinggegevens
75e percentiel 173
Peermediaan 71
25e percentiel 36
wo 22 okt vs wo 15 okt
Actieve gebruikers 6 ↑ 500,0%
20 okt - 23 okt 2025
Recent gebruikt


Actieve gebruikers
43
↑ 230,8%
Aantal gebeurtenissen
194
↑ 207,9%
Belangrijke gebeurtenisse
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-
ACTIEVE GEBRUIKERS IN DE AFGE
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ACTIEVE GEBRUIKERS PER MINUU
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22
23
Aangepast
Vorige periode
Referentiemediaan en -bereik: Landbouw en bosbouw
Benchmarkinggegevens
75e percentiel 177
Peermediaan 70
25e percentiel 36
do 23 okt vs do 16 okt
Actieve gebruikers 16 ↑ 433,3%
20 okt - 23 okt 2025
Momentopname van rapporten bekijken
Recent gebruikt

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# SUSTAINABLE STORAGE OF GRAINS BY IMPLEMENTING A NOVEL PROTECTANT AND A VERSATILE APPLICATION TECHNOLOGY

United Experts Group, Belgium

## CONSORTIUM MEMBERS

- Maxiline - Belgium
- Babolna Bio Ltd - Hungary
- SOJAM - France
- CRI - Czech Republic
- United Experts - Belgium
- TOXI COOP - Hungary
- EV ILVO - Belgium
- UBM Grain - Hungary
- Linge - the Netherlands

## INTRODUCTION

novIGRain is an international European Horizon 2020 project, focussed on developing of a new Plant Protection Product (PPP), with the goal to minimize post-harvest grain losses. Right now, approximately 20% of all produced grain is lost while being stored. These losses are caused by mycotoxine contamination and storage pests, which are becoming more and more resistant against commonly used pesticides.

### IMPORTANCE OF novIGRain

- Introducing the first larvicide for stored grain protection in the European Union
- Increasing the amount of available insecticides, to counteract insecticide resistance
- Creating easily accessible innovations, products and tools

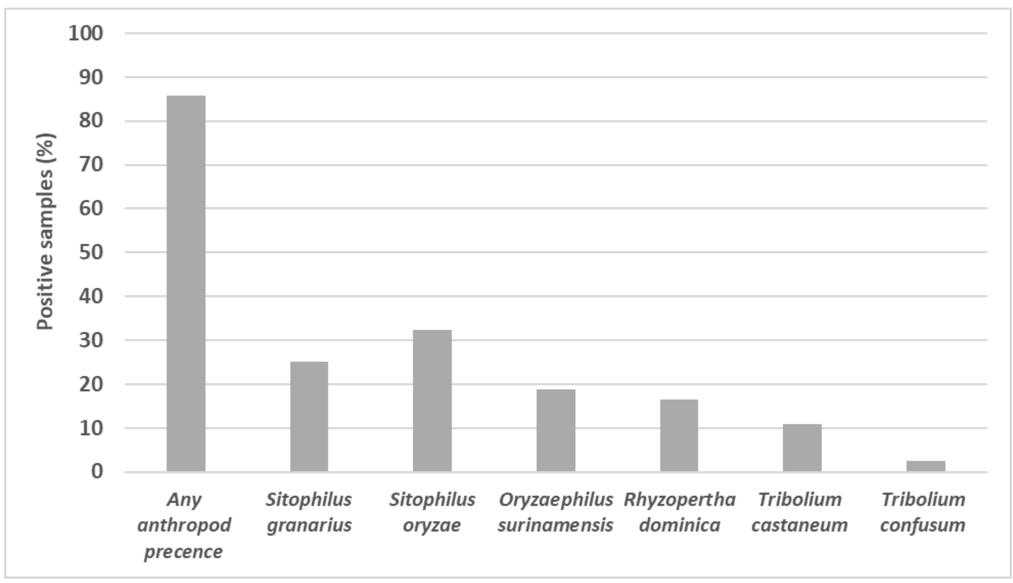



*Figure 1: Percentage of positive samples for arthropod presence and six different target species. Samples collected from various facilities in the Czech Republic (n = 238) (Aulicky, R., Frydova, B., Vendl, T., Stejskal, V., 2022)*



