



Desired Properties of Recycling-Derived Fertilisers from an End-User Perspective

(WPT1_Activity 4_Deliverable 4.2)

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Summary

The Interreg North-West (NW) Europe ReNu2Farm project aims to increase the recycling rates of the plant nutrients nitrogen (N), phosphorous (P) and potassium (K). Currently, farmers predominantly use mineral fertilisers that are a finite resource and in the case of nitrogen are energy-intensive to produce. Then again, there are several regions in NW Europe with a nutrient surplus and there have been many advances in technology that can recover these nutrients. However, there has been very little up-take overall, with these recycling derived fertilisers (RDFs). To explore the reason behind the reluctance of farmers to use these sustainable recycled products, a survey was conducted.

The survey consisted of 52 questions in total and it covered topics, including, users and non-users of RDFs, advisors and future use of RDFs. The survey was available in five languages to participants in seven NW Europe countries. The results of the relevant questions that explored the desired properties of RDFs are described in this report.

The desired RDF properties from an end-users perspective were explored and the outcome suggested there were several desired properties and parameters in RDF products that the respondents found important. Many of which were common among the participating countries and between RDF users and non-users, farmers and advisors. The respondents highlighted that a known fertiliser nutrient content and composition, a high organic matter content, product cost and the ease of use/ application were the most important parameters to know when selecting fertilisers. RDF users found that a nutrient ratio that fits with a crop nutrient demand was the most important quality in RDFs. However, non-users indicated the price per unit N or other nutrients was the most important.

To increase the uptake and success of these sustainable recycled products the producers and policymakers must acknowledge and meet the desired properties that farmers and advisors, RDF users and non-users have highlighted in this survey. In doing so, they will gain the end-users trust and build confidence in these recycled products. Assuring the consumers of the product safety, a known and consistent nutrient content at an affordable price will encourage them to get on board with using these recycled products, and actively contribute to the circular economy.

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Abbreviations

K	Potassium
N	Nitrogen
NW	North-West
P	Phosphorous
RDFs	Recycling-derived fertilisers
S	Sulphur

1 Introduction

The Interreg North-West (NW) Europe ReNu2Farm project aims to increase the recycling rates of the plant nutrients nitrogen (N), phosphorous (P) and potassium (K). P and K are limited and finite resources, and production of N fertilisers is energy-intensive. Despite several recovery technologies being at a mature stage, the use of recycling-derived fertiliser (RDF) products by farmers has been limited to date. ReNu2Farm aims to put the farming community at the heart of the research; therefore, stakeholder engagement is essential to this project.

To assess the attitudes and opinions of the stakeholders, mainly farmers, to RDFs, an extensive survey was conducted across seven different NW Europe countries. This survey explored the opinions of respondents to various topics including RDF sources, qualities and properties of RDFs, and their past, current and future use.

In this report, the desired properties of RDFs from an end-user perspective is explored. To develop RDF products and promote RDF use, the important properties and qualities of RDFs, from a potential customers perspective, must be known to the producers and the suppliers. Conducting a survey is an excellent way to, directly and indirectly, engage with the stakeholders to determine what they are looking for in RDFs. More specifically what qualities, properties or parameters are important to them, what are the desired RDF textures and what qualities in RDFs would make them consider substituting mineral fertilisers.

The survey questions assessed in this report focused initially on the respondents' demographics. The different parameters or properties that are important for farmers and advisors were explored. The importance of various qualities in RDFs from a user and non-users perspective was determined, and the farmers and advisors preferred RDF textures were assessed. The importance of cost and various qualities, which would encourage the substitution of mineral fertilisers with RDFs, was also explored. In addition, any other important qualities that farmers and advisors highlighted were assessed.

It is important to know the farmers' responses to these questions to understand why the uptake of these products is low and to identify what is constraining the farmers from using these products. Central to this study is to inform farmers of the benefits of these products, not only as sustainable substitutes for mineral fertilisers but also to protect the soil and environment for the future. The use of these recycled products is an example of the circular economy in action.

2 Methodology

The survey was compiled on Survey Monkey and consisted of 52 questions in total. The survey contained various question types including multiple-choice, rating scale and open-ended questions. It covered eight different topics, including, users and non-users of RDFs, advisors and future use of RDFs. The survey was available in five languages to participants in Belgium, France, Germany, Ireland, Luxembourg, the Netherlands and the United Kingdom. The survey opened in December 2018 and closed in April 2019. The survey responses were collated from the participating countries and translated to English. The results of the relevant questions that explored the desired properties of RDFs are described in this report.

In total, 1225 participants, which were predominantly farmers, responded to the survey (see Table 2-1: Total number of survey respondents per country.). The highest number of respondents were from those in France (679 respondents), Belgium (250 respondents) and Ireland (149 respondents). The number of responses per survey question varied according to the respondents' participation.

Table 2-1: Total number of survey respondents per country.

Country	Respondents
Belgium	250
France	679
Germany	65
Ireland	149
Luxembourg	2
Netherlands	73
United Kingdom	7

The quantitative closed-question responses were initially assessed on Microsoft Excel where the total number of respondents and responses per country and age group were recorded. To visually assess each question, the percentage of responses overall and per country and age group were graphed. The responses from those in Luxembourg and the United Kingdom were omitted from the graphed results due to the low number of respondents that took part in the survey and subsequently a low number of responses. However, the number of responses from Luxembourg and in the United Kingdom were recorded within each question description.

The responses per question were statistically analysed using the statistical package SPSS version 26 (IBM Statistics). The results were assessed using the Pearson Chi-Square test followed by a Bonferroni post-hoc test, provided they met the assumptions of the test. The assumptions included, (1.) that the number of responses in each cell must be to the value of five or above, and (2.) no more than 20% of the responses in all cells per question were to be below the value of five. If the responses to the question failed the assumption of the statistical test, a Fishers Exact test followed by a Bonferroni post-hoc test was used. This test was employed as it took into account the responses with a value below five, to give confidence in the results.

The open-ended questions were assessed using the qualitative data analysis software NVivo 12 Plus (QSR International). The number of respondents that took part in the questions and the total word counts per county and age group was recorded. The most frequently occurring words in the question were determined and visually represented in a word cloud graph. The bigger and darker that words are on these graphs indicates the frequency that the word occurs in the question. The themes that emerged from the questions were identified and recorded. Often subthemes were classified under the main theme heading to build on the opinions of the respondents.

3 Respondents Demographic

3.1 Chapter Overview

To determine the demographic of the respondents a series of questions were asked to ensure the survey reached the target stakeholders i.e. farmers. The country of origin and their age group were determined to overall assess where the respondents were from and what age groups interacted with the survey. The participants' farming and employment type, and the types of activities carried out on their farms were also assessed to ensure the survey targeted the required respondents.

3.2 Country of Origin

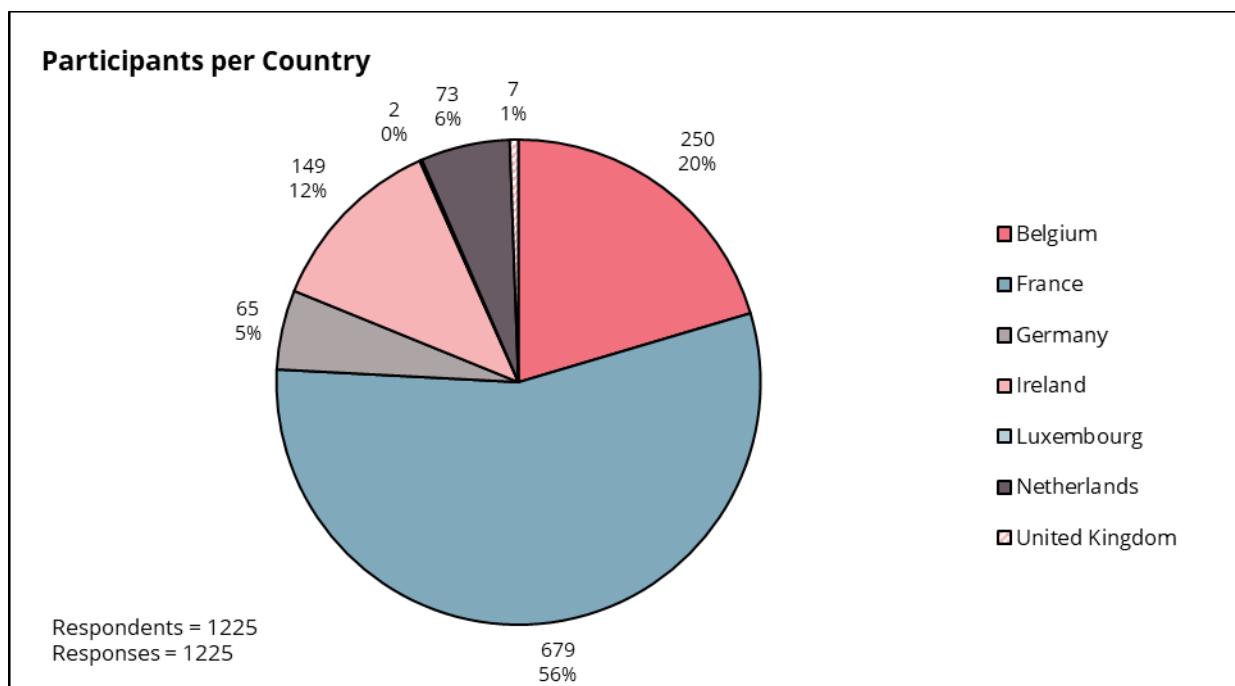
The respondents were asked to identify their country of origin to determine the number of responses per country, which gave an overall demographic of participant engagement. The question was structured with a simple drop-down box, in which the participants could select their own country of origin (Figure 3-1).

* 2. Which country are you from?



Figure 3-1 Country of origin question, from the ReNu2Farm Stakeholders Survey.

In total, 1225 farmers responded to the country of origin question. See Figure 3-2 for the breakdown of the number of participants recorded per country. In total, most of the respondents were from France with just over half of all participants (56%), followed by 20% of those in Belgium and 12% of respondents in Ireland.



***The number of responses and the percentage of the survey responses are indicated on the figure.*

Figure 3-2: Distribution of participants per country in the survey.

3.3 Respondents Age Profile

In this question, respondents were asked to identify their age to understand the distribution of age groups across the survey participants (Figure 3-3). It was a multiple-choice question with five different age group options to choose from.

10. What is your age?

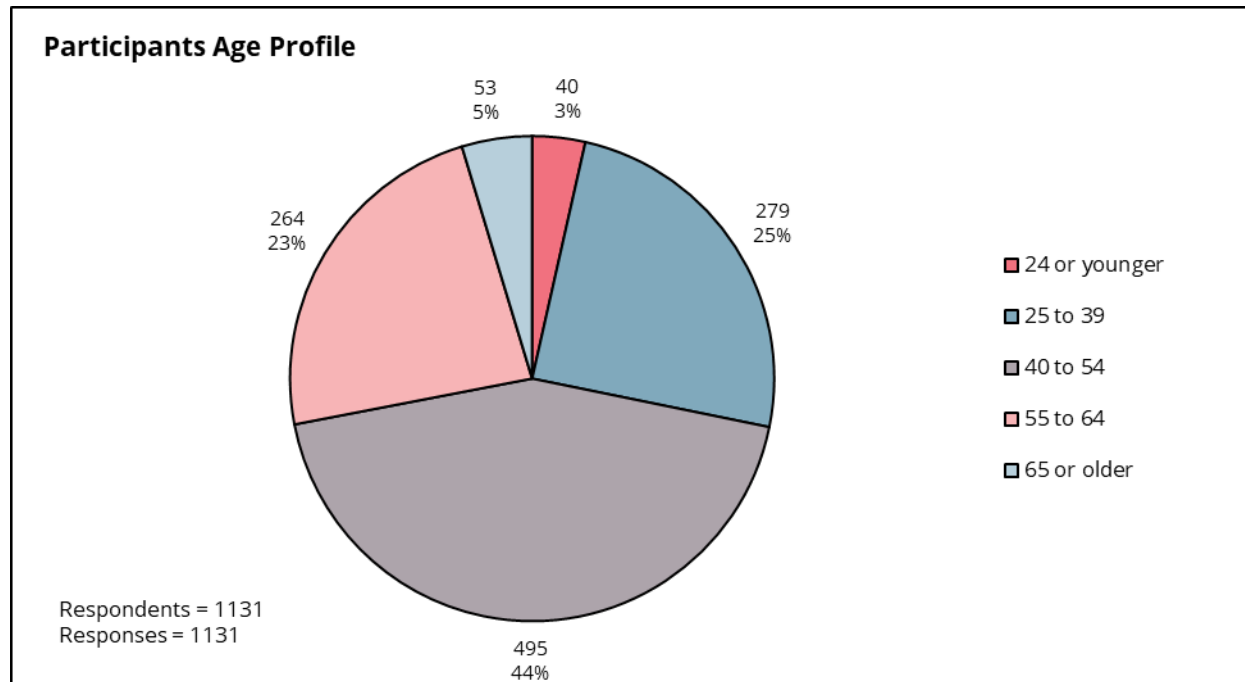
- ☐ 24 or younger
- ☐ 25 to 39
- ☐ 40 to 54
- ☐ 55 to 64
- ☐ 65 or older

Figure 3-3 Age profile question, from the ReNu2Farm Stakeholders Survey.

3.3.1 Overall Response

*In total, there were 1131 responses to this question. **The number of responses and the percentage of the survey responses is indicated on the figure.*

Figure 3-4 describes the distribution of respondents per age group in the survey. 44% of all participants were in the 40 to 54 age group, followed by 25% in the 25 to 39 group and 23% in the 55 to 64 age group.

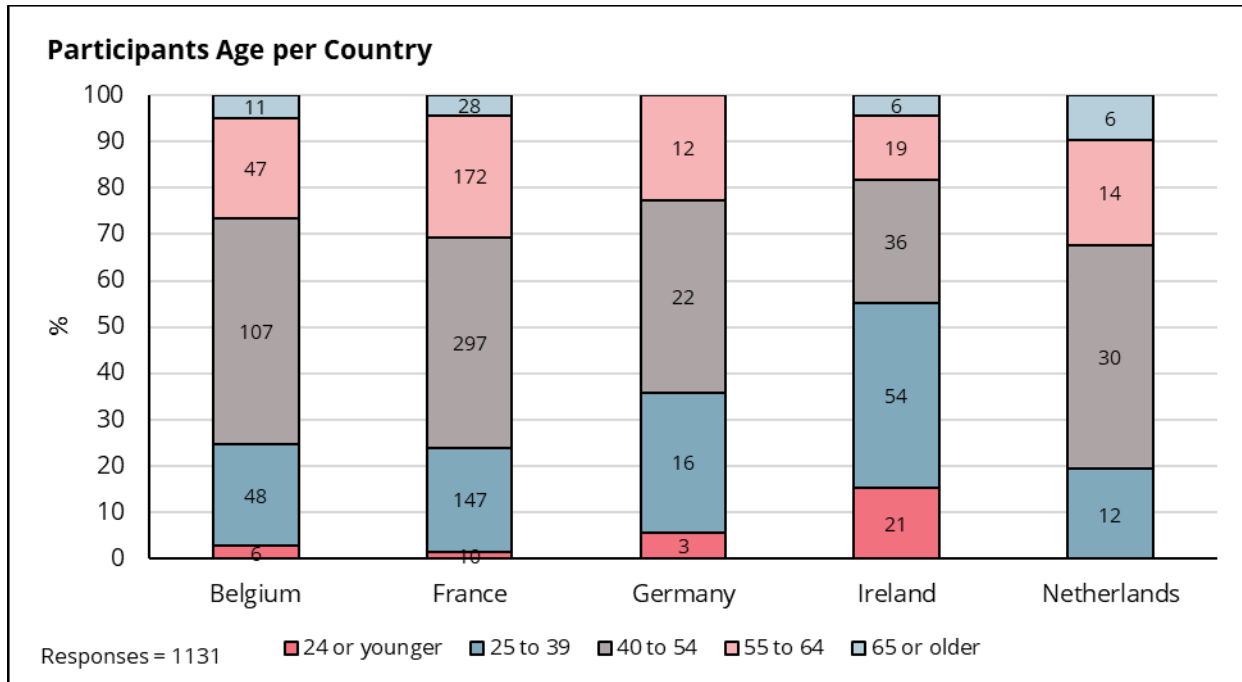


***The number of responses and the percentage of the survey responses is indicated on the figure.*

Figure 3-4: Distribution of participants per age group in the survey.

