



FAIRshare

DIGITAL TOOLS FOR FARM ADVISORS



Deliverable 7.6: Responsible Research and Innovation Workshop

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* It was decided that it would be appropriate to conduct an RRI workshop at the first general partners meeting, M12. However, the first Annual Meeting was conducted in M13; therefore the delivery of the D7.6 was carried out in M13. D7.6 is categorised as ‘Websites, patents, filling, etc.’ with regards to deliverable type in the Grant Agreement. Nevertheless, it was decided that a written report such as this would serve as an additional resource which can be used as a reference tool by partners.

v	Date	Beneficiary	Author
1.0	10/01/2020	TEAGASC	Áine Regan (TEAGASC)

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Summary

A radical transformation of the agricultural sector is envisioned by many with the increased application of ‘smart’ technologies in farming and food production. Significant social and cultural changes are expected with the emergence of ‘Digital Agriculture’ and the widespread application of smart, connected technologies in farming. Although offering many benefits and opportunities for agriculture, new technologies can also bring unpredictable or unforeseen impacts and social changes. Responsible Research and Innovation, a cornerstone of the EU H2020 programme, is a governance framework which supports the development of technologies in a way that harnesses the benefits whilst managing the risks – it aims to ensure the trajectory of innovation is responsive to the concerns, needs and expectations of society.

FAIRshare is committed to the principles of RRI. A series of ‘RRI workshops’ within WP7 focus on cross-cutting ‘hot topics’ which consider the social changes technology can bring. The first cross-cutting hot topic for reflection in Year 1 of the FAIRshare project has been that of ‘data and ethics in digital agriculture’. This topic has raised many questions in agricultural circles, also relevant for advisory services. What are the issues surrounding data ownership and data sharing that farm advisory services should be cognisant of as more and more digital technologies are introduced to farming communities? What are the ethical and legal issues that farm advisory services may encounter, and how can they be supported to recognise and respond to these issues? What are the ‘new skills’ that farm advisory services may need to acquire to deal with ethical issues related to data in digital agriculture?

In FAIRshare, we are exploring the issue of data and ethics in digital agriculture and what it means for our project and for farm advisory services. The FAIRshare project has collaborated with the H2020 IOF2020 project to carry out workshops identifying preferred solutions for data governance in digital agriculture. At the 2019 annual Consortium Meeting in November, the FAIRshare consortium also discussed the issue of data and ethics specifically in the area of *Digital Advisory Tools and Services*, and reflected on the issues which may arise in this context and what actions the FAIRshare project and other actors can take to mitigate against unexpected consequences related to data governance with DATS.

The main risks consortium partners associated with data generation through the use of DATS included: manipulation of data (misuse of data); integrity of data (trustworthiness of data); power shifts; and rights of the farmer. Suggested responses require actions from a wide range of actors but of particular relevance for the FAIRshare project, a number of actions were identified which involve the advisor. The advisor is viewed as having a gatekeeper role and can help to (1) raise awareness and inform farming communities about this issue; (2) provide practical support, education and training to farmers in this area; and (3) ensure that the actions and behaviours they themselves undertake with respect to DATS are responsible. It was identified that for advisors to assume such roles, training and awareness in the area of data and ethics in digital agriculture is first and foremost required for advisory services. The FAIRshare project should consider actions to support farm advisors to assume a gatekeeper role in ensuring responsible governance of data in digital agriculture.

1. Digital Agriculture

While technological innovation and digitalisation have been a permanent feature in agriculture for many decades now, the idea of a radical transformation of the agricultural sector is gaining attention with the increased application of ‘smart’ technologies in farming and food production. The introduction of robotics, Internet of Things, sensors, Artificial Intelligence, drones, and satellites into farming, has led some to argue that the fourth agricultural revolution (‘Agriculture 4.0’) is on the horizon, if not already here (Rose and Chilvers 2018; Shepherd et al. 2018). These technologies promise many positive impacts through evidence-based, data-driven decision-making, improving on-farm efficiency and quality of life and meeting societal demands for healthier, safer, more sustainable, more ethical and more transparent food production (Shepherd et al. 2018; Ayre et al. 2019). At the same time, all new technologies and innovations which are introduced into society bring with them social changes, some of which are unpredictable and unforeseen.

As digital technologies are increasingly embedded within agriculture, a growing body of empirical studies have sought to explore what these impacts and changes could look like. Inquiries with different actors have revealed concerns about possible impacts such as digital divides, digital exclusion, distribution of power, data ownership, knock-on effects of technological reliance, economic and cultural impacts, and societal backlash to emergent technologies (Jakku et al. 2019; Regan 2019; Fleming et al. 2018; van der Burg, Bogaardt, and Wolfert 2019; Bronson 2019; Carolan 2019; Small 2017). To counter the impact of unintended consequences of technology, governance frameworks for research and innovation have been suggested which encourage the prioritisation of ‘values-based questioning’ into the decision-making process; to question the type of future society we want and to critically reflect on how our innovations are going to

deliver that society (Bronson 2018; Fleming et al. 2018; Glerup, Davies, and Horst 2017). Responsible Research and Innovation is one such governance framework.