*Figure 2: The target species.*
*Upper row: S. granarius, S. oryzae and O. surinamensis.*
*Lower row: R. dominica, T. castaneum and T. confusum*

## OBJECTIVES

- Investigating the resistance of storage pests to insecticides commonly used in the EU
- Developing a new larvicide to protect stored grain from insects
- Developing a new technology, which can apply two different insecticides at the same time
- Estimating the environmental, social and economic impacts of the newly developed products

### STAKEHOLDER INTERACTION

Co-creation workshops
International Expert Panel
Interaction with Policy makers
Demo tours
Efficacy trials

### RESISTANCE ASSESSMENT

- Estimation of the current resistance of storage pests to currently used pesticides
- Focus on six of the most economically important storage pests
- Evaluating the different levels of pest resistance based on geographical location and type of business
- Evaluation of the the efficacy of new juvenoid-based products on resistant species

novIGRain

### IMPACT ASSESSMENT

Economic
Environmental
Social




## INNOVATIONS

### Decision Supporting Tool

- User friendly tool accessible on the novIGRain website
- Provides suggestions on grain storage management
- Uses the resistance assessment and input from stakeholders and experts to reduce the risk of development of insect resistance to grain protection products

### New Larvicide based on S-Methoprene

- Juvenile Hormone Analogue-type Insect Growth Regulator
- Effective against several common storage pests at the same dose and specificity
- Can be applied in Ultra-low volumes
- Favourable mammalian toxicology profile
- Good Maximum Residue Levels (MRL)

### Dual-channel spraying system

- Placed onto the conveyor belt
- Tracks the speed of the conveyor belt and adjusts the application of the insecticides
- Separate nozzles prevent mixing between insecticides
- Combination of larvicide and adulticide application possible

### Executive Summary

- European regulations on insecticides are becoming more and more strict. As a result, the amount of available insecticides in the European Union is decreasing.
- The resistance of storage pest to commonly used insecticides is increasing. Because of the limited amount of different solutions, the resistance will continue to increase, and commonly used insecticides will become unreliable.
- The introduction of new and safe products is necessary, and bringing a new product to market requires systematic work not only from a technical and chemical perspective but also through extensive regulatory effort to meet high standards.
- New product should be developed as part of a system with application technology to maximise its impact, supported by a thorough assessment of economic, environmental, and social factors to ensure it is sustainable by design.

### novIGRain Project Status (Final Year)

- The product prototype has been developed and is undergoing extensive testing to meet regulatory requirements.
- The application technology prototype is complete and will soon be showcased in a series of demonstration tours.
- Resistance research has resulted in several scientific publications and supported communication goals of the project.
- Impact assessment work is in its final stage, with initial conclusions ready for presentation.

**Explore more insights on the potential Business Models for the new Larvicide on the second novIGRain poster** →

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# POTENTIAL BUSINESS MODELS FOR INTRODUCTION OF NEW LARVICIDE FOR STORED GRAIN PROTECTION

United Experts Group, Belgium

## Background and Approach

Introduction of new product requires analysis of the potential pathways for the product to the market. NovIGRain consortium has wide range of experts related to grain storage. Using their expertise and knowledge of the network a set of business models was drafted ranging from conventional to more obscure ones.

These models were then shared among both internal experts of the project as well as with the external experts from the network not involved in the project. To evaluate the experts assessed each model across 5 criteria: Value proposition, Feasibility, Scalability, Innovativeness and Strategic Fit.

### Business Model 7
### Certification of IGR-Treated Grain for Market Differentiation

- **Core Concept:** IGR-treated grain receives a market-recognized certificate, driving product use through buyer preference.
- **Target Users:** Cooperatives, exporters, large farms
- **Revenue Model:** Product sales + optional certification fee
- **Key Strength:** Market-driven adoption; long-term positioning
- **Potential Limitations:** Requires system-wide coordination; slow adoption curve; certificate credibility must be built

### Business Model 1
### B2B Bundled Service Model (Large-Scale Buyers)

- **Core Concept:** IGR insecticide sold in bulk to large clients with bundled services (e.g., equipment leasing, training), enabling compliant application at scale.
- **Target Users:** Large farms, storage companies, cooperatives, ports
- **Revenue Model:** Bulk product sales with optional service bundles or leasing agreements
- **Key Strength:** Higher revenue per client, lower misuse risk, strong client retention
- **Potential Limitations:** Slower scalability