3.3.2 Distribution of Age Groups per Country

The overall distribution of the different age groups per country is described in Figure 3-5. In general, the distribution of the age groups per country follows the same trend, with the most responses from the 40 to 54 age group. In particular, 49% of those in Belgium and 48% of those in the Netherlands were in the 40 to 54 age group. However, this is not the case for participants in Ireland, which was dominated by 40% of those in the 25 to 39 age group. There were no respondents in the 24 or younger age group in the Netherlands, or the 65 or over age group in Germany. There were two responses from those in Luxembourg, one participant was in the 25 to 39 group and the other was in the 65 or older age group. There were also five responses from those in the United Kingdom. These respondents were in the 25 to 39 group, the 40 to 54 group and the 65 or older age group.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number of responses is represented in each bar.

Figure 3-5: Overall distribution of the age groups across the participating countries.

3.4 Employment Type

In another question, the respondents were asked to identify their employment type (Figure 3-6). This question was useful to assess that the intended stakeholder engaged. It was a multiple-choice question with six employment options to choose from, including farmer, advisor or biogas plant owner. There was also an option that the participants could answer if their employment type was not mentioned in the predefined list of options, where they could input their employment information.

9. Which of the following are you?

- | | |
|---|--|
| <input type="checkbox"/> Farmer | <input type="checkbox"/> Advisor |
| <input type="checkbox"/> Contract worker | <input type="checkbox"/> Farmer with biogas installation |
| <input type="checkbox"/> Farmer and advisor | <input type="checkbox"/> Biogas plant owner |
| <input type="checkbox"/> Other (please specify) | |

Figure 3-6: Employment question from the ReNu2Farm Stakeholders Survey.

3.4.1 Overall Response

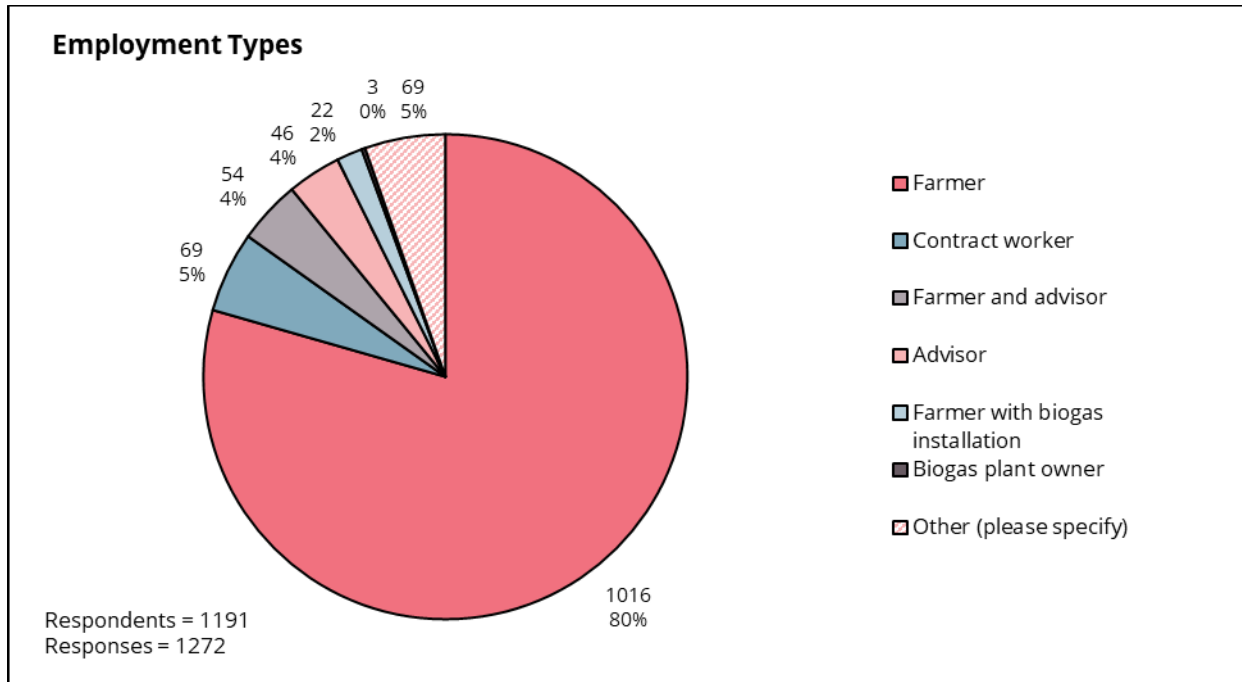
In total, 1191 respondents answered this question. However, several respondents indicated more than one employment option; therefore, there is a total number of 1272 responses. Fewer people answering the age-related question caused the discrepancy between the participants' responses to the different countries and age groups. See Table 3-1 for the breakdown of the number of respondents and responses recorded per country.

Table 3-1: Total number of respondents, responses and word counts for the employment, farming and activity type questions.

	Employment Type		Farming Type		Types of Activities	
	Closed Respondents (Responses)	Open-ended Respondents (Word count)	Closed Respondents (Responses)	Open-ended Respondents (Word count)	Closed Respondents (Responses)	Open-ended Respondents (Word count)
Total	1191 (1272) *	69 (150)	1129	77 (189)	1132 (1881)	94 (183)
Belgium	234 (246)	29 (80)	216	15 (29)	219 (424)	26 (54)
France	671 (713)	23 (35)	653	60 (151)	653 (993)	44 (62)
Germany	64 (72)	5 (11)	55	0	55 (98)	6 (22)
Ireland	148 (153)	7 (14)	136	1 (7)	136 (176)	6 (18)
Luxembourg	2 (2)	0	2	0	2 (3)	0
Netherlands	66 (80)	5 (10)	62	1 (2)	62 (83)	9 (27)
United Kingdom	6 (6)	0	5	0	5 (10)	0

***The number of responses and the percentage of the survey responses is indicated on the figure.*

Figure 3-7 describes the overall different types of workers that interacted with the employment question. 80% of survey participants were farmers, 5% were contracted workers, 4% were farmers & advisors, and 4% were advisors only. In addition, 5% of respondents selected the 'other' option for this question.



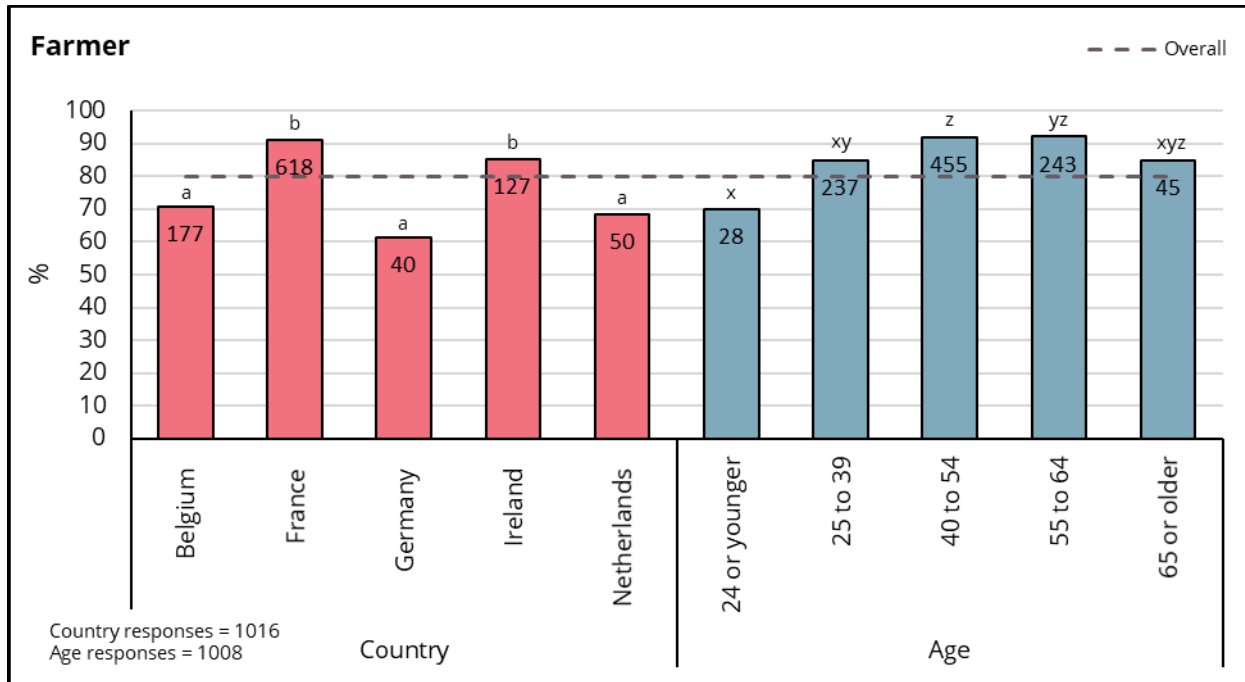
***The number of responses and the percentage of the survey responses is indicated on the figure.*

Figure 3-7: The total percentage of different employment types that took part in the survey.

3.4.2 Employment Responses

Farmers

- In total, 80% of those that responded to this option were farmers. This was the most commonly occurring employment type among the participants and therefore, this cohort was examined in more detail (see Figure 3-8).
- Of those that participated in France, 91% were farmers, followed by 85% in Ireland and 71% in Belgium.
- The statistical analysis suggested that responses from participants in France and Ireland were statistically significantly different from those from Belgium, Germany and the Netherlands.
- There was one response from Luxembourg and three responses from the United Kingdom.
- Overall, of those that responded from the 40 to 54 group and the 55 to 64 age group, 92% respectively stated they were farmers. Responses from those in the 40 to 54 age group were statistically significantly different to the 24 or younger and the 25 to 39 age groups. There was also a statistically significant difference between the responses from those in the 24 or younger group and the 55 to 64 age group.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses. The dashed line refers to the overall farmers' responses. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different.

Figure 3-8: Distribution of farmers per country and age group.

Other Employment Responses

Based on the employment question several interesting trends came to the fore including:

Contract workers

- Overall, 5% of those that responded to this option were contract workers. In total, 14% of respondents in the Netherlands (10 responses) were contract workers, followed by 6% of those in Germany (4 responses).
- Of those in the 24 or younger age group (6 responses), 15% were contract workers. Following this, 6% of participants in the 25 to 39 group (16 responses) and the 40 to 54 age groups (31 responses) were contract workers.

Farmers & advisors

- Overall, 4% of those that responded to this option were farmers & advisors. Of those that responded from the Netherlands (8 responses) and Germany (7 responses), 11% were farmers and advisors.
- In total, 13% of those in the 24 or younger age group (5 responses) were farmers and advisors, followed by 8% of those in the 25 to 39 age group (21 responses).

Advisors only

- In total, 4% of those that responded to this option were advisors. Of those that responded from Germany (8 responses) 12% were advisors, followed by 10% of those in the Netherlands (7 responses).

Farmers with biogas installations and biogas plant owners

- Overall, 2% of those that responded to this option were farmers with biogas installations and biogas plant owners. There were 22 responses from farmers with biogas installations and three responses from those that were biogas plant owners.
- In total, 13% of those that responded to this option from Germany (8 responses) were farmers with biogas installations and biogas plant owners or biogas plant owners, followed by 2% those in France (15 responses).
- There were no responses from the other participating countries.
- Responses from those in Germany were statistically significantly different from all other participating countries for this option.

3.4.3 Open-Ended Question Responses

Overall, 12% of participants (69 respondents) responded to the 'other' option in the employment question, which resulted in 150 words recorded. This option enabled participants to include any other employment types they are involved in. See Table 3-1 for the breakdown of the number of respondents and words recorded per country for this option.

Themes

The most frequently occurring words, as displayed in Figure 3-9, farmer (13 counts) and horticulture (10 counts). In addition, other farming types that responded to this survey the most were farmers (9 responses), hobby farmers (7 responses), agricultural employees (5 responses) and retired farmers (3 responses). Other commonly occurring employment types included horticulturalists (10 responses) such as garden contractors, cucumber growers and rose growers. Recycled fertiliser producers (9 responses) were the next common, which included farmers with composting installations, manure treatment enterprises and producers of mushroom substrate. There were seven responses from agricultural students or researchers.



Figure 3-9: Word cloud produced from the most commonly occurring words in the "Other" section in employment question.

Several different themes emerged in this question regarding the types of employment of these respondents.

- The most frequently occurring responses were from farmers (20 counts) with 30%, including from hobby farmers (6 counts), farmers with composting facilities (3 counts) and mushroom farmers (2 counts).
- The next frequently occurring were those in horticulture (16 counts) with 24%, including arborists (2 counts), gardeners (2 counts) and wine growers (1 count).
- Some participants were employees (7 counts) including an employee related to a farm company (1 count), employed in a manure treatment enterprise (2 counts), a participant in agricultural administration (1 count) and a machine constructor (1 count).
- Some respondents were involved with research (4 counts) such as a field trial collaborator (1 count), an experimenter (1 count) and one participant identified as working in research and science.
- There were three counts from those that stated they were advisors, and three counts from students, including a student of agriculture (1 count).
- Other participants stated they were contract workers (2 counts) while some worked in industry (2 counts) or as policymakers (2 counts).

3.5 Farming Type

The different types of farming carried out by the survey participants were assessed (Figure 3-10). This was a single-answer question with two options to choose from, either conventional or organic farming. If the participants were neither conventional nor organic farmers, they could choose the other option and record the type of farming being carried out on their farms.

11. What type of farming is being carried out?

☐ Conventional farming

☐ Organic farming

☐ Other (please specify)

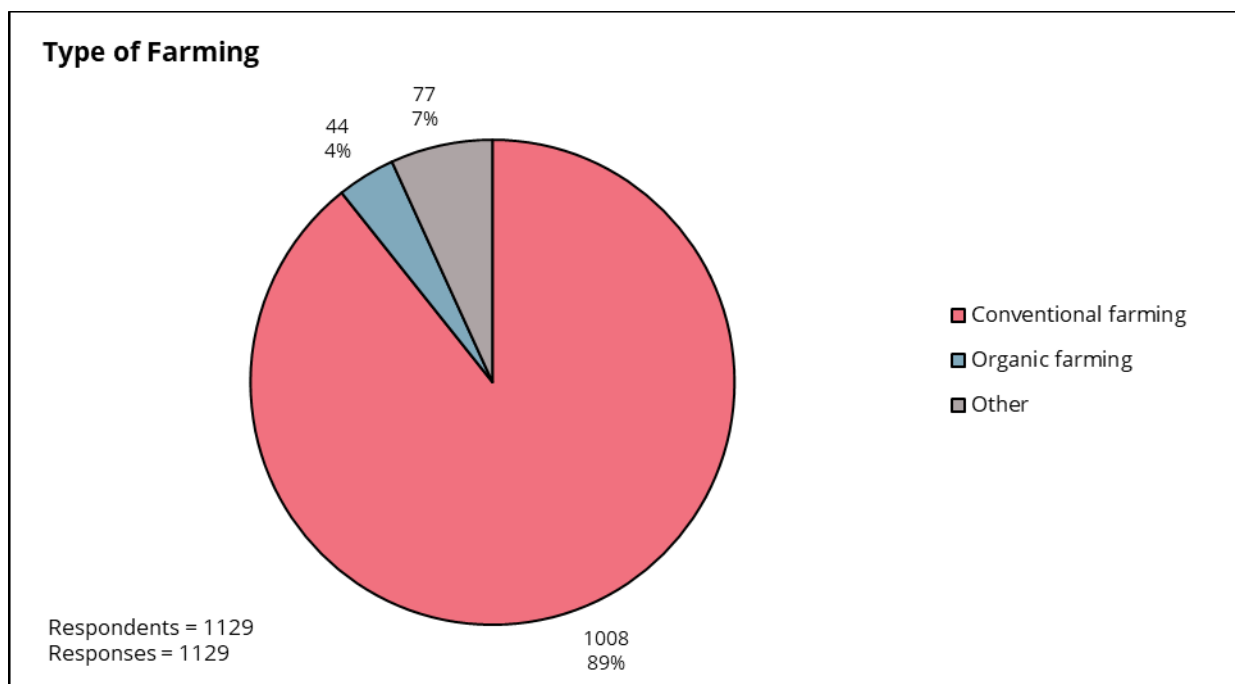
Figure 3-10: Type of farming question, from the ReNu2Farm Stakeholders Survey.