2. Responsible Research and Innovation

Responsible Research and Innovation (RRI) is a values-based theoretical framework for governing science & technology. It is a cornerstone of many national and international research programmes, including Horizon 2020. As a values-based governance framework, RRI aims to support techno-scientific progress in a socially and morally responsible manner (Stilgoe, Owen, and Macnaghten 2013; Von Schomberg 2013). The framework encourages researchers, innovators, policy-makers, and all individuals in key governance positions to be conscious of and responsive to the needs and values of diverse societal actors.



Whilst there are different approaches to defining RRI, a process-oriented RRI model is of particular value for digital agriculture (Rose and Chilvers 2018; Eastwood et al. 2017; Bronson 2018). This framework suggests a procedure for RRI centred around 4 dimensions which guide technology research and innovation: anticipation, inclusion, reflexivity and responsiveness (Owen, Macnaghten, and Stilgoe 2012; Stilgoe, Owen, and Macnaghten 2013).

- **Anticipation** supports exploration of the possible short- and long-term impacts of research and innovation (including social and ethical); reflection on how research and innovation may shape the future; and engagement in upstream risk assessment.
- **Inclusion** encourages engagement of diverse voices at an early stage, and on a continuous basis, during the research process, ultimately resulting in the collection of diverse types of knowledge (including local, practical knowledge).
- **Reflexivity** fosters actors to critically reflect upon their own assumptions, values and interests, and actively consider the views and values of others and how they may correspond or conflict with one's own views.
- **Responsivity** ensures that actors take meaningful action in response to insights which emerge during the RRI process so that the research and innovation process is adapted to align with the needs expressed by other actors.

3. RRI Workshops: Data and Ethics in Digital Agriculture

FAIRshare is committed to the principles of RRI. A series of 'RRI workshops' within WP7 will focus on cross-cutting 'hot topics' to consider the social changes technology can bring.

The cross-cutting hot topic selected for Year 1 of the FAIRshare project has been that of '*Data and Ethics in Digital Agriculture*'. The generation and aggregation of data through growing adoption of farm-level digital technologies has raised many questions, illustrated and summarised in Figure 1.

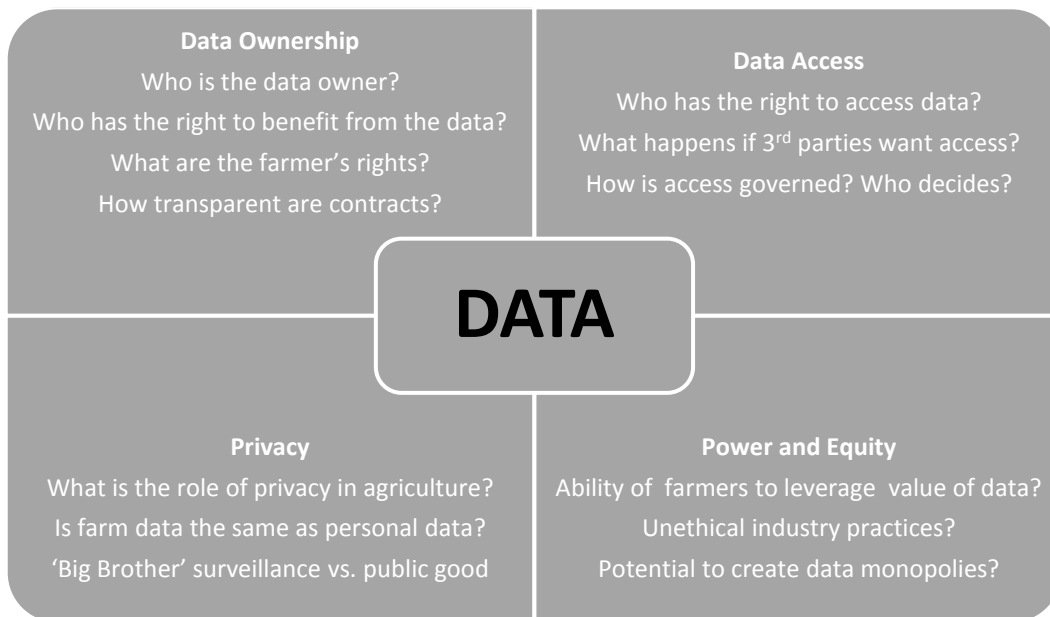


Figure 1: Ethical and social questions which are emerging about the governance of data generated through digital technologies in agriculture.