### Business Model 6
### Rapid Detection and Customised Treatment via Lab Partnership

- **Core Concept:** Customized IGR treatment based on scientific pest detection and lab recommendations.
- **Target Users:** Storage operators, large farms, cooperatives
- **Revenue Model:** Diagnostic fee + linked product sale or subscription
- **Key Strength:** Precision use; scientific credibility; reduced misuse
- **Potential Limitations:** Coordination complexity, turnaround time, need for lab capacity

7 Business Models

### Business Model 2
### Online & Retail-Oriented Model (Small-to-Medium Buyers)

- **Core Concept:** IGR insecticide sold online or via agri-retailers for self-application, based on its safe and easy-to-use properties.
- **Target Users:** Farmers, small-to-mid-sized grain storage operators
- **Revenue Model:** One-time product sales (retail or online)
- **Key Strength:** Broad accessibility, high scalability, low distribution cost
- **Potential Limitations:** Risk of misuse without oversight; limited value-added support

### Business Model 5
### On-Demand ULV Equipment Leasing for Small-Scale Users

- **Core Concept:** Portable ULV sprayers leased on-demand and bundled with IGR product for accessible, accurate use by small-scale users.
- **Target Users:** Smallholders, cooperatives, rural service providers, agri-service hubs
- **Revenue Model:** Short-term leasing + bundled product sales or use-based agreements
- **Key Strength:** Enables ULV use at small scale; removes equipment cost barrier
- **Potential Limitations:** Requires logistical support and scheduling coordination

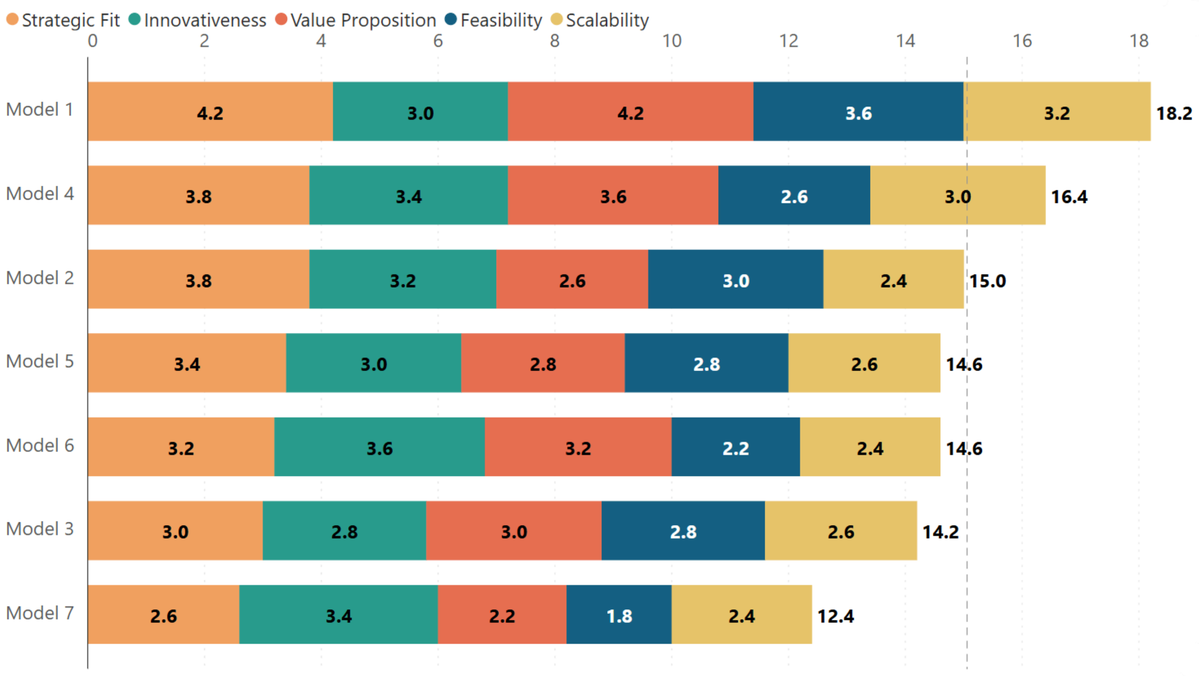
### Business Model 3
### Direct Product Sale to Pest Control Operators