3.5.1 Overall Response

In total, 1129 respondents responded to this question (**The number of responses and the percentage of the survey responses are indicated on the figure.

Figure 3-11). See Table 3-1 for the breakdown of the number of respondents and responses recorded per country. **The number of responses and the percentage of the survey responses are indicated on the figure.

Figure 3-11 describes the overall different farming types that responded to this question. Overall, 89% of participants carried out conventional farming on their land. Just 4% of participants practised organic farming while 7% of respondents selected that they practised other types of farming.



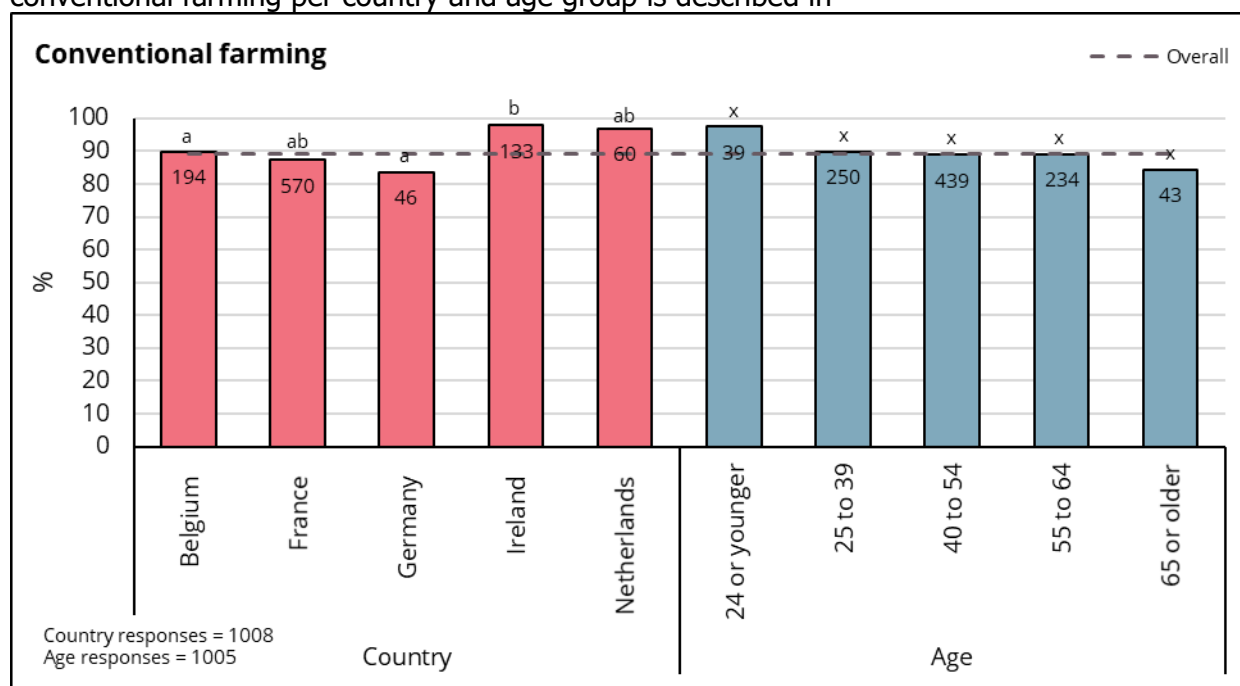
***The number of responses and the percentage of the survey responses are indicated on the figure.*

Figure 3-11: Overview of the types of farming carried out by the survey participants.

3.5.2 Farming Responses

Conventional farming

- Overall, 89% of respondents practised conventional farming. The distribution of conventional farming per country and age group is described in



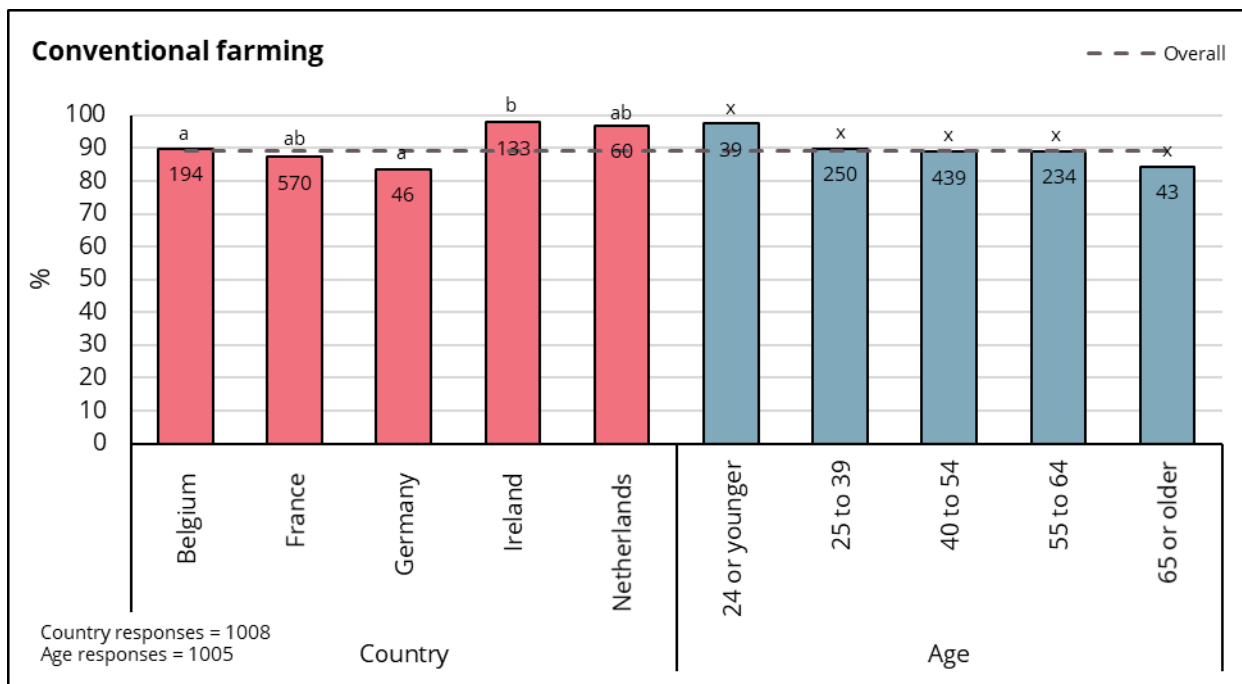
*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The overall percentage of conventional farming is represented by a dashed line. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different. The number on each bar refers to the number of responses.

- Figure 3-12. Of those that participated in Ireland, 98% were conventional farmers, followed by 97% of participants in the Netherlands. The responses from those in Ireland were statistically significantly different from those from Belgium and Germany.
- Participants in Luxembourg did not respond to this option and there were five responses from those in the United Kingdom.
- In total, 98% of the participants in the 24 or younger age group were conventional farmers, followed by 90% of those in the 25 to 39 age group.

Organic farming

- Overall 4% of respondents were organic farmers. Of those that responded in Germany, 16% were organic farmers (9 responses), followed by 4% of those in France (23 responses). Responses from those in Germany were statistically significantly different to all participating countries.
- There were two responses from those in Luxembourg. Those in the United Kingdom did not respond to this option.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The overall percentage of conventional farming is represented by a dashed line. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different. The number on each bar refers to the number of responses.

Figure 3-12: Distribution of responses from those that practice conventional farming per country and age group.

Other farming types

- In total, 7% of respondents stated that they carry out other farming types on their land. 9% of those in France (60 responses) did other types of farming activities on their land, followed by 7% of those in Belgium (15 responses). The responses from those in France were statistically significantly different between those from Ireland.
- There were no responses from those in Luxembourg or the United Kingdom to this option.
- Of those that participated in the 65 or older age group (6 responses), 12% were involved with other farming types, followed by 7% of those in the 40 to 54 age group (37 responses).

3.5.3 Open-Ended Question Responses

In total, 7% of participants (77 respondents) stated that they carry other farming types on their farm, which resulted in 189 word counts. This option enabled the respondents to give a good insight into the other types of farming carried out on their farms. See Table 3-1 for the breakdown of the number of respondents and words recorded per country for this option.

Themes

The words, agriculture (39 counts) and conservation (32 counts) were the most frequently occurring words (Figure 3-13), followed by farming (12 counts), sustainable (12 counts) and organic (7 counts). While analysing the open-ended option, several different themes emerged regarding the type of farming being carried out on the participant's farms.

- The most frequently occurring was from farmers that practice conservation agriculture (32 counts).
- The next most frequently occurring type of farming was sustainable farming (11 counts), followed by no or minimum-till (4 counts).
- Other types mentioned included direct seeding (3 counts), integrated farming (3 counts) and agro-ecological farming (2 counts).
- Some farming types mentioned in this question included combination farming (6 counts), horticulture (4 counts), and crop farming (5 counts) including field vegetables (3 counts) and flax crops (1 count).
- Other types included animal farming (2 counts) including animal husbandry (1 count), a worm nursery (1 count) and hobby farmers (1 count). Another type included those who work in industry (1 count) and those that are not farmers (1 count).



Figure 3-13: Word cloud produced from the most commonly occurring words in the "Other" section in farming type question

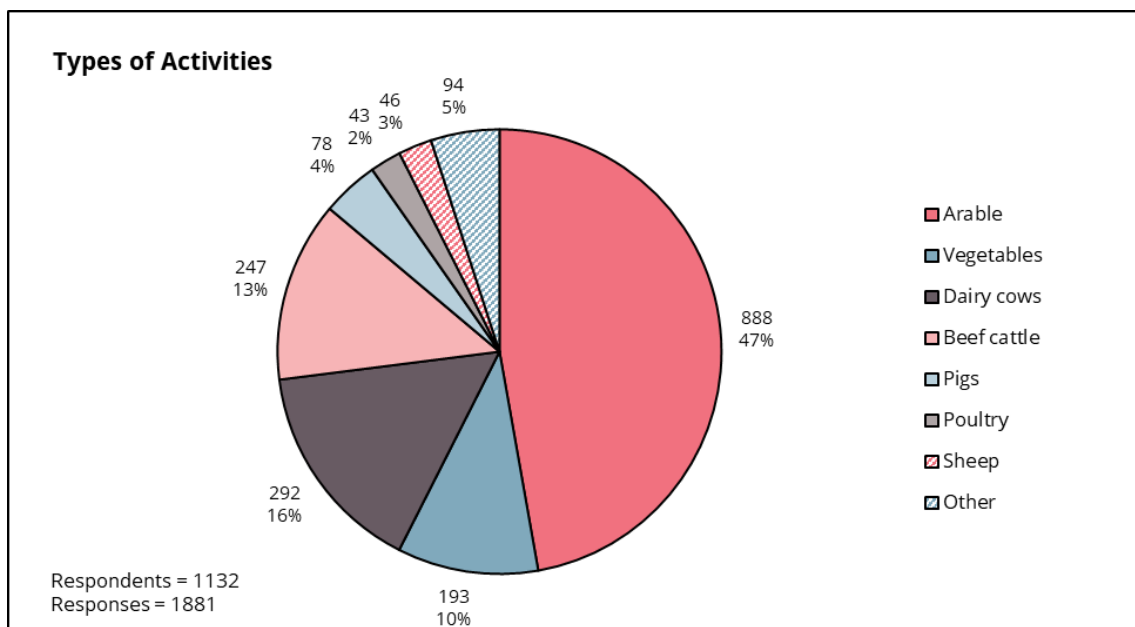
3.6 Types of Activities

In Figure 3-14, the survey participants were asked about the types of activities they carry out on their farms. This was a closed multiple-choice question, with six options to choose from, including arable, dairy cows, pigs and sheep farming. If the type of activities carried out on their farm were not included in the multiple-choice options, participants could choose the 'other' option and write in the type of activities carried out on their farm.

12. What are your activities? (multiple answers allowed)

- | | |
|---|----------------------------------|
| <input type="checkbox"/> Arable | <input type="checkbox"/> Pigs |
| <input type="checkbox"/> Vegetables | <input type="checkbox"/> Poultry |
| <input type="checkbox"/> Dairy cows | <input type="checkbox"/> Sheep |
| <input type="checkbox"/> Beef cattle | |
| <input type="checkbox"/> Other (please specify) | |

Figure 3-14: Farming activity question, from the ReNu2Farm Stakeholders Survey.



***The number of responses and the percentage of the survey responses is indicated on the figure.*

Figure 3-15: Overview of the different types of farming activities carried out on the participants land.

3.6.1 Overall Response

In total, 1132 respondents interacted with this question (**The number of responses and the percentage of the survey responses is indicated on the figure.

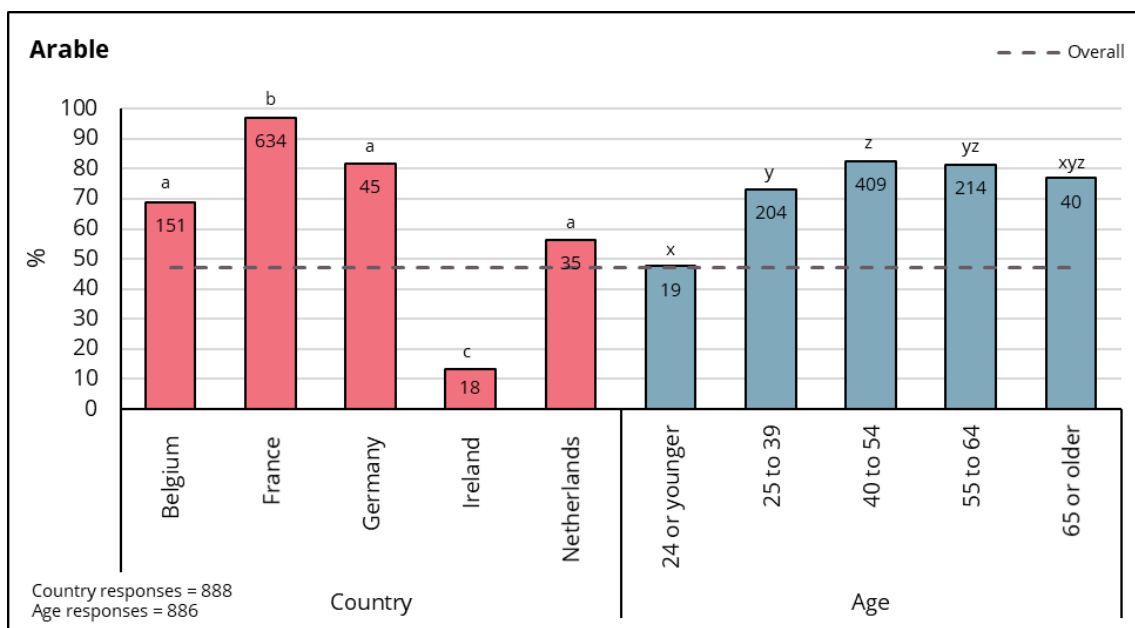
Figure 3-15) which resulted in 1881 responses. See Table 3-1 for the breakdown of the number of respondents and responses recorded per country. **The number of responses and the percentage of the survey responses is indicated on the figure.