Pertinent questions related to data in digital agriculture also exist for advisory services. What are the issues surrounding data ownership and data sharing that farm advisory services should be cognisant of as more and more digital technologies are introduced to farming communities? What are the ethical and legal issues that farm advisory services may encounter, and how can they be supported to recognise and respond to these issues? What are the 'new skills' that farm advisory services may need to acquire to deal with ethical issues related to data in digital agriculture?

In FAIRshare, we are exploring the issue of data and ethics in digital agriculture and what it means for our project and for farm advisory services. The FAIRshare project is collaborating with the H2020 IOF2020 project to carry out workshops with farmers, scientists, policy and agtech identifying preferred solutions for data governance in digital agriculture. At the 2019 annual Consortium Meeting in

November, the FAIRshare consortium engaged in a participatory workshop on the issue of data and ethics specifically in the area of *Digital Advisory Tools and Services*, and reflected on the issues which may arise in this context and what actions the FAIRshare project can take to mitigate against unexpected consequences.

4. Workshop Insights

At the annual FAIRshare consortium meeting in November 2019, a participatory workshop with all consortium partners was organised to explore the issue of *Data and Ethics in Digital Agriculture*. This workshop was held on day 2 of the meeting and lasted 90 minutes. Áine Regan (Teagasc) provided a short introductory presentation explaining the Responsible Research and Innovation concept, introducing the issue of data and digital agriculture, and highlighting some of the data governance questions which have emerged with increased use of digital technologies in agriculture. Partners were then invited to take part in a participatory workshop on the topic. Participants were divided into four groups (with approximately 5-7 participants per group). The workshop consisted of three inter-linked exercises.

4.1. Brainstorming types of data generated through DATS

The first exercise asked participants to work in groups and brainstorm all the different types of data that could be generated from different Digital Advisory Tools and Services (DATS). In a participatory workshop held on Day 1 of the meeting, participants had already brainstormed different types of DATS – the outputs of this brainstorming exercise were posted on the walls. Participants were encouraged to visit these posters to stimulate thinking around types of data that may be generated from the previously identified DATS. Participants were asked to write one type of data down on one sticky note. Once they had exhausted the

brainstorming exercise, participants were then asked to group the types of data into meaningful groups and give the group a coherent name. **Types of data** identified by participants are illustrated in Figure 2.



