**AHDB Dairy Cost of Production Model Co-Build and Co-Review - Project Specification**

**A1. Background and objectives**

AHDB wish to procure a consultancy to co-build their new dairy cost of production models alongside the AHDB, and once developed, co-review for the remainder of the project duration. This review period is to refine and update variables and assumptions, once the model has been built.

The project duration will be for a total of 3 years. These models will be owned by AHDB, though importantly delivered in partnership which will be credited in communications of model results.

Background

The GB dairy sector represents a range of farming systems producing milk. Key system variation stems from different calving patterns (all year round, versus spring and autumn blocks), with costs varying on-farm based on feeding regimes, forage strategy, housing system, time of the year and by market destination. As a result, the cost profile, and resulting cost of production differs considerably by system due to the different levels of exposure to input costs.

These cost variations need to be encapsulated within this new cost of production model, for messaging to recognise sector nuances for accuracy of conclusions, and to ensure findings both resonate with levy payers and ensure credibility from industry.

AHDB’s cost of production analysis will also be essential in quantifying the impact of upcoming challenges for the GB dairy sector, for example continued input cost volatility, changing government regulations or policy change, by producing multiple levels of cost data and by stress testing.

Model objectives

1. Accurately forecast on-farm cash costs for producing milk, as well as the full economic cost of production, producing breakeven milk prices for typical GB dairy enterprises. To represent the GB dairy sector, it is proposed the model initially looks at the following system types/calving patterns individually:
   1. All Year Round (AYR) Calving Grazing
   2. AYR Calving Housed
   3. Autumn Block Calving
   4. Spring Block Calving
2. Produce timely analysis on the levels of on-farm cost by calving pattern/system. This will be achieved by incorporating physical aggregated farm data with live cost data.
3. Outline the different variables impacting key cost areas and creating clear assumptions to reflect these, recognising relationships between different costs, inputs and external factors.
   1. For example, on-farm a change in one cost area will therefore impact the cost or farmer behaviour related to another input, on-farm.
4. Use the model to stress test the impact of dairy sector challenges, across identified risk areas. E.g., entering land into SFI, cost spikes, or capital investment to meet new regulations.
5. Understand performance in milk production over time and identify economic signals for behaviour change, to support milk production forecasting and AHDB market messaging.
6. Compare dairy economics by system type, to benchmark costing and anticipate any changes to sector structure over time, and what this may mean for milk production.

**A2. Requirements**

**A2.1 Concept**

AHDB require the successful consultancy to work with the AHDB in partnership to co-build and co-review the dairy cost of production models, initially for the four different systems outlined above in A1.

The model will estimate multiple layers of cost data, from cash costs observed on-farm to full economic cost of production. Importantly, the cash cost picture can help the AHDB to predict farmer behaviour, for example, understanding economic signals and what they may mean for milk production looking ahead. Whereas the full economic cost of production can signpost future sector confidence for long term investment.

**A2.2 Requirements for delivery – model build and review**

A2.2.1 Co-build

Importantly, the models must be agile and based on calculations, to easily adjust and amend with live data, to regularly and accurately forecast cost of production insights.

The models should estimate **a twelve-month rolling cost of production** to the date of publishing, as well as having a **three-month forecast** element.

Variables to make assumptions on within the model are detailed below:

System Profile

* Farm size & cropping areas
* Rented and owned land areas
* Cow numbers
* Replacement rate
* Labour profile
* Milk production
* Cow yields
* Milk quality (fat & protein)
* Grazing period
* Cow liveweight

Outputs

* Milk sales
* Cull cow sales
* Beef calf sales
* Sustainable Farming Incentive payments

Variable Costs

* Milking cow feed
* Youngstock feed
* Bedding
* Forage purchases
* Livestock purchases
* Vet & medicine
* AI, breeding & semen
* Recording & registration
* Dairy sundries
* Fertiliser
* Seed
* Spray
* Crop sundries

Overhead Costs

* Labour
* Family labour
* Contract & hire
* Machinery repairs
* Dairy repairs
* Fuel
* Electricity
* Water
* Property repairs
* Council tax
* Professional fees
* Insurance
* Office/telephone
* Sundries
* Machinery depreciation
* Property depreciation
* Rent
* Finance

Balance Sheet

* Short term liabilities
* Long term liabilities
* Capital repayments

Energy correction mechanism for milk

With milk production having a critical influence on pence per litre cost of production, it is essential production forecasts are accurate.