- **Core Concept:** Product is sold per unit via existing channels to pest controllers who apply it as part of their service.
- **Target Users:** Pest control operators
- **Revenue Model:** Bulk product sales
- **Key Strength:** Fast to deploy; low operational complexity
- **Potential Limitations:** Commoditised product, limited control over usage quality

### Business Model 4
### Dual-Use Application Platform Model

- **Core Concept:** IGR insecticide adoption enabled through leasing of dual-application equipment compatible with current adulticide use, allowing seamless integration into existing pest control routines.
- **Target Users:** Current adulticide users (e.g., deltamethrin), grain storage operators, progressive farms
- **Revenue Model:** Product sales (IGR + adulticide); equipment leased free as adoption incentive
- **Key Strength:** Accelerates IGR adoption; builds on existing habits; increases product pair sales
- **Potential Limitations:** Higher capital investment (equipment leasing); need for user training; risk of underutilization if not well supported

## Results




### novIGRain Expert Perspective

- Given the tight margins and high competition in the grain trading business, more conservative and established business models are generally preferred, with new approaches often seen as unnecessary complications.
- Direct sales to large customers or pest control operators remain the preferred routes, as they provide better control over how the product is perceived and help maximise its value.
- By contrast, selling through retail or online channels tends to drive price-based competition rather than building understanding of the IGR product's mode of action.
- Dual application can be a viable way to introduce a new IGR product to customers already using adulticides.

**Curious to share your perspective? Help us out! Explore our third interactive novIGRain poster and leave your feedback!**

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novIGRain

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# YOUR INPUT IS NEEDED! - LEAVE YOUR REACTION
# BUSINESS MODELS FOR NEW LARVICIDE FOR STORED GRAIN PROTECTION

United Experts Group, Belgium

## Guide - How to Score Business Models

**Participate in our survey on this poster!**
Take a look at the shortlisted potential business model for the new larvicide developed in novIGRain and assess them taking into account
**5 key criteria**

**5 key criteria:**
- Quality of Value Proposition
- Feasibility
- Scalability
- Innovativeness
- Strategic Fit

**When scoring the models consider the following:**
- Does the business model bring value to the target market?
- Does this model meet an urgent or underserved need?
- How realistic is it to implement this model with current capabilities and resources?
- Consider technical, regulatory, financial, and organisational barriers.
- How easily can the model grow in size, geography, or customer base over time?
- How novel, original, or disruptive is this model in the context of pest control and grain storage?
- Does it introduce a new way of delivering value?
- How well does the model align with the current grain protection industry?

Place sticker in the range from **very bad** to **very good**

### Business Model 1
### B2B Bundled Service Model (Large-Scale Buyers)

This model is based on the idea that while the new IGR insecticide is safe and easy to apply, larger-scale clients — such as **commercial grain storage companies, cooperatives, and industrial farms** — often prefer integrated solutions that combine product delivery with application support, equipment access, and service continuity.
The product is sold directly or **via agri-distributors, typically in bulk quantities**, and is bundled with value-added services such as leasing of application equipment, on-site staff training, and technical support. This reduces reliance on third-party applicators while ensuring correct and compliant use at scale. The IGR's safety profile makes internal application feasible, but structured support builds trust and mitigates operational risk.
This model mirrors how large ag-input deals are managed today — through contracted supply, service bundling, and key account relationships. It is **designed to secure repeat purchases, encourage loyalty,** and align with the operating models of professional buyers.
This model enables **deeper market access in high-volume segments and builds long-term relationships**, but it is less scalable than retail models due to the need for field support and longer sales cycles.

Bad | Average | Good

### Business Model 2
### Online & Retail-Oriented Model (Small-to-Medium Buyers)

This model is based on the idea that the new IGR insecticide is safe, easy to handle, and **does not require licensed application**, making it suitable for direct sale and self-application by small-to-medium-scale farmers or storage operators through **online platforms and agricultural retailers**.
The product is sold **via e-commerce channels, agri-retailers, and farmer cooperatives**, and marketed as a "user-friendly pest control solution" that allows end users to treat their stored grain themselves without relying on external service providers. The IGR's favourable safety profile — such as low toxicity, no re-entry restrictions, and simple application requirements — enables this direct-to-user approach.
Instructional materials (e.g., videos, labels, pictograms) are provided to ensure correct use. Optional **remote support via helpline or chat, as well as digital resources such as mobile apps or WhatsApp tutorials**, may be offered to improve confidence and compliance. This model mirrors how many fertilizers, herbicides, or biostimulants are sold today — as off-the-shelf solutions with user autonomy.