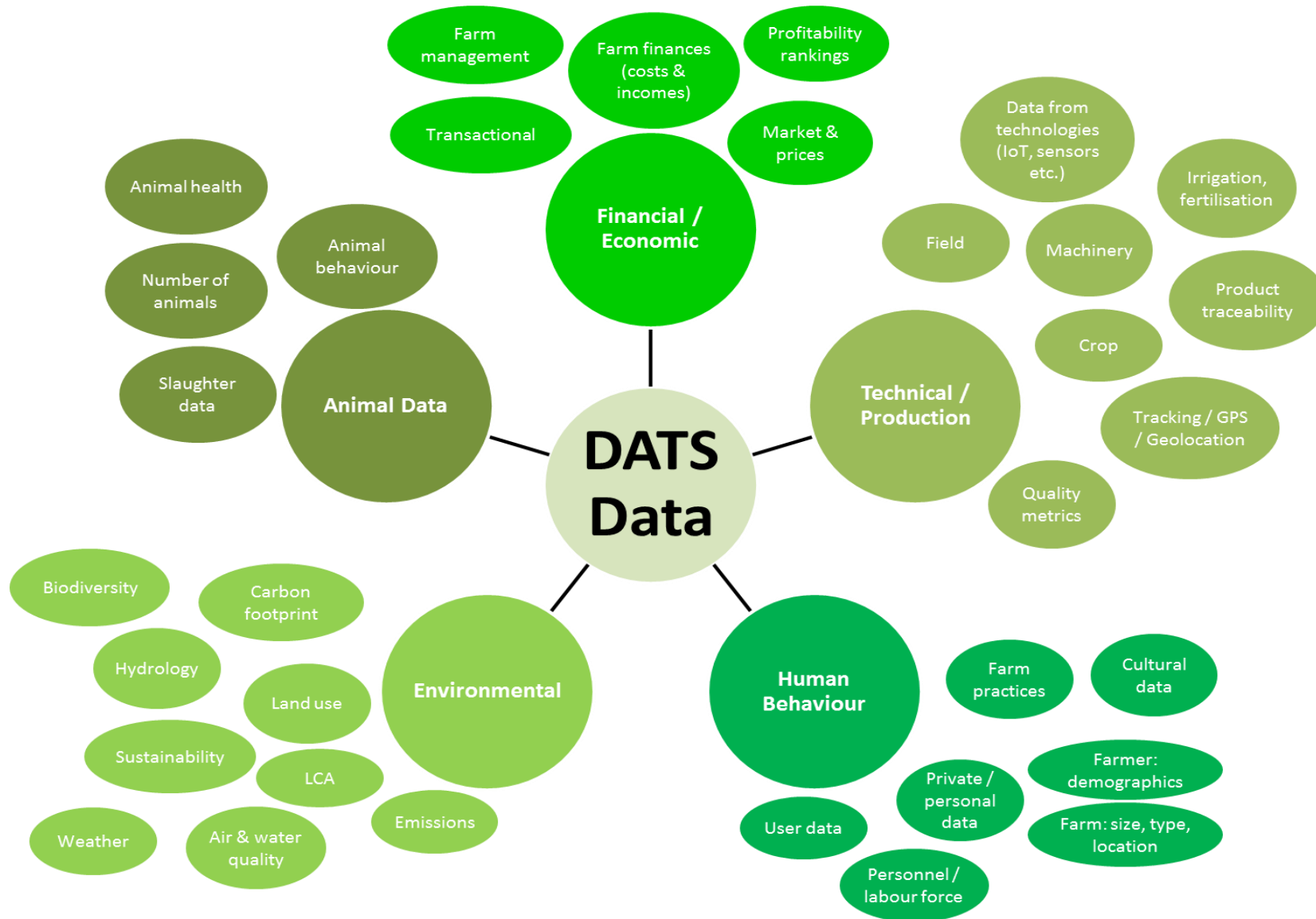


Figure 2: Types of data generated through Digital Advisory Services and Tools (DATS), as identified by consortium partners

4.2. Brainstorming risks and responses

For the second exercise, participants were asked in their groups, to brainstorm what challenges, issues or risks could arise with the generation of data from DATS. They were asked to give particular attention to possible ethical and social risks that could arise. For the third exercise, participants were asked to brainstorm possible solutions to address the identified challenges or risks. They were asked to consider the role of FAIRshare, and the role of other actors. At the end of the exercises, participants from each group were asked to present back their findings to the larger group. **Identified risks and responses to the issue of data and ethics in digital agriculture are summarised in Table 1 and Table 2.**



Table 1: Potential risks which could arise with increased data generation through DATS, as identified by consortium partners

Potential risks arising from data generated through DATS
➤ Manipulation of data to serve individual interests (data misuse, biased use of data, cherry picking)
➤ Data collected through DATS may not always be accurate (may not reflect reality)
➤ Misinterpretation of data, providing wrong advice
➤ Uncertainty about future use of data collected
➤ Farmers could be targeted if their financial information is known (e.g. discriminatory pricing)
➤ Power shifts (limited negotiation power of farmers, isolation from <i>not</i> sharing data)
➤ User rights (enforcement of non-voluntary mandates, exposure to spam and irrelevant information, privacy violations)
➤ Loss of competition, creation of monopolies
➤ Inequitable distribution of benefits (farmer benefits less than tech provider)

Table 2: Suggested responses to safeguard or mitigate the impact of risks associated with digital agricultural data, as identified by consortium partners

Potential responses for data governance associated with DATS
➤ Put in place regulations which ensure appropriate data use and data reliability (Role of Government)
➤ Ensure compliance with existing regulations such as GDPR (Role of Government)
➤ Develop political, legal and policy frameworks and strategies (Role of Government)
➤ Provide training & support to farmers (Role of Farmers' Associations)
➤ Raise awareness and inform farmers (Role of Media)
➤ Provide unbiased political and social support (Role of NGOs)
➤ Favour an open source approach (Role of Government / Industry)
➤ Develop a Working Group dedicated to Digital Agricultural Data at EU level (Role of Government)
➤ Simplify agreements and processes related to data (Role of Technology Provider)
➤ Advocate for the rights of the farmer (Role of Farmers' Associations)
➤ 'Train the trainer' – raise awareness and provide training to Advisors (Role of Advisors) → FAIRshare
➤ Provide tailored education and training to farmers (Role of Advisors) → FAIRshare
➤ Provide support in the field (Role of Advisors) → FAIRshare
➤ Raise awareness about the potential uses of data (Role of Advisors) → FAIRshare
➤ Identify good practices and Use Cases (Role of Advisors) → FAIRshare
➤ Ensure all data collected is kept anonymous and secure (Role of Advisors) → FAIRshare
➤ Develop a coherent vision, mission and strategy on Digital Agricultural Data (Everyone, including Advisors) → FAIRshare
➤ Ensure that consent systems are in place and respected (Everyone, including Advisors) → FAIRshare

5. Conclusions

A wide range of data are collected and generated through DATS. The main risks the consortium partners identified as possible challenges associated with data generation through the use of DATS included: manipulation of digital agricultural data (misuse of data); integrity of digital agricultural data (trustworthiness of data); power shifts; and rights of the farmer. These types of risks have been previously identified in the literature related to digital agriculture more generally (Jakku et al. 2019; Regan 2019; Fleming et al. 2018; van der Burg, Bogaardt, and Wolfert 2019; Bronson 2019; Carolan 2019; Small 2017).