Figure 3-15 describes the overall different types of activities that responded to this question. In total, 47% of participants were arable farmers and 16% of participants are dairy cow farmers, 13% of participants were beef cattle farmers, while vegetable farmers comprised of 10% of the survey responses. 5% of participants selected the 'other' option in this question.

3.6.2 Activities Responses

Arable

- Overall, 47% of respondents were arable farmers. This was the most frequently occurring farming activity carried out by participants. The distribution of arable farming per country and age group is described in Figure 3-16. Of those that responded from France, 97% were arable farmers followed by 82% of those in Germany. The responses between those in France and Ireland were statistically significantly different from the other participating countries.
- There were two responses from those in Luxembourg and three responses from those in the United Kingdom.
- In total, 83% of those in the 40 to 54 age group were arable farmers, followed by 81% of those in the 55 to 64 age group and 77% of those in the 65 or older group. The responses from those in the 24 or younger age group were statistically significantly different to all the other age groups, except the 65 or older group. The responses from those in the 25 to 39 age group were statistically significantly different from those in the 24 or younger and the 40 to 54 age groups. Those in the 55 to 64 age group was statistically significantly different from those in the 24 or younger age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses. The dashed line refers to the overall response from arable farmers. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different.

Figure 3-16: Distribution of arable farming per country and age group.

Dairy cows

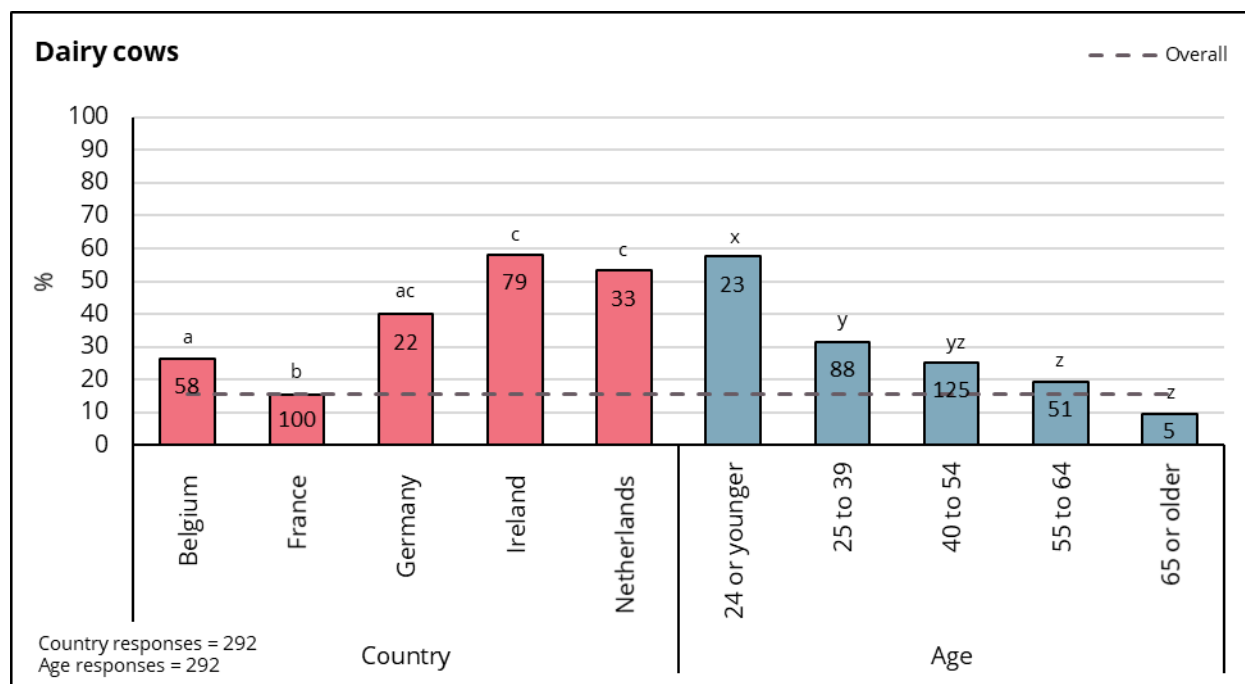
- Overall, 16% of respondents were dairy cow farmers (
- *Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses. The dashed line refers to the overall response from dairy cow farmers. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different.

- Figure 3-17). This was the 2nd most frequently occurring farming activity carried out by participants. It is clear from
- *Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses. The dashed line refers to the overall response from dairy cow farmers. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different.

- Figure 3-17 that of those who participated in Ireland, 58% were dairy cow farmers, followed by 53% of participants in the Netherlands and 40% of participants in Germany. Participant responses from those in France were statistically significantly different from all other participating countries. Responses from those in Belgium were statistically significantly different to all other countries except Germany.
- Those in Luxembourg and the United Kingdom did not answer the dairy cow option in this question.
- In total, 58% of those in the 24 or younger age group were dairy cow farmers, followed by 32% of those in the 25 to 39 age group and 25% of those in the 40 to 54 group. Responses from those in the 24 or younger age group were statistically significantly different to all other participating countries.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses. The dashed line refers to the overall response from dairy cow farmers. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different.

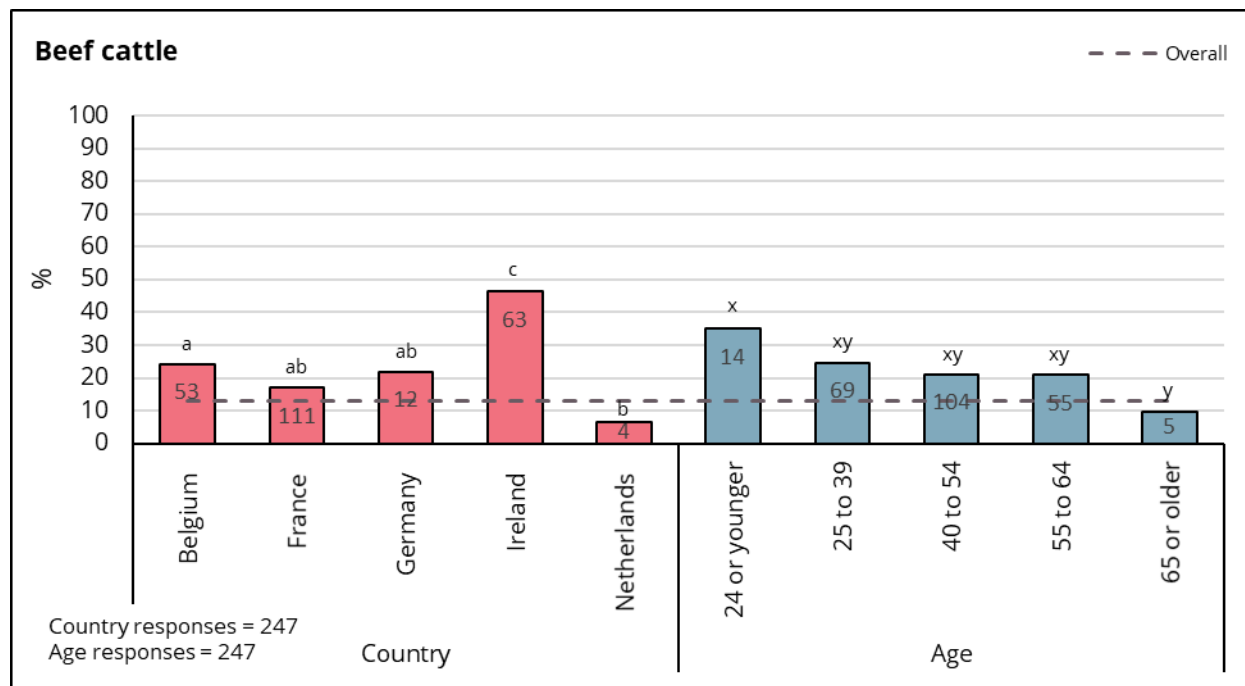
Figure 3-17: Distribution of dairy cow farming per country and age group.

Beef cattle

- In total, 13% of participants were beef cattle farmers (*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

***The number on each bar refers to the number of responses. The dashed line refers to the overall response from beef cattle farmers. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different.*

- Figure 3-18). This was the 3rd most frequently occurring farming activity carried out by participants. Overall, 46% of participants in Ireland were beef farmers, followed by 24% of those in Belgium. The responses from Ireland were statistically significantly different from all other participating countries. Also, the responses from Belgium were statistically significantly different from those in Ireland and the Netherlands.
- There was one response from those in Luxembourg and three responses from those in the United Kingdom.
- Of those that participated in the 24 or younger age group, 35% were beef cattle farmers, followed by 25% of those in the 25 to 39 age group. Responses from those in the 24 or younger age group were statistically significantly different from those in the 65 or older age group.



**Luxembourg and the United Kingdom were not included in the graph due to a low response rate.*

***The number on each bar refers to the number of responses. The dashed line refers to the overall response from beef cattle farmers. Values marked with letters indicate a significant difference in the post hoc analysis among either the different countries or age groups. The same letters are not statistically significantly different.*

Figure 3-18: Distribution of beef cattle farming per country and age group.

Other farming activities

Poultry

- Overall, 2% of respondents were poultry farmers (43 responses). This was the least frequently occurring farming activity carried out by participants.
- The highest percentages were 13% of those from Germany (7 responses), followed by 5% of those in Belgium (10 responses) were poultry farmers.
- Responses from those in Germany were statistically significantly different from the responses from those in Ireland and the Netherlands.
- There were no responses from those in Luxembourg, the Netherlands and the United Kingdom.

Sheep

- Overall, 3% of participants were sheep farmers (46 responses). This was the 2nd least frequently occurring farming activity carried out by participants.
- Of those that participated in Ireland, 8% were sheep farmers (11 responses), followed by 5% of those in Germany (3 responses).
- The responses from Ireland were statistically significantly different from those from France.
- There were no responses from Luxembourg to this option in the Question. However, there were four responses from those in the United Kingdom.

Pigs

- Overall, 4% of participants were pig farmers (78 responses). This was the 3rd least frequently occurring farming activity carried out by participants.
- Of those that participated from Belgium, 29% were pig farmers (63 responses), followed by 9% of those in Germany (5 responses).
- Responses from those in Belgium were statistically significantly different from all other participating countries.
- The responses from those in Germany were statistically significantly different to all participating countries, except those in the Netherlands.
- There were no responses from those in Luxembourg and the United Kingdom.

Vegetables

- Overall, 10% of respondents (193 responses) were vegetable farmers. This was the 4th most frequently occurring farming activity carried out by participants.
- Vegetable farmers made up 37% of those who participated in Belgium (80 responses), along with 15% of those who participated in France (100 responses).
- The lowest number of vegetable farmers that responded to this question were from Ireland (3 responses) with just 2%.
- There was a statistically significant difference between Belgium and Ireland and the other participating countries.
- Those in Luxembourg and the United Kingdom did not respond to this option in the question.

3.6.3 Open-Ended Question Responses

In total, 5% of participants (94 respondents) suggested they were involved with other types of farming activities which resulted in 183 words counted. This option enabled the respondents to give an insight into the other types of farming activities they were involved with on their

- Dairy and cattle farming (9 counts) with 10%, including beef farming (3 counts) or dairy farming (3 counts) and butchery (2 counts).
- Arboriculture and tree nursery (8 counts) with 9%, included firewood production (1 count) and growing Christmas trees (1 count).
- Along with 6% working in horticulture (5 counts).
- 4% as contract workers (4 counts) and 3% in other sustainable farming methods (3 counts) such as photovoltaic (2 counts) and biogas production was also popular.

3.7 Chapter Summary

In total, 1225 people responded to the survey across seven countries from North-West Europe. Participants in France followed by Belgium and Ireland responded the most to this survey. However, the response rate for Luxemburg and the United Kingdom were low and therefore not a true reflection of the respondents desired RDF properties from these countries.

Those in the 40 to 54 age group responded the most to the survey overall. The distribution of the different age groups was similar in each country, with participants predominantly in the 40 to 54 age group. Except, those in Ireland, which was dominated by the 25 to 39 age group.

From the survey, 80% of the participants were farmers, which indicates that the survey was available to and taken up by the main stakeholder group. From this information, it was determined that farmers in France responded the most to this survey, followed by those in Belgium and Ireland. The other participants identified their employment type as hobby farmers, horticulturalists, working for agricultural companies or in research.

Of those identified as farmers, 89% indicated that they were conventional farmers, in particular those from Ireland and the Netherlands. 4% were organic farming while the remaining 7% of farming carried out included conservational agriculture, sustainable farming and combination farming.

The most frequently occurring farming activities that respondents were involved in, were arable farming (in France and Germany and the 40 to 54 and the 55 to 64 age group), dairy cow farming (in Ireland and the Netherlands), and beef cattle farming, (in Ireland and Belgium, and the 24 or younger group and the 25 to 39 age groups respectively).

Other types of farming activities that also frequently occurred were fruit and vegetable farmers, grassland management and working with other animals such as horses and goats not previously mentioned in the closed section of the question.

Overall, these results indicate that the required stakeholders were targeted and that there was a good distribution of respondents in the participating countries, except Luxembourg and the United Kingdom. There was also a good distribution of age groups and range of farming activities, to give a broad and dynamic overview into the participants' desired properties of RDFs from an end-user perspective.

4 Important Parameters and Properties to know when Selecting Fertilisers

4.1 Overview

In this chapter, participants were asked what parameters/properties are important to know when selecting a fertiliser. This question was proposed to both farmers (Figure 4-1) and advisors separately (Figure A-1), to assess if both had similar or different unprompted responses to parameters or properties that were important to them when selecting a fertiliser from the farmers' point of view and those advising farmers on fertilisers and agricultural practices. This was an open-ended question, to allow the respondents to fill in their own opinions on the important parameter or properties when selecting a fertiliser for their farms.

23. What parameters/properties are important to know when selecting a fertiliser?

Figure 4-1: Important parameter/properties question to farmers, from the ReNu2Farm Stakeholders Survey.

4.2 Important Parameters/ Properties

In total, 892 farmers and 33 advisors responded to the important parameters/properties question. This resulted in 3599 words recorded from farmers and 250 words recorded from advisors. This allowed participants to include which unprompted parameters or properties they find important when selecting fertilisers. See Table 4-1 for the breakdown of the number of farmers and advisors responses and words recorded per country.

Table 4-1: Total number of respondents and word counts from farmers and advisors in this question.