Monthly milk production can be forecast using cow numbers, replacement rate, yield and calving system data per year for each dairy system. Adjustments to production and quality numbers can then be made monthly using AHDB milk deliveries data and milk recording data from National Milk Records.

**Monthly production should be energy corrected** and displayed as energy corrected milk, adjusting yields based on the fat and protein content. This will allow a more precise comparison between system on productivity. AHDB requires this calculation to be included in the main cost models.

A2.2.2 Data provision supporting model calculations

Importantly, where appropriate, the successful consultancy will provide aggregated physical and financial on-farm data to support model calculations and assumptions over the three-year contract, for all system types detailed in A1. This may be shown as individual numbers for cost areas, or to form calculations.

More detail on review of assumptions and data frequency below (A2.2.3).

A2.2.3 Co-review of assumptions with AHDB – frequency of updates

For smaller and relatively stable cost areas, actual aggregated farm physical and financial data will be used from each dairy system (or within calculations) with the model using annual data applied for each calving pattern, supplied by the successful consultancy for the initial model build. For example, Kite Consulting in the pre-modelling phase report, identified a contribution to the total cost of production of under 3-5%, to be agreed with the successful consultancy.

Annual data for these small cost areas will be adjusted in-line with inflation monthly to capture any changes before being re-based annually. For example, using the Defra Agricultural Price Indices data to adjust monthly/quarterly for inflation.

Larger and more volatile cost areas should be calculated within **smaller cost models**, which feed into the main cost of production model. Again, it is required the cost models should be easy to update through calculations. These cost models may need actual aggregated farm physical and financial data within calculations (annual aggregated data supplied by the successful consultancy, adjusted for inflation) alongside using (live) monthly data from transparent and reputable datasets. For example, using AHDB data for milk deliveries and fertiliser prices. It is essential the model calculations will be transparent here.

Modelled by monthly data, the variables below should be calculated in smaller (satellite) cost models:

* Cow feed
* Youngstock feed
* Crop input costs/fertiliser
* Purchased forage
* Bedding
* Employed labour
* Family labour
* Contract & hire
* Fuel
* Machinery depreciation
* Property depreciation
* Rent
* Finance
* Capital repayments

Appendix 1 shows a graphic to display the functionality of the main model and satellite models.

These satellite cost models should have a monthly/bi-monthly review schedule on rota, designed to streamline time needed to update the model each month but ensuring accuracy for assumptions remains.

Review notifications within the model

Within the models, there should be inbuilt review notifications for all input prices based on the previous 12, 18, 24 months, to be decided using trial in model build stage on an individual cost line basis - to determine the period of comparison and percentage which enacts a notification. If there is a large change in input cost values, this should be flagged for review of this assumption and related assumptions. An example could be highlighting the new value in red in the model.

For example, a significant change in compound feed cost from the previous month or over time, or if we see a large shift in the milk to feed price ratio, we must review the related variables, including diet ration and forage cost model.

Understanding relationships between variables

The models must have built in review for interactions between variables, considering both severity/significance and longevity. This must then be used to support messaging from the model.

For example, if fertiliser costs significantly increase, then application could decrease by X and grass growth decrease by Y.

**A2.3 Outputs**

A2.3.1 Model outputs – reporting metrics

The cost of production models should produce the following metrics for reporting, for all calving patterns/systems investigated.

* Actual total cost of production (including drawings, rent paid and finance)
* Breakeven milk price
* Cash cost of production
* Cash breakeven milk price
* Full economic cost of production and breakeven milk price (including imputed labour and rent)
* Retained profit (ppl, per cow and per hectare)
* Net cashflow
* Debt per cow

In addition to this, from the models, the AHDB can forecast milk production up to 3 months ahead to support the AHDB’s domestic dairy market messaging.

For the full economic cost of production, this should include imputed values for rent and family labour as opportunity cost. The opportunity costs and actual costs should be displayed separately by calving pattern in analysis results, to give clarity when moving from full economic and total cost to cash cost.

A2.3.2 Project outputs

A2.3.2.1 Format

The main model and satellite models should all be built within **Microsoft Excel** to make them easy to adjust and update with new data. The satellite cost models should feed into the main model.