Suggested responses would require actions from a wide range of actors but of particular relevance for the FAIRshare project, a number of actions were identified which involve the advisor. The advisor is viewed as having a gatekeeper role and can help to (1) raise awareness and inform farming communities about ethical issues pertaining to digital agricultural data; (2) provide practical support, education and training to farmers in the area of digital agricultural data; and (3) ensure that the actions and behaviours advisors themselves undertake with respect to digital agricultural data are responsible and ethical. It was identified that for advisors to assume such roles, training and awareness in the area of data and ethics in digital agriculture is first and foremost required for advisors.





Figure 3: Suggested actions for the FAIRshare project to consider so to support farm advisors to assume a gatekeeper role in ensuring responsible governance of data in digital agriculture.

6. References

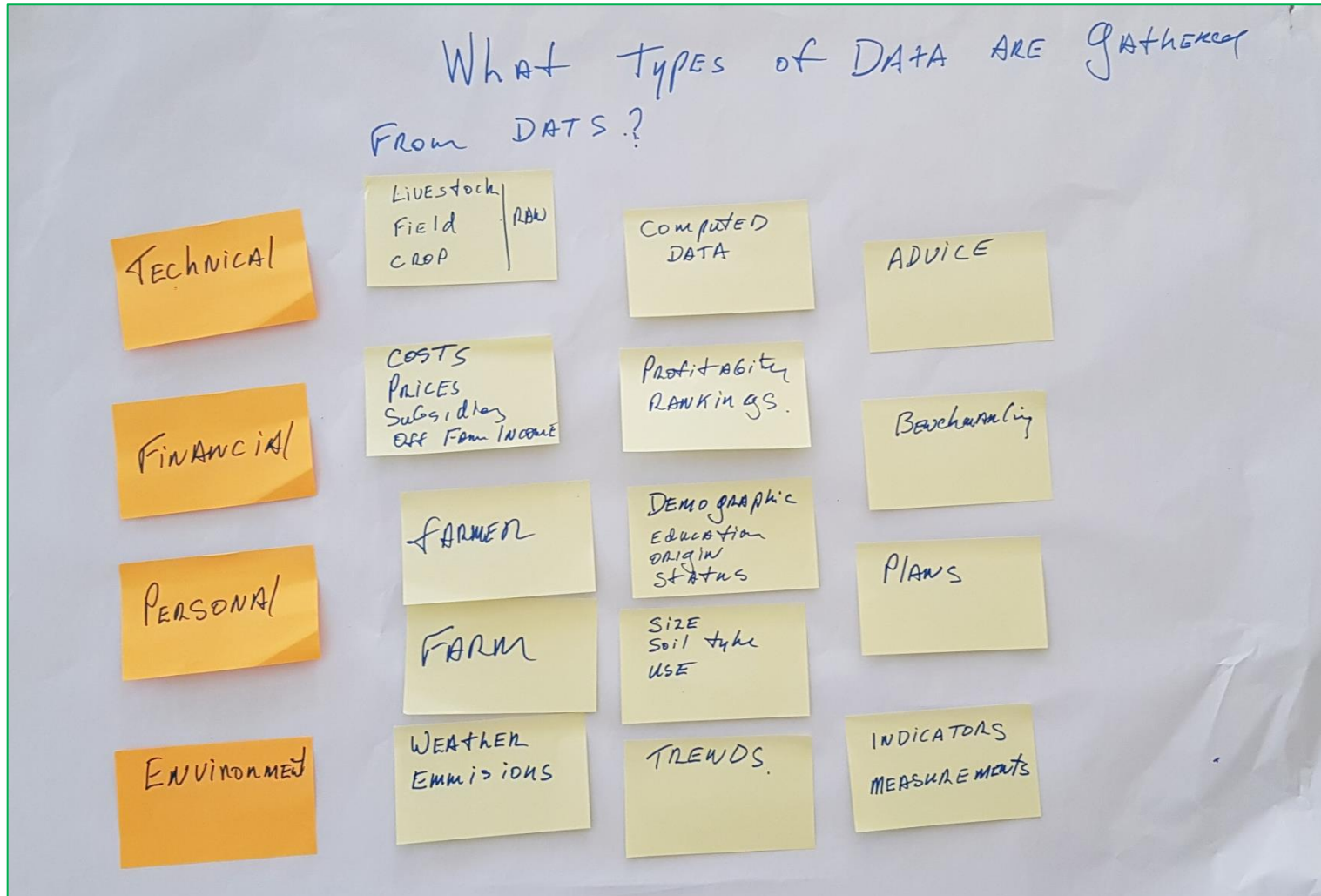
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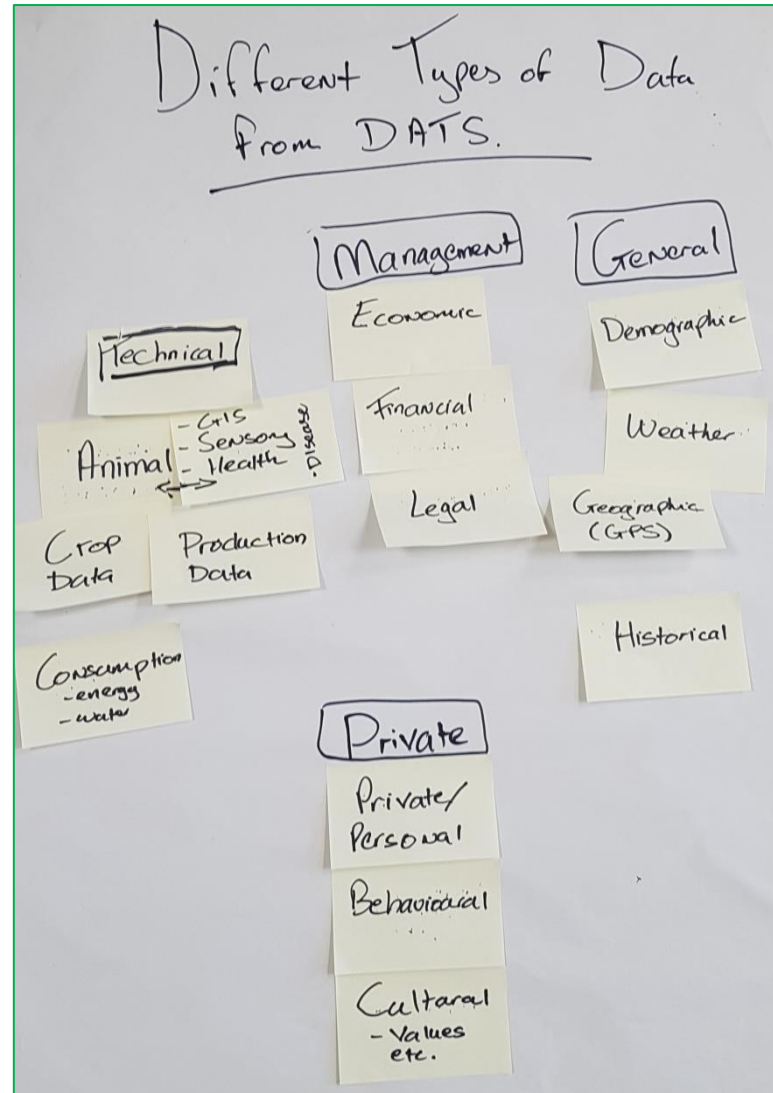