Bad | Average | Good

### Business Model 3
### Direct Product Sale to Pest Control Operators

In this model, the new insect growth regulator (IGR) insecticide is sold through conventional agricultural input channels — including pest control operators, agro-dealers, and agricultural distributors. These **pest control operators** are the key customers, and they are responsible for product storage, marketing, and application for end users such as farmers or grain storage operators.
Pest controllers are already **trusted** by many farmers and grain storage managers, so the model builds on their role to handle the application of pest control treatments. The IGR is promoted as a safer, more sustainable, and residue-compliant alternative to traditional fumigants or contact insecticides.
This business model **relies on existing practices,** it offers limited control over how the product is applied or positioned in the market. The company behind the IGR product may provide **marketing and training support** to pest controllers to ensure awareness and proper usage, but no additional services or structures are required.

Bad | Average | Good

### Business Model 4
### Dual-Use Application Platform Model

This model is based on the idea that introducing the new IGR insecticide (S-methoprene-based larvicide) can be accelerated by leveraging **existing consumer habits** — specifically, the widespread use of deltamethrin adulticides — through leasing model for dual-application equipment that simplifies adoption and integrates both products into a single workflow.
The core offering is a **dual-mode applicator**, leased to end users, that enables precise application of both an adulticide (e.g., deltamethrin) and the new IGR in a single or sequential treatment. This technology **lowers the barrier to adoption for the IGR** by fitting into familiar practices, while offering enhanced efficacy through integrated pest lifecycle control.
The product(s) are sold through retailers, cooperatives, and direct channels, but the **key differentiator is the value of the bundled application system**, which positions the IGR as an easy, compatible upgrade rather than a replacement. Instructional content, training, or optional support is provided to ensure proper dual use. This model encourages cross-sell and product pairing, increasing total product demand with minimal disruption to user behaviour. The leasing model **lowers upfront cost** and provides a platform for long-term customer engagement.

Bad | Average | Good

### Business Model 5
### On-Demand ULV Equipment Leasing for Small-Scale Users

This model enables proper **ULV application of the IGR insecticide** among small and medium-sized farms by offering portable, calibrated ULV sprayers through short-term, on-demand leasing. Equipment is accessed **via cooperatives, agri-service providers, or rural platforms**, removing the need for ownership or long-term sharing.
The ULV units are designed for **precise droplet size and dosing**, tailored to the IGR's safety and efficacy profile. Instructions and calibration features are built in or digitally supported. **The equipment is bundled with the insecticide**, and leasing fees may be reduced through minimum purchase commitments or service contracts.
This model addresses several key barriers. Most smallholders cannot afford their own ULV-capable equipment, and improper application compromises product performance. Pest treatments often require timely and accurate measures, which this model supports by providing access to tools without complex cooperative arrangements or ownership responsibilities.
This model promotes broader adoption of IGR through safe, **consistent ULV application**, while reducing technical and financial barriers.

Bad | Average | Good

### Business Model 6
### Rapid Detection and Customised Treatment via Lab Partnership

This business model connects product use to **scientific diagnosis and decision support**, enhancing the precision and effectiveness of treatments. In this model, farmers or grain storage operators **collect pest samples** from their facilities using a simple field detection kit or guidance form. These samples are sent to a **partner laboratory or university** specializing in entomology and pest resistance monitoring.
The lab conducts a rapid identification and analysis, determining the pest species, infestation stage, and environmental conditions. Based on this, a customized treatment recommendation is issued — including the **dosage, timing, and IGR formulation** suited to the specific infestation.
The IGR product is then ordered or applied based on this recommendation. This could be handled by the product provider or a licensed pest controller.
This model offers a **data-driven, evidence-based approach** that appeals to larger operators and high-value supply chains. It may also support monitoring of resistance development, compliance with regulations, and product stewardship.

Bad | Average | Good

Curious what our experts think about these business models, take a look at our poster No. 2

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