	Farmers		Advisors	
	Respondents	Word count	Respondents	Word count
Total	892	3599	33	250
Belgium	157	592	10	23
France	536	1950	8	32

Germany	45	193	6	55
Ireland	108	659	7	71
Luxembourg	1	2	0	0
Netherlands	43	199	2	34
United Kingdom	2	4	0	0

4.2.1 Themes

The farmers most frequently occurring words, as displayed in Figure 4-2, were cost/price (286 counts), followed by content (124 counts) and quality (99 counts). The word, soil (77 counts) also frequently occurred, along with composition (59 counts) and ease (49 counts). For the advisors, the most frequently occurring words in **Error! Reference source not found.**, nutrient/s (18 counts) and content (13 counts), followed by composition (9 counts) and availability (6 counts). Some of the most frequently occurring themes that emerged from the farmers and advisors responses were identified as follows:

Nutrient content and composition

- Farmers and advisors both highlighted that the fertiliser nutrient content and composition was the most important property to know when selecting a fertiliser.
- In total 35% of advisors (16 counts) and 29% of farmers (322 counts) indicated the importance of this property. Of that, 75% of advisors (12 counts) and 44% of farmers (143 counts) suggested that knowing the percentage NPK content was important.
- This was followed by 22% of advisors (10 counts) and 14% of farmers (44 counts) indicating the importance of known nutrient composition.
- In particular, one advisor respondent highlighted that they wanted to know the exact composition (1 count) of the products, whereas others suggested that the formulation was important (1 count) and that they had a consistent composition (1 count).
- In addition, 25% of advisors (4 counts) and 9% off farmers (28 counts) suggested a high organic matter content was important.
- Other properties that were important to farmers with regards to fertiliser nutrient content were trace elements with 6% (19 counts), 4% suggested the microorganism content (14 counts) and 3% highlighted the concentration of sulphur (8 counts) and lime (2 counts).
- 13% of advisors proposed the dry matter content (2 counts) and 6% indicated the sulphur (1 count) concentration of the fertiliser were important properties.
- Also important to advisors with 6% respectively were the C/N ratio (1 count) and the N/K ratio (1 count).



Figure 4-2: Word cloud produced from the most commonly occurring words in the open-ended question, on the important parameters/properties when selecting a fertiliser from a farmer perspective.

Product cost

- This parameter was ranked the 2nd most important by farmers and joint 4th or joint least important by advisors.
- In total, 26% of farmers (290 counts) and 10% of advisors (4 counts) indicated the cost of the fertiliser products was an important parameter when selecting a fertiliser.
- Specifically, farmers highlighted that when selecting a fertiliser, they must be affordable, cheap and competitively priced. Whereas, advisors wanted to ensure there was a good cost-benefit ratio (1 count).



Figure 4-3: Word cloud produced from the most commonly occurring words in the open-ended question, on the important parameters/properties when selecting a fertiliser from an advisors perspective.

Ease of use/ application

- Overall, farmers ranked this the 3rd most important and advisors ranked it 2nd most important parameter when selecting fertilisers.
- In total, 17% of advisors (8 counts) and 15% of farmers (160 counts) suggested the ease of use/application was an important parameter.
- In particular, they must be easy to use and easy to apply or spread onto their fields.
- Of that, 45% of farmers indicated that the ease of application/ spreading the fertilisers (72 counts) is an important property, followed by 33% suggesting the fertiliser texture (53 counts) is also important.
- Other properties regarding the ease of use/ application of the fertilisers that participants found important with 8% were storage (12 counts) and fertiliser formulation (12 counts), and 4% suggested fertiliser size (6 counts) and dust (7 counts).
- Some suggested fertiliser density (3%; 4 counts), packaging (2%; 3 counts), fertiliser shape (2%; 3 counts) and the stability of the fertiliser (1%; 2 counts) were also important parameters and properties in selecting fertilisers.

Safety

- In total, advisors rated this the 3rd most important parameter when selecting a fertiliser.
- Farmers did not highlight the importance of this parameter in this question.
- In total, 11% of advisors suggested the safety (5 counts) of the products was an important parameter, including the quality (2 counts) of the products, that the products are hygienic (1 count), undergo soil testing (1 count) and there are no long-term effects (1 count) from the products in the soil.

Nutrient efficiency, release/uptake speed

- This property was rated 2nd least important when selecting a fertiliser by farmers and joint least important by advisors.
- Overall, 15% of advisors (7 counts) and 10% of farmers (121 counts) highlighted that when selecting a fertiliser, the efficiency of the fertilisers and the nutrient release and or the uptake speed is important.
- Of the farmers that responded to this property, 46% suggested the efficiency/effectiveness (74 counts) of the fertiliser was an important property in selecting fertilisers.
- The advisors highlighted the fast/slow uptake speed (2 counts), the release speed (1 count) and the nutrient efficiency/ loss potential of the fertilisers were also important.

Other themes

Apart from the themes indicated above, several other reoccurring themes were identified among the participant's that respondents deemed important when selecting a fertiliser. These other themes amounted to 20% of the overall word counts. There were:

- Origin of the fertilisers (91 counts farmers and 3 counts advisors).
- The plants' needs (55 counts farmers) and plant availability (5 counts advisors).
- The solubility of the fertilisers (50 counts farmers).
- Soil analysis (37 counts farmers).
- Fertiliser quality (21 counts farmers) and soil pH (12 counts farmers).
- Other important parameter included the needs of the soil (6 counts farmers) and nutrient leaching in the soil (6 counts farmers).
- Participants in Ireland indicated that the weather or the seasons (5 counts farmers) were also an important parameter to consider when selecting a fertiliser.
- Presence of contaminants (4 counts advisors) including that they were non-polluting (1 count), low in heavy metals (2 counts) and are contaminant-free (1 count).
- Availability (2 counts advisors).
- Some participants also did not stipulate or did not know (12 counts farmers) any parameters or properties that they would consider important when choosing a fertiliser.
- Others did not use fertilisers in their farms (7 counts farmers).

4.3 Chapter Summary

This chapter focused on the parameters and properties that were important to both farmers and advisors. These parameters and properties were unprompted responses and before this question, no properties or parameters were discussed in the survey. The results suggest that there were some similarities and differences between the different parameters and properties among farmers and advisors when selecting fertilisers.

The fertiliser nutrient content, quality and composition were the most frequently occurring words highlighted by the farmers and advisors in this question. Therefore indicating that these are important parameters and properties when selecting a fertiliser by all participants.

There are some similarities between farmers and advisors among the themes that emerged from this question. Both farmers and advisors highlighted the fertiliser nutrient content or composition as the most important property when selecting a fertiliser. This was followed by the product cost for farmers and ease of use/ application for advisors. It is interesting to compare the importance placed by farmers to advisors, in this instance, the farmers prioritised that the fertilisers must be affordable over the other properties. In comparison, those in an advisory position suggested, how easy the fertilisers are to spread and use were the priority.

When examining the least important parameters highlighted in the question, it is observed that both advisors and farmers indicate that the nutrient efficiency and release/uptake speed was one of the least important. It is interesting to see that both farmer and advisor priorities knowing the nutrient content of the fertilisers over how well the fertilisers work with the plants and in the soil. Another point of interest is that the safety aspect of the fertilisers does not come up in responses from farmers; however, the advisors shared their concerns on this parameter.

Knowing the parameters and properties that are important or not important to farmers and advisors gives great insight into what the respondents could be looking for in recycled fertilisers. The parameters and properties highlighted in this question were proposed by the farmers and advisors themselves directly. This, therefore, gives an objective opinion of what they find important. By applying this information from a producers perspective, it will help to increase the uptake of these recycled products and increase the farmers, and likewise the advisors, confidence in these products. Also from an advisory perspective, knowing the recycled products meet the parameters/ properties that farmers find important will help to promote and market these products in the future.

5 Importance of Different Qualities in RDFs

5.1 Overview

The importance of different RDF qualities was explored over four different questions in the survey and included responses from farmers that are RDF users and non-RDF users, and from advisors. These questions aimed to explore the participants' opinion on the importance of various qualities in RDFs, including the opinion of both farmers and advisors on the texture of the products for the application of RDFs.

5.2 Rating the Importance of Various Qualities in RDFs

Survey participants were asked to rate the importance of various qualities of RDFs (users {Figure 5-1}, and non-users of RDFs {Figure A-2}). There were 13 different RDF qualities listed in the question. Examples of the RDF qualities explored included a nutrient ratio that fits with crop nutrient demand, high organic-matter content or the ability to use the same machinery and machine tracks when applying the fertilisers. This was a multiple-choice, matrix-style question with a rating scale. The rating scale included eight options for the participants to choose from that ranged between 0-7, whereby zero was not important at all and 7 was extremely important.

The last option in the question was named 'other', where the participants had to rate the importance of other RDF qualities not mentioned. This was followed by an open-ended section to the question where the participants could specify what other quality they felt was or was not important.

For analysis, the responses gathered from the rating scale were pooled together and re-labelled. For this question numbers, 0-2 were classed as not important, 3-4 were pooled and named neutral and 4-7 were combined and called important.

33. On a scale from 0 (not important at all) to 7 (extremely important), how would you rate the importance of the following qualities in recycling-derived fertilisers?

	0	1	2	3	4	5	6	7
Nutrient ratio that fits with crop nutrient demand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fast nutrient release speed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Slow nutrient release speed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High organic matter content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Basic pH - lime value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stable quality over several charges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of use (practical handling: physical structure/form, mixing, ...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price per unit Nitrogen or other nutrient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Possible mixing with other fertiliser (no extra fertiliser run necessary on the field)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use same machinery and machine tracks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability to buy at fertiliser supplier/trader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Certification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Storage (packaging, packaging size, ...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other, namely:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

Figure 5-1: Rating the importance of various qualities of RDFs from an RDF users perspective, taken from the ReNu2Farm Stakeholders Survey.

5.2.1 Importance of Various Qualities in RDFs

In total, 438 users and 345 non-user respondents interacted with this question, which resulted in 5519 user and 4322 non-user responses. See Table 3-1 for the breakdown of the number of respondents and responses recorded per country.

Table 5-1: Total number of closed and open-ended question respondents and responses from RDF users and non-users.

	Closed Question		Open-Ended Question	
	RDF Users (Responses)	Non-Users (Responses)	RDF Users (Word count)	Non-Users (Word count)
Total	438 (5519)*	345 (4321)	31 (211)	16 (130)
Belgium	91 (1152)	51 (643)	2 (16)	2 (32)
France	284 (3549)	184 (2281)	23 (164)	5 (30)
Germany	21 (278)	15 (195)	4 (14)	1 (2)
Ireland	19 (241)	75 (947)	0	6 (49)
Luxembourg	0	1 (14)	0	0
Netherlands	22 (286)	18 (228)	1 (17)	2 (17)
United Kingdom	1 (13)	1 (13)	0	0

5.2.2 Overall Response

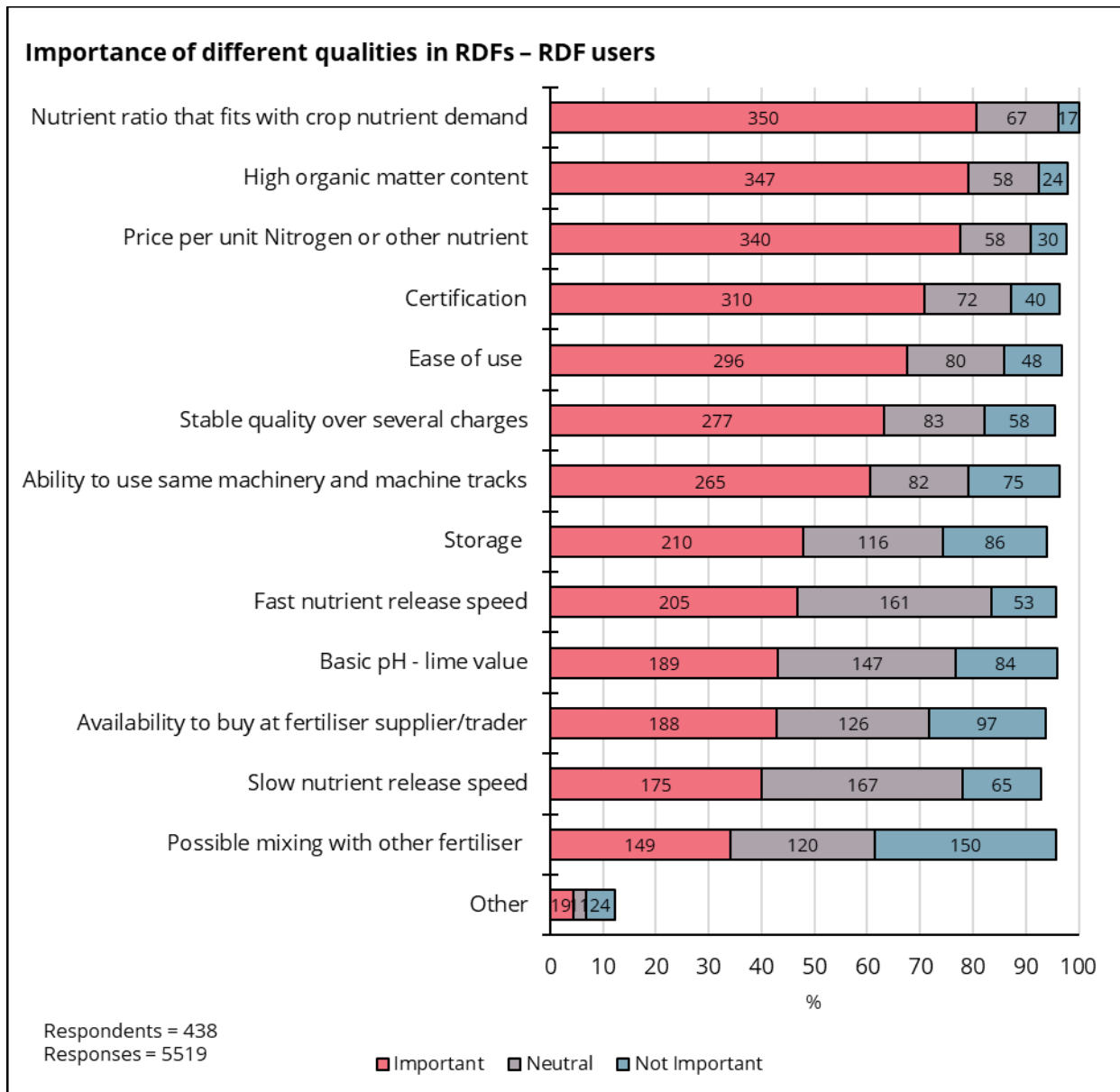
Overall the percentage of important, neutral and not important responses from RDF users and non-users were graphed. The difference (evident in the graphs) between the percentage responses and 100% represents the percentage of respondents that did not engage with the options in the question.

In general, 81% of RDF users (**The number on each bar refers to the number of participants' responses.

Figure 5-2) indicated that the nutrient ratio that fits crop nutrient demand was important, followed by 79% indicating high organic matter content and 78% suggesting a price per unit nitrogen or other nutrients was also important. In comparison, 83% of non-users (**The number on each bar refers to the number of participants' responses.

Figure 5-3) suggested that price per unit nitrogen or other nutrients followed by 81% suggesting ease of use and 81.5 indicating certification were important qualities in RDFs.