A2.3.2.2 Working with AHDB

The successful consultancy is expected to work closely with AHDB colleagues, as the model is co-built and co-reviewed. This will require commitment to a reasonable number of meetings online as well as in-person over the course of the contract length, including both in model build and at review points.

The frequency and details of the meetings will be agreed between the two parties, the AHDB and successful consultancy.

A2.3.2.3 Model build

The successful consultancy will work in partnership with the AHDB to co-build the cost of production model, supplementing AHDB’s internal knowledge.

A guide for delivery is referenced below in A2.4.2.

A2.3.2.4 Model review

Once the model is built, the successful consultancy is expected to support the AHDB in continually monitoring sector challenges and decision-making on-farm, to support the management and review of assumptions into the cost models, for the remainder of the duration of the three-year contract.

AHDB and the successful consultancy will have **review point meetings**, to discuss assumptions and on-farm challenges, either online (through Microsoft Teams) or in-person – as agreed between the two parties. These review points are proposed to be held quarterly.

If agreed between the AHDB and successful consultancy, the frequency of review points can be increased in response to sector challenges. Should the consultancy exceed the commitments outlined in the basic delivery of review (e.g. quarterly check ins), additional consultancy support can be negotiated (see A2.5).

At the review points, the consultancy is expected to support the AHDB with qualitative information and evidence on sector challenges and on-farm cost. Where appropriate, updates may be required to some cost level data to make sure calculations are up to date, should the sector see large changes in on-farm behaviour or cost levels – linking closely in with review notifications and the review schedule. Insights discussed at review points may also include horizon scanning, in particular relating to successful use of the model to stress test upcoming challenges.

**A2.4 Timing and timelines**

A2.4.1 Project timelines

|  |  |
| --- | --- |
| Submission return deadline | 5pm on 06 September 2024 |
| Date to be notified of outcome by | 5pm on 13 September 2024 |
| Project start | 23 September 2024 |
| Project complete by | 23 September 2027 |

A2.4.2 Model delivery timelines

|  |  |
| --- | --- |
| Co-design and model build | September 2024 to December 2024 |
| Model testing and first internal results | December 2024 |
| First model output | January 2025 |
| Review framework (quarterly meetings) | January 2025 to end September 2027 |

**A2.5 Budgeted time and guide price**

The guide price for the co-build and co-review of this modelling project is £49,000 including VAT. Please provide a thorough breakdown of your itemised costs based against the budget and our requirements.

A2.5.1 Providing support over the outlined project

Through the duration of the contract, should the contracted consultancy exceed the outlined commitments in the delivery of model co-build and review, (for example additional data requirements and/or additional consultancy time), additional consultancy support can be negotiated between the AHDB and successful consultancy.

**A3. Evaluation of tender**

The scoring of proposal submissions will be in accordance with the following criteria and weighted according to importance.

1. 20% - Demonstrated strong understanding of the GB dairy sector, recognising the cost profile nuances by calving pattern and clear detail on how this will be incorporated into the model function. To be representative of all four dairy systems covered within the model, including: all year round (AYR) grazing focus, AYR housed focus, spring block and autumn block.
2. 15% - The ability to provide aggregated physical and financial on-farm data to support model calculations and assumptions over the three-year contract, for all four calving pattern systems across GB dairy sector (listed in criteria 1).
3. 15% - Demonstrated understanding of, and ability to manage, project risks. For example, the consultancy should identify potential data limitations for evaluation criteria 2 above and provide mitigations to ensure data covers all four systems outlined in criteria 1.
4. 15% - Experience building budgets for the sector, evidencing an understanding of reviewing assumptions and understanding relationships between assumptions.
5. 10% - The ability to work in close partnership with the AHDB through both in-person and online meetings. The submission must display a detailed timeline to deliver this project over the three-year period.
6. 10% - Displayed understanding of the challenges and risk areas facing the GB dairy sector and incorporating these challenges into the model function for stress testing, to evidence the impact of challenges on the sector.
7. 10% - Displayed understanding of the importance of making and managing assumptions in a transparent way, making outputs accessible to a broad audience.
8. 5% - Displayed itemised costings and additional ideas that add value to the project.

Please return submission to megan.hesketh@ahdb.org.uk no later than 5pm on 06 September 2024 quoting **AHDB Dairy Cost of Production Model Co-Build and Co-Review.**

**Appendices**

**Appendix 1. Model functionality map**

**A screenshot of a computer

Description automatically generated**