**APPENDIX 4: Major Research Project (MRP) and MRes Project Specification Form:**

**Project Design Considerations (Updated October 2023)**

* Primary research that requires use of the Laboratories, Future Farm, Workshops, RFA or other facilities are **only** permitted following Project Supervisor approval of your project risk assessment **and** explicit permission from the relevant facility manager and Project Supervisor that university facilities are available to support the project.

***Please complete ALL Sections (Sections 1, 2 and 3 as well as Intellectual Property form and on-line ethics form).***

**Section 1 – Details of Project**

**Student name: Course:**

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| William Banda |  | Msc Data Science for Global Agriculture Food and Environment |

**Title of Project:** (the initial wording of the title *must* be agreed with your Supervisor, however, subsequent minor changes are possible.

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| Transforming Agricultural Data Management: User perception of a Farm Data Dashboard for decision support |

**Supervisor name:**

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| **Dr Ed Harris** |

**Resource Requirements:**

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| 1. Will you need to work in any of Harper Adams’ practical facilities\* and, if so, at what times of the year? *\* Practical facilities include: labs, glasshouses, Crops, fields, animal production units, Veterinary Education Centre, Companion Animal Unit, Engineering (AEIC Labs, Workshops, Soil & Machinery Halls), RFA instrumentation and sensory rooms.*   No practical facilities are needed, this is a data-based project.   1. *Please provide an overview of your proposed MRP.*   This project aims to address challenges of farm data management through organizing data and improving data awareness and accessibility. The aim is to improve accessibility, usability, compatibility, and convenience to end users or other stakeholders One challenge is that data exist in many separate “silos” such as My John Deere, Muddy Boots, or Omnia. Access to this data is essential to support farm decision making and for other uses such as carbon calculation.  Despite that this data exists, there is need to enhance its useability for farm stakeholders and for uses such as research and teaching. The aim of this project is to create and trial a data platform that is open and accessible to all, to enable users like university staff, researchers and farmers to visualize, monitor, and comprehend the data. Specific objectives include: 1) Identify a suitable exemplar source of relevant farm data; 2) create a dashboard-like interface; 3) Trial the interface with farm data users and evaluate feedback, impressions and perceived end-user requirements for farm data access.   1. *What do you plan to do in this/these facilities and when?*   N/A |

**Background and Objectives:**

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| Provide 2 paragraphs similar in spirit to an introduction of an academic manuscript, including 2-5 key peer reviewed references.  There has been a remarkable growth in the agricultural sector in terms of accumulation of data from different sources. This has ranged from precision farming to climate monitoring tools. The applications of digital agriculture technologies are increasing rapidly, with interest from a new generation of farmers to use digital solutions (Kayad et al., 2022). Even though the presence of this data has huge potential to optimize sustainable farming practices, challenges to accessibility, data compatibility, and the lack of comprehensive representation are huge barriers to effective utilization. Advances in Smart Farming and Big Data applications have the potential to deliver a range of benefits, such as improved decision-making, increased efficiency and economic gain and even decreased environmental impact, which could in turn help agricultural industries meet their productivity and sustainability challenges ([Sonka, 2016](https://www.tandfonline.com/doi/full/10.1016/j.njas.2018.11.002)).  Our understanding of data-driven agriculture to ensure sustainability holds promise but there are many challenges (Lioutas et al., 2019). These include a need to organize existing farm data originating from proprietary software, and to address issues surrounding end-user needs. A data-driven approach to sustainable agriculture allows one to incorporate all the knowledge, technology, and resources available to decision-makers (Rozenstein et al., 2024). While the hope is that this data can contribute to good farming practice including business efficiency and informing net-zero environmental practices, more work must be done to realise these ambitions. Support is required to improve the capacity to interpret the data to answer specific questions, for example to compare years and management decisions, as well as to look at non-traditional indicators to open new market niches (Jakku et al., 2018). |