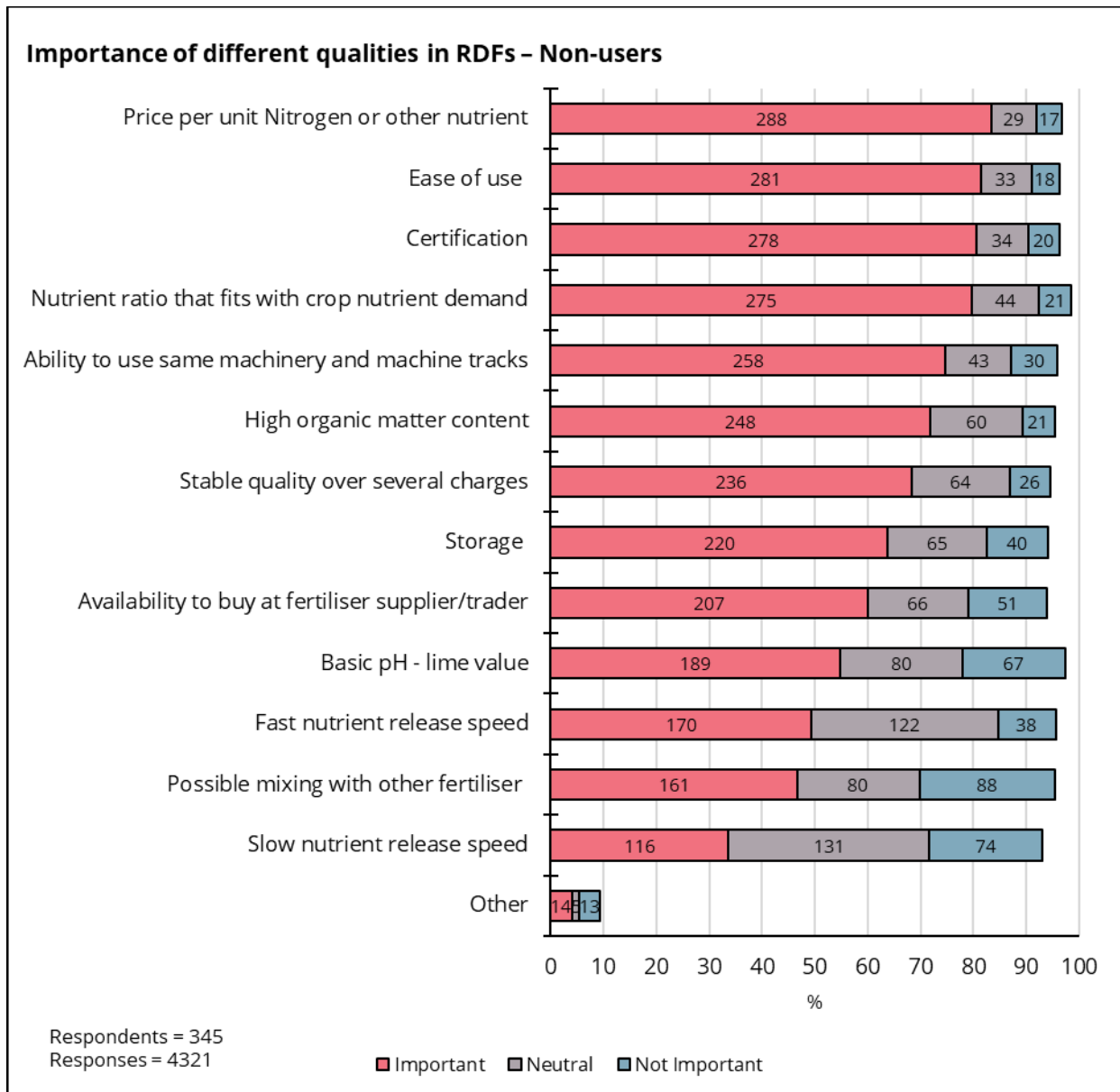
In total 38% of RDF users suggested that slow and 37% suggested fast nutrient release speed, while 34% suggested basic pH- lime value was neutral regarding importance. On the other hand, 38% of non-users highlighted a slow nutrient release speed, 35% fast nutrient release speed and, 23% respectively indicated a basic pH- lime value and possible mixing with other fertilisers were of neutral importance.



**The number on each bar refers to the number of participants' responses.

Figure 5-2: Overview of the importance of various qualities in RDFs from a user perspective.

On the opposite end, in general, only 34% of RDF users suggested possible mixing with other fertiliser, 22% indicated availability to buy at fertiliser supplier/ trader, and 20% suggested storage were not important qualities in RDF products. Compared to non-users which indicated that possible mixing with other fertilisers 26%, slow nutrient release speed 21% a basic pH-lime value 19% were not important qualities in RDFs.



**The number on each bar refers to the number of participants' responses.

Figure 5-3: Overview of the importance of various qualities in RDFs from a non-users perspective.

5.2.3 Closed Question Responses

The distribution of those that responded per country and age group to the important RDF qualities are discussed in this section. Of the respondents that participated overall (Figure 5-2 and Figure 5-3) to each quality, their percentage importance per country and age group is displayed as 100%.

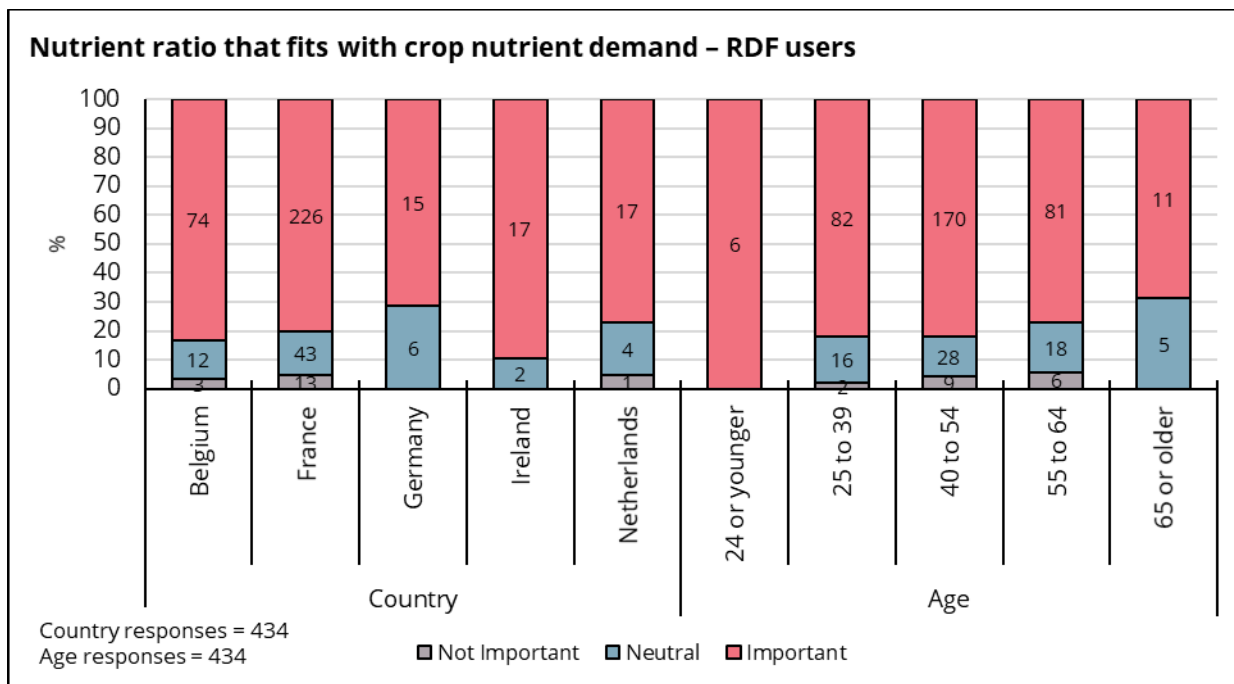
Nutrient ratio that fits with crop nutrient demand

- Overall 81% of RDF users and 80% non-users found this quality to be important.

- This quality was rated the most important from a user perspective in comparison to the 4th most important to the non-users of RDF products.
- 89% of RDF users (
- Figure 5-4) in Ireland found this quality to be important, followed by those in Belgium with 83%. Of the non-users (Figure 5-5) that participated in Belgium, 90% found this quality to be important, followed by those in Ireland with 88%.
- In total, 15% of RDF users and 13% of non-users found this quality to be of neutral importance in RDFs. Of those that participated in Germany, 29% of users and 40% of non-users highlighted this quality as neutrally important, followed by 22% of non-users and 18% of users in the Netherlands.
- The non-users important and neutral responses from Belgium were statistically significantly different from those from Germany. Also, the non-users important responses from Ireland were statistically significantly different from those from Germany.
- In general, 4% of users and 6% of non-users indicated this quality was not important. There was a one not important response from non-users in Luxembourg and there was one important response from users and non-users in the United Kingdom.

High organic matter content

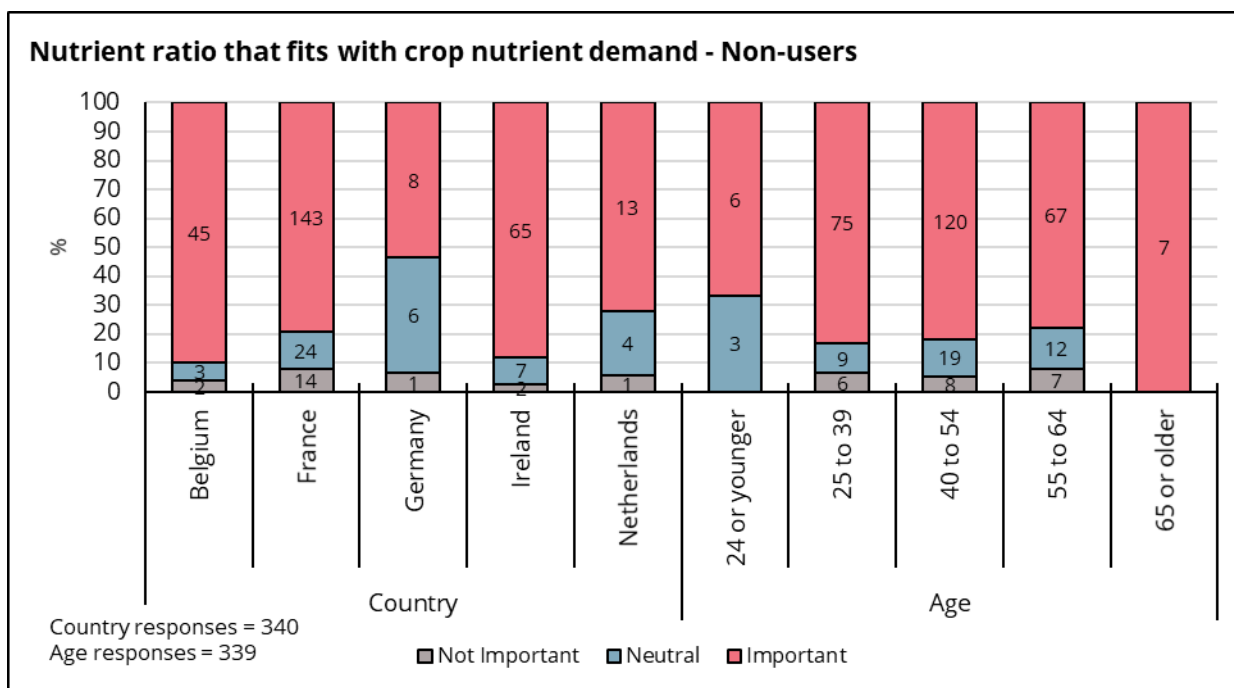
- Overall 79% of users and 72% of non-users found this quality to be important. This quality was rated the 2nd most important from a user perspective, however, it does not feature as high from the non-user perspective.
- 91% of users (Figure 5-6) and 89% of non-users (Figure 5-7) that participated in the Netherlands, found this quality important, followed by 89% of users in Ireland and 81% of non-users in Belgium.
- In total, 13% of users and 17% of non-users indicated that a high organic matter content in RDFs was of neutral importance. 20% of users in Belgium and 31% of non-users in Germany indicated that this quality was of neutral importance in RDFs, followed by 14% of users in Germany and 27% of non-users in Ireland.
- In general, 5% of users and 6% of non-users suggested that this was not an important quality in RDFs. 14% of users in Germany and 11% of non-users in the Netherlands, had the highest not important response to this option and followed by 6% of users in France and 9% of non-users in Ireland.
- There was a one not important response to this quality in RDFs from non-users in Luxembourg, and one important response from users and non-users in the United Kingdom.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

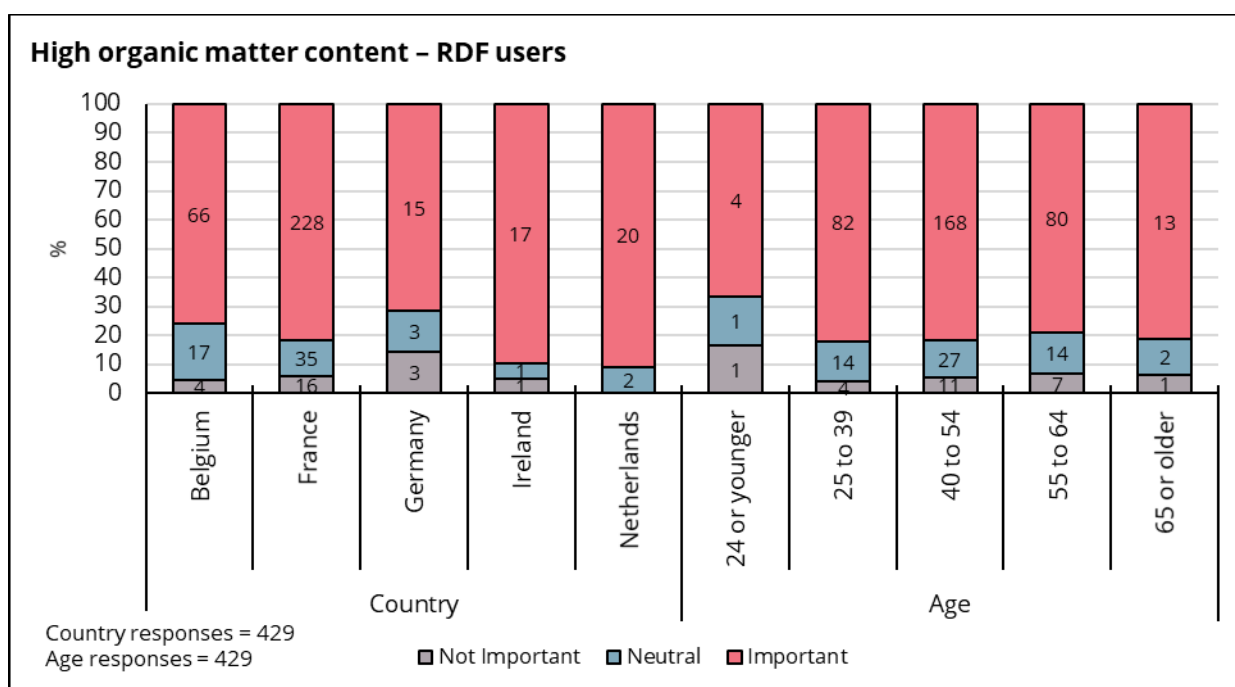
Figure 5-4: Distribution of the importance of nutrient ratio that fits with crop nutrient demand as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