Appendix 1 – Raw Data from Workshop



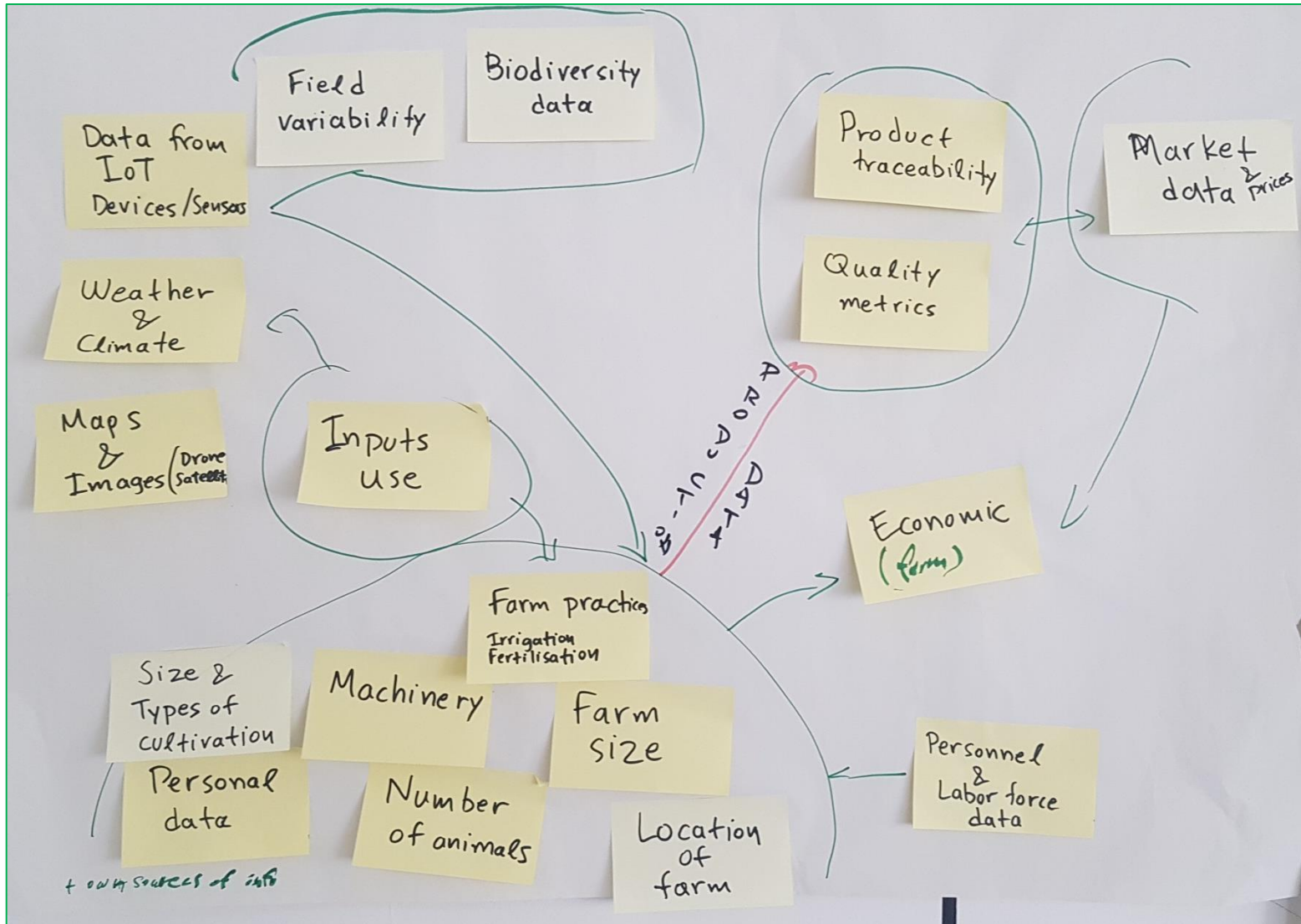
Exercise 1, identifying types of data from DATS: Group 1