**Information sources**:

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| I.e. sources relevant to this particular topic.  Jakku, E. *et al.* (2018) “If they don’t tell us what they do with it, why would we trust them?” Trust, transparency and benefit-sharing in Smart Farming. *NJAS Wageningen Journal of Life Sciences*. <https://doi.org/10.1016/j.njas.2018.11.002>  Kayad, A. *et al*. (2024). How many gigabytes per hectare are available in the 530 *Precision Agriculture* (25:520–531 1 3.<https://doi.org/10.1016/j.compag.2022.107080>  Lioutas, E. et al. (2019). Key questions on the use of big data in farming: An activity theory approach. NJAS-Wageningen Journal of Life Sciences, 90, 100297. https://doi.org/10.1016/j.njas.2019.04.003  Rozenstein, O. *et al.* Data-driven agriculture and sustainable farming: friends or foes?. *Precision Agriculture* **25**, 520–531 (2024). https://doi.org/10.1007/s11119-023-10061-5  Sonka, S. (2015). Big Data: from hype to agricultural tool. *Farm Policy Journal*, *12*(1), pp.1-9. |

**Methods:**

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| *What you intend to do and how you intend to do it (e.g. plot designs, measurements required, s*ystematic review, case study of, semi-structured interviews, questionnaires etc.)  To achieve this objective, this approach will be taken.  **1. Data Collection and Processing**   * Identifying, organising and compiling existing Data: Gather existing farm data from appropriate software.   **2. Technical Implementation**   * Data Interface Development: Create an intuitive and user-friendly interface to visualise and access farm data. Identify requirements to repeat for all data sources.  1. **User Feedback and Refinement**  * Pilot Testing: Conduct testing with data end-users to assess data resource functionality, usability, and effectiveness. |

**Plan of statistical analysis and sample size justification:**

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| Describe your experimental design or data collection plan and how your data will be analysed. Justify the amount of data you plan to collect.  There are two components to data analysis for this project.   1. Identify an exemplar data source on the Future Farm (e.g. Dairy, Arable, Pigs, Beef, etc.). Design a series of data analytical methods to visualize and create information from the data. Then, design a user interface to make these analytics and visualisations accessible to stakeholders including farm staff, researchers and students. 2. Design a sampling protocol for screening the farm data tools to end users, collating and analysing user feedback, e.g. via a questionnaire paired with a farm data interface experience. Questionnaire and feedback data will be analysed using standard methods. |

**Section 3 – Contingency arrangements:**

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| *How might the MRP need to be revised if the proposed methodology cannot be authorised or completed.*  Technical challenges associated with data interface development. The contingency plan will be to adopt a simplified version of the dashboard with limited features. Additionally, the failure could prompt an in-depth investigation for the identification of key challenges and potential solutions. The knowledge gained shall be leveraged to refine the research questions and methodologies, leading to the development of a revised project approach.  Data availability problems. There is low risk of data availability problems, but in this case relevant open data will be obtained in order to create a data facility to test. |

**Section 4 – Risk Assessment:**

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| *All projects require a risk assessment to be completed (see detail on the Learning Hub) – even if they are desktop based. Those that use specific facilities also require approval from the specified facility manager/s as well as your supervisor.*  *A risk assessment form is required for each facility that you use. If you use more than one facility, please duplicate the following form so that each facility manager is consulted.* |

| C:\Users\00750340\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\Z7IHBU04\HAU_full_logo (003).jpg **RISK ASSESSMENT TEMPLATE** | | | **Likelihood** multiplied by **Severity** equals **Risk Rating**.  NB: Calculated after taking in to account existing precautions | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| School/Service/Department:  Project Title: Transforming Agricultural Data Management: User perception of a Farm Data Dashboard for decision supportProduction and Decision Support in the Net-Zero Era | | Severity | Insignifi-cant (1) | Minor (2) | Moder-ate (3) | Serious (4) | Fatal / Critical (5) |
| Likelihood |
| Details of Task/Activity/Area: | | Almost Certain (5) | **5** | **10** | **15** | **20** | **25** |
| Likely (4) | **4** | **8** | **12** | **16** | **20** |
| Assessed By: William Banda | Signature: | Possible (3) | **3** | **6** | **9** | **12** | **15** |
| Approved by: Ed Harris | Signature: | Unlikely (2) | **2** | **4** | **6** | **8** | **10** |
| Date of Assessment: (today’s date) | Review Date: 2024-02-01 | Rare (1) | **1** | **2** | **3** | **4** | **5** |