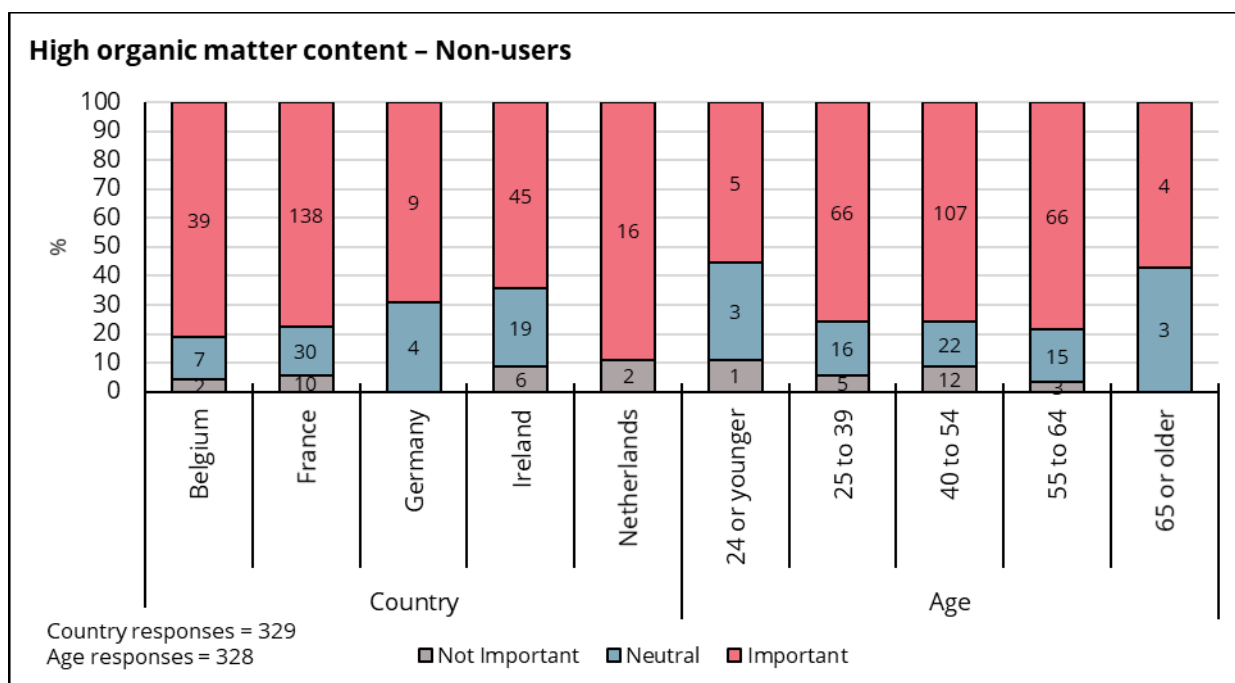
Figure 5-5: Distribution of the importance indicated by non-users of nutrient ratio that fits with crop nutrient demand as a quality in RDFs per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-6: Distribution of the importance of high organic matter content as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

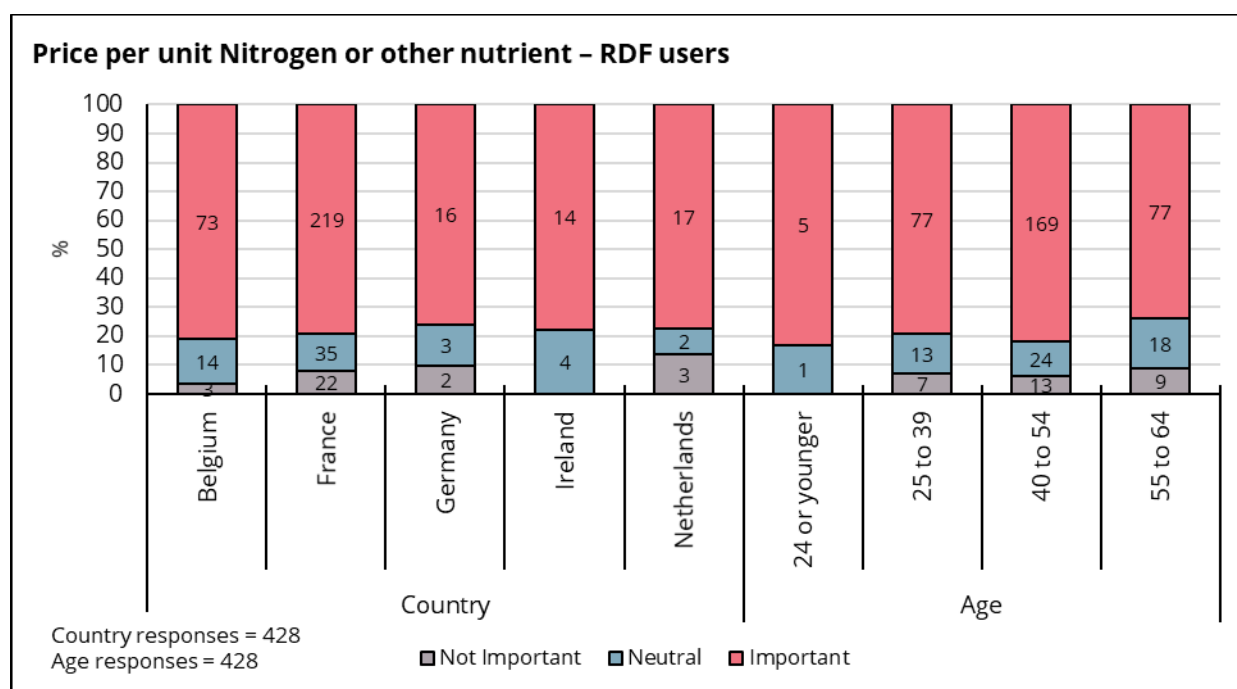
Figure 5-7: Distribution of the importance of high organic matter content as a quality in RDFs from a non-user perspective, per country and age group.

Price per unit Nitrogen or other nutrients

- In total, 83% of non-users and 78% of users found this quality to be important. Therefore, this was rated as the most important quality in RDFs from a non-user perspective. While this quality was rated the 3rd most important for users of RDF.
- 91% of non-users (Figure 5-9) in Ireland and 81% of users (Figure 5-8) in Belgium found this quality to be important in RDFs, followed by 90% of non-users in Belgium and 79% of users in France.
- 13% of users and 8% of non-users indicated that this quality was of neutral importance. Of those that participated, 22% of users in Ireland and 13% of non-users in Germany suggested this was a neutrally important quality in RDFs.
- Overall, 7% of users and 5% non-users found this was not an important quality in RDFs.
- There was a one not important response from non-users in Luxembourg and one important response from users and non-users in the United Kingdom.

Ease of use

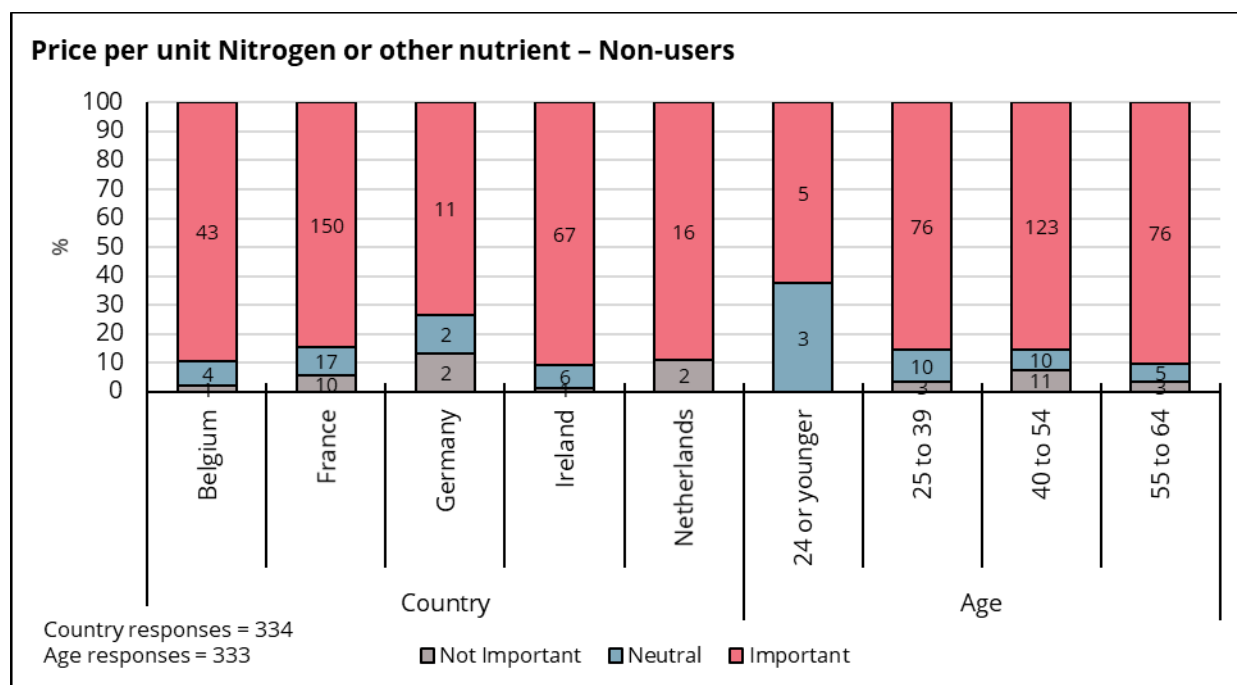
- In total, 81% of non-user participants and 68% of users indicated that the ease of use, including practical handling, the physical structure or form, mixing etc. was an important quality in RDFs. This quality was rated the 2nd most important from a non-user, however, this quality does not feature as high from the user perspective.
- Of those that responded from Ireland, 95% of non-users (Figure 5-11) and 79% of users (Figure 5-10) suggested that the ease of use was an important quality in RDFs. Followed by 75% of users in Germany and 94% of non-users in Belgium suggesting this was an important quality. The non-users important responses from France were statistically significantly different from those from Ireland.
- In general, 18% of users and 10% of non-users indicated that the ease of use in RDFs was of neutral importance. In particular 38% of users in the Netherlands and 14% of non-users in France. The users' neutral responses from France were statistically significantly different from those from the Netherlands.
- 11% of users and 5% of non-user participants suggested that ease of use was not an important quality in RDFs. The responses from those in Belgium were statistically significantly different from those in France for this option.
- The users' not important responses from Belgium were statistically significantly different from those from France.
- There was one important response from users and non-users in the United Kingdom, and one neutral response from non-users in Luxembourg.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

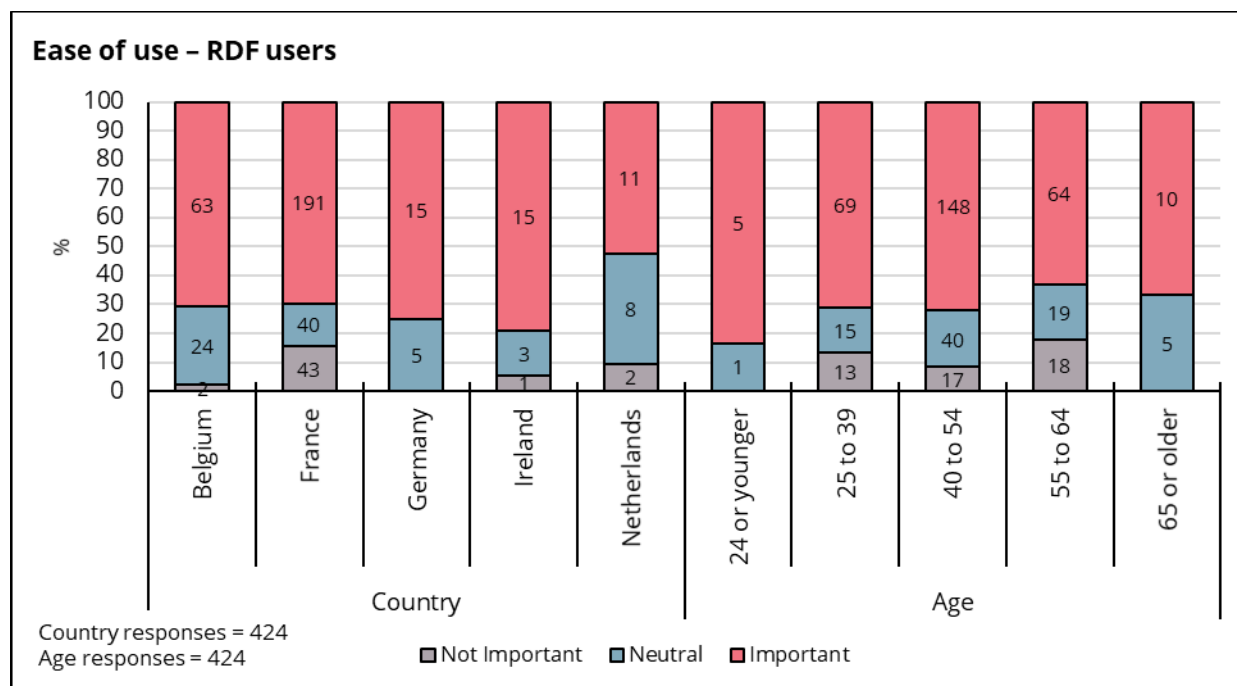
Figure 5-8: Distribution of the importance of price per unit of Nitrogen or other nutrients as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

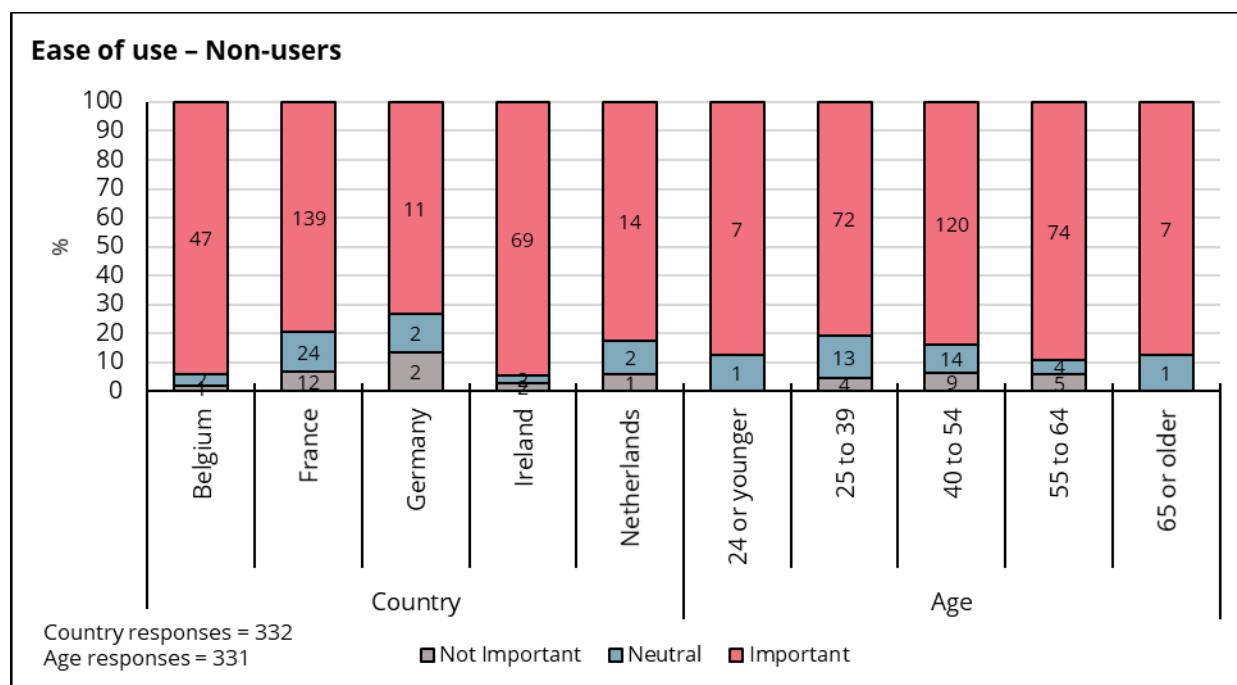
Figure 5-9: Distribution of the importance of price per unit of Nitrogen or other nutrients as a quality in RDFs from a non-user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-10: Distribution of the importance the ease of use as a quality in RDFs from a user perspective, per country and age group.



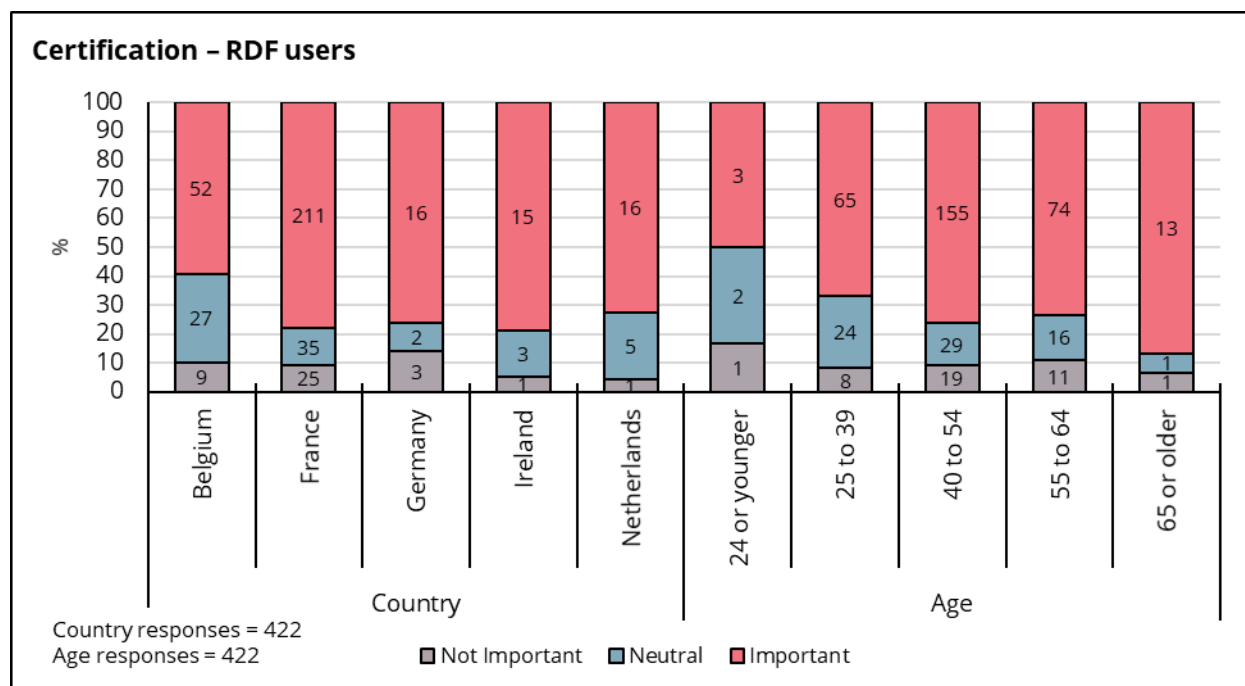
*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-11: Distribution of the importance the ease of use as a quality in RDFs from a non-user perspective, per country and age group

Certification

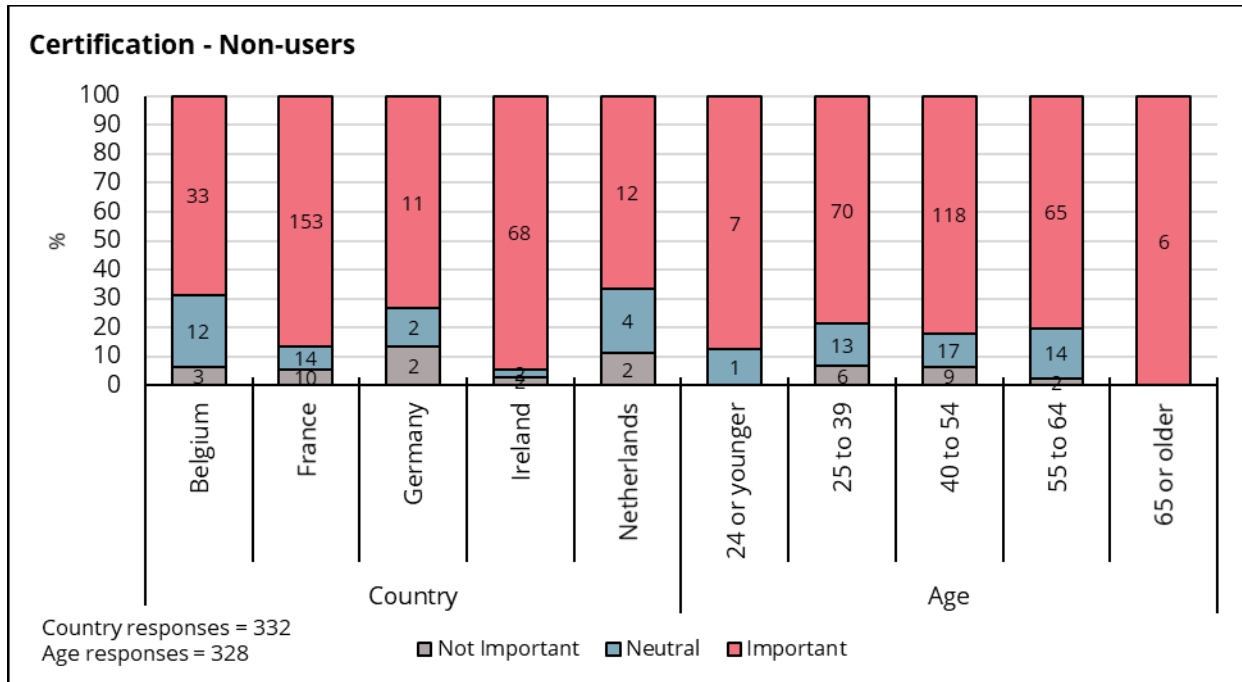
- Overall 81% of non-user participants and 71% of users found this quality to be important. Therefore, this is rated as the 3rd most important quality in RDFs from a non-user perspective and rated 4th overall most important quality in RDFs from a users perspective.
- Of those that participated in Ireland, 94% of non-users (Figure 5-13) and 79% of users (Figure 5-12) found this quality to be important. Followed by 78% of users and 86% of non-users in France. The user and non-user responses from Belgium were statistically significantly different from those from France for this option.
- 16% of users and 10% of non-users indicated that this quality was of neutral importance. Of those that participated in Belgium, 31% of users and 25% of non-users suggested this was a neutrally important quality in RDFs. The user and non-user responses from Belgium were statistically significantly different from those from France for this option.
- The users' important and neutral responses from France were statistically significantly different from those from Belgium. The non-users important and neutral responses from Belgium were statistically significantly different from those from France and Ireland. In addition, the non-users important and neutral responses from Ireland were statistically significantly different from those from the Netherlands.
- In total, 9% of users and 6% non-users found this was not an important quality in RDFs.
- There was a not important response from non-users in Luxembourg and users in the United Kingdom. Also, there was one important response from non-users in the United Kingdom.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-12: Distribution of the importance of certification as a quality in RDFs from a user perspective, per country and age group.



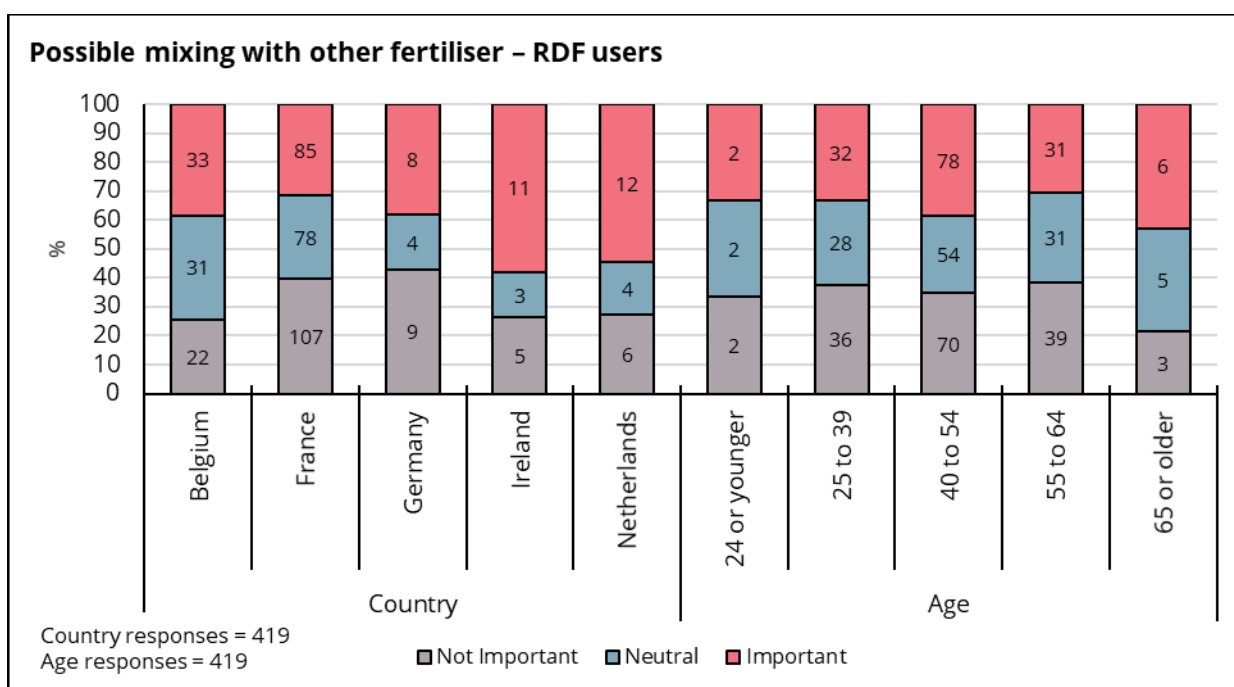
*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-13: Distribution of the importance of certification as a quality in RDFs from a non-user perspective, per country and age group.

Possible mixing with other fertiliser

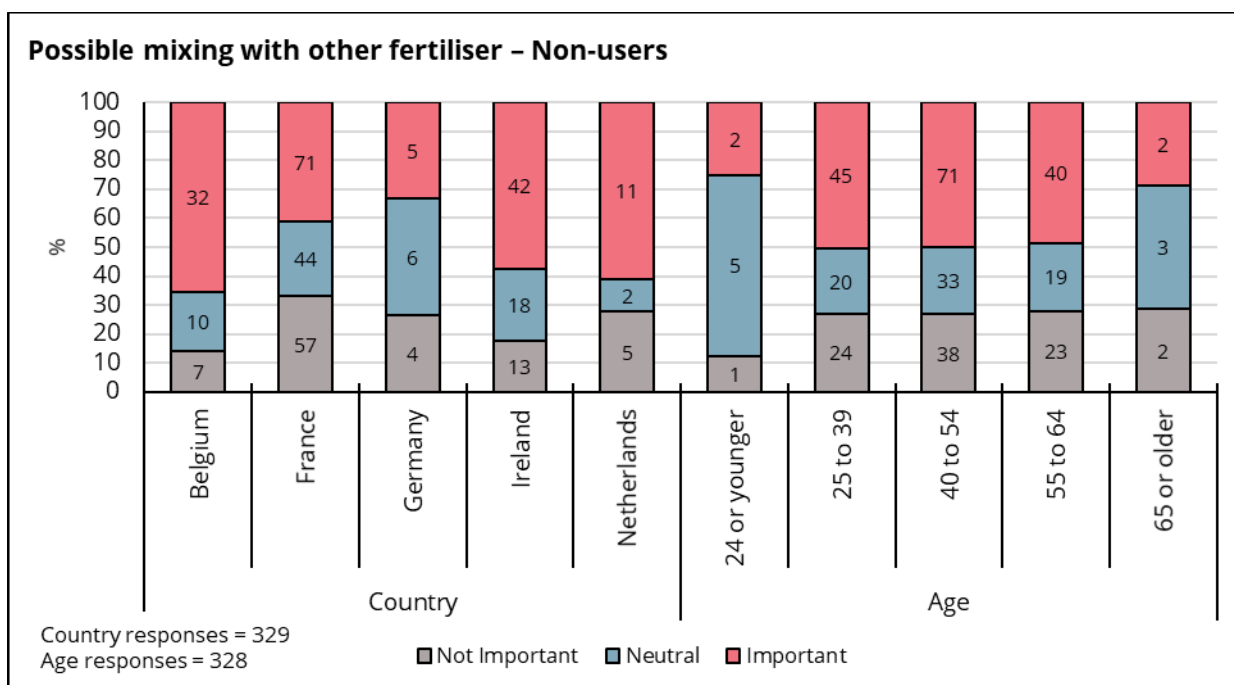
- Overall, only 34% of users compared to 47% of non-users found this to be an important quality in RDFs. This was rated the least important quality from a user perspective and 2nd least important quality from a non-user perspective.
- 65% of non-users (Figure 5-15) in Belgium and 58% of users (Figure 5-14) in Ireland, found this was an important quality in RDFs. This was followed by 55% of users and 61% of non-users in the Netherlands.
- The non-users important responses from Belgium were statistically significantly different from those from France.
- In part, 27% of users and 23% of non-users indicated that possible mixing with other fertilisers was of neutral importance. Specifically, 36% of users in Belgium and 26% of non-users in France found this was of neutral importance in RDFs.
- Also, 34% of users and 26% of non-user participants suggested that this was not an important quality in RDFs.
- In total, there was one not important response from non-users in Luxembourg and one not important response from users in Luxembourg and the United Kingdom for this option.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-14: Distribution of the importance of possible mixing with other fertilisers as a quality in RDFs from a user perspective, per country and age group.



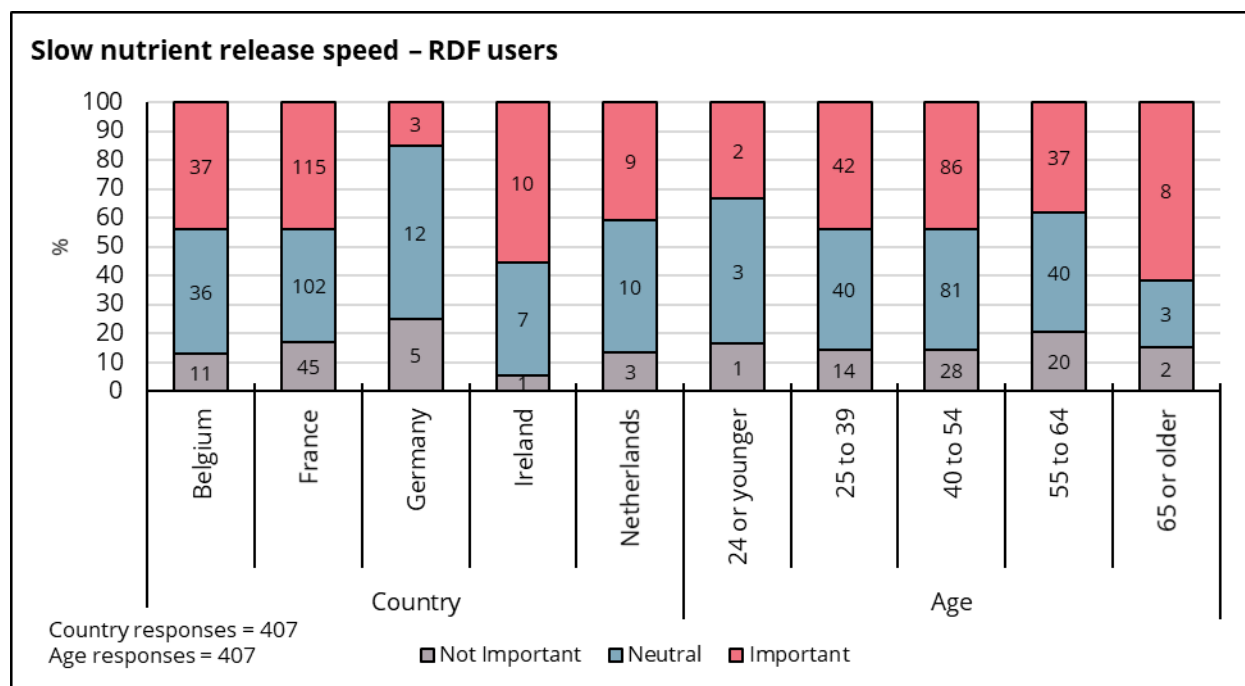
*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-15: Distribution of the importance of possible mixing with other fertilisers as a quality in RDFs from a non-user perspective, per country and age group.

Slow nutrient release speed