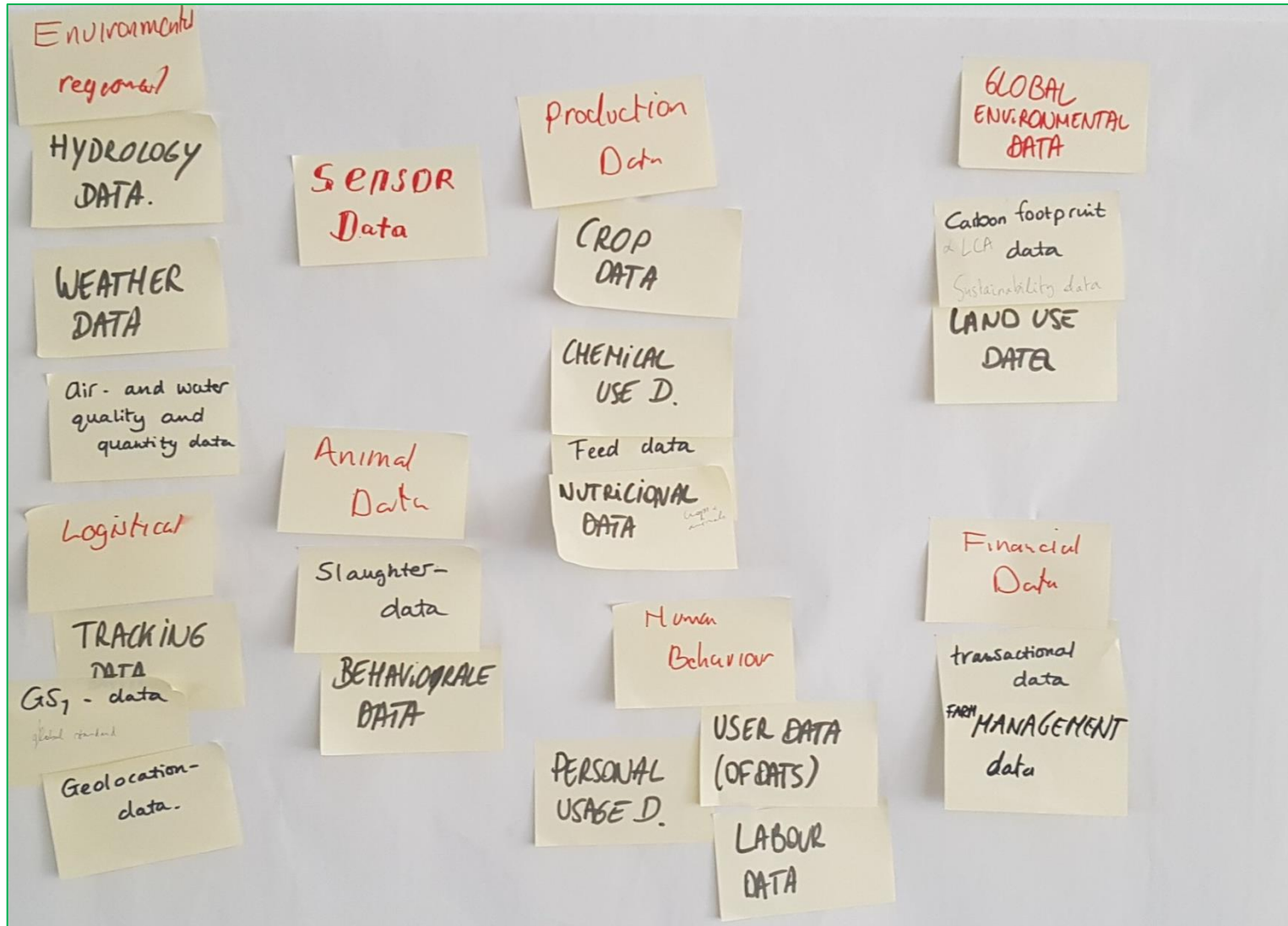


Exercise 1, identifying types of data from DATS: Group 2





Exercise 1, identifying types of data from DATS: Group 3



Exercise 1, identifying types of data from DATS: Group 4



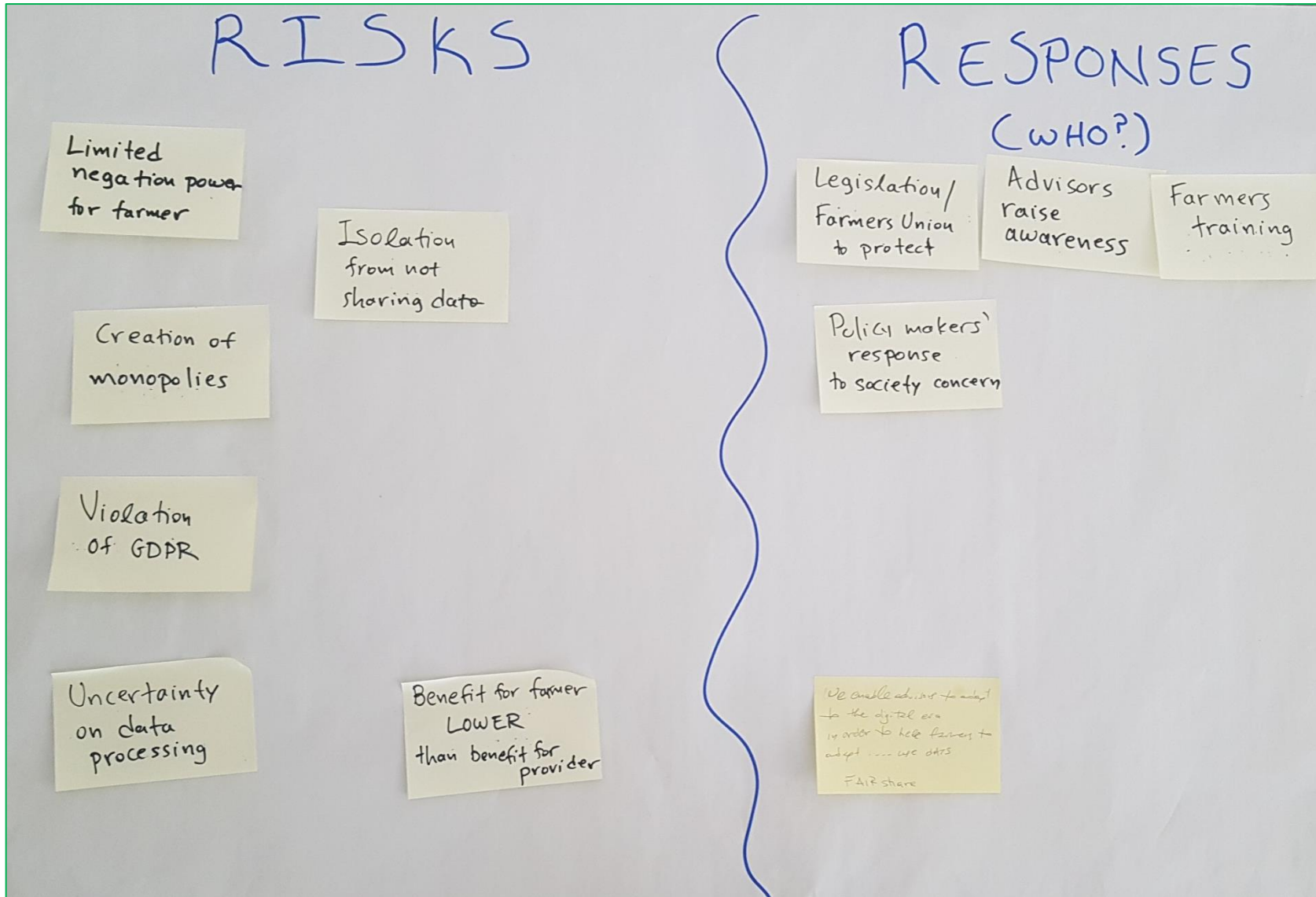
Exercise 2, identifying risks and responses: Group 1





Exercise 2, identifying risks and responses: Group 2





Exercise 2, identifying risks and responses: Group 3





Exercise 2, identifying risks and responses: Group 4