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| **HAZARD**  **PERSONS AT RISK** | **HOW IS PERSON AT RISK** | **CONTROL MEASURES** | **RISK RATING**  **(5 x 5 matrix)** | | | **ADDITIONAL CONTROL MEASURES** | **RESIDUAL RISK RATING**  **(5 x 5 matrix)** | | | **ACTION BY WHOM** | **ACTION BY WHEN/DATE** |
| L | S | R | L | S | R |
| Any person whose personal data may be exposed in the process of making data accessible | In case of reveal of personal information | Follow all rules and procedures in the Harper Adams Data Privacy and Protection. | 2 | 2 | 4 | De-identification wherever sensitive personal information is involved. | 2 | 2 | 4 | William Banda | March, 24 – July, 24. |
| Risk of repetitive stress for computer work. | Working on the computer for longer times to complete the work | Starting task timely to give more time for room and re-trials | 2 | 2 | 4 | Seek necessary support from the right authorities | 1 | 1 | 1 | William Banda | March, 24 – July, 24. |
| Risk that technology fails for the survey. | Failing to deliver the results of time | Using reliable survey tools | 1 | 1 | 1 | Starting project on time so that in the case that tech fails action be taken on time | 1 | 1 | 1 | William Banda | March, 24 – July, 24. |
| Low engagement from end-users to give feedback on performance | Failing to gather enough evidence on usability of the product hence failure to deliver project on time | Engaging adequate number of people for feedback incase others are willing to give feedback | 1 | 1 | 1 | Engaging potential end users on time. | 1 | 1 | 1 | William Banda | March, 24 – July, 24. |
| Low data quality | Failing to process data adequately | Properly cleaned via statistics processes | 2 | 2 | 4 | Getting feedback from other statisticians | 1 | 1 | 1 | William Banda | March, 24 – July, 24. |
| Misuse of information by other users | Mis representation of work and intentions | Providing terms and conditions of data usage | 2 | 3 | 6 | Applying the HAU terms and conditions for data management. | 1 | 2 | 2 | William Banda | March, 24 – July, 24. |
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**\*Likelihood x Severity = Risk Rating**

*Refer to 5 x 5 risk matrix in Risk Assessment Policy & Guidance document*

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| **Is this an acceptable risk once control measures are in place?** | YES |
| **Assessment conclusion:** | *All risks have been reduced as far as is reasonably practicable with control measures in place which should be adhered to.* |

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| **Signature of student** |  | Date  02-02-24 |
| **Signature of supervisor** |  | Date  02-02-24 |
| **And, if applicable,** Facility Manager Signature/s of: |  |  |
| Aquaculture Unit: Alex Miles |  | Date |
| Jean Jackson Entomology Lab: Nikoletta Foskolou. |  | Date |
| Princess Margaret, Elizabeth Creak Labs and Building 90: Dr Victoria Talbot |  | Date |
| Engineering (AEIC Labs, Workshops, Soil & Machinery Halls), Tim Dicker. |  | Date |
| RFA instrumentation and sensory rooms: Holly Rosser |  | Date |
| Monogastric (Pigs and Poultry): Matt Swaine |  | Date |
| Ruminants (Beef, Sheep, Dairy, Youngstock, Smart Dairy): Kate Robinson |  | Date |
| Farm Operations (Crops): Chris Ruffley |  | Date |
| Nematology Lab: Nikoletta Foskolou |  | Date |
| Vet Education Centre/Vet Services: Nina Tudor |  | Date |
| Companion Animal Unit: Fred Baker |  | Date |
| Farm Trials: David Hughes |  | Date |

**Signatures demonstrate agreement between the Student and Supervisor to be involved in the project outlined by the project specifications.**

**Note: Submission of this completed form is required for registration on the Masters Research Project module, and is mandatory to be classed as an MSc student.**

**Major Research Project Specification Checklist**

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| Have you: | **🗸** | 🗶 |
| Completed the Project Specification Form (including all relevant signatures) | **🗸** |  |
| Completed and submitted the online Research Ethics Form? (Available through the MRP Hub page) | **🗸** |  |
| Fully completed the Intellectual Property Agreement (Appendix 5) including relevant signatures? | **🗸** |  |
| Fully completed all relevant risk assessments? | **🗸** |  |
| Obtained all relevant signatures from facility managers? |  |  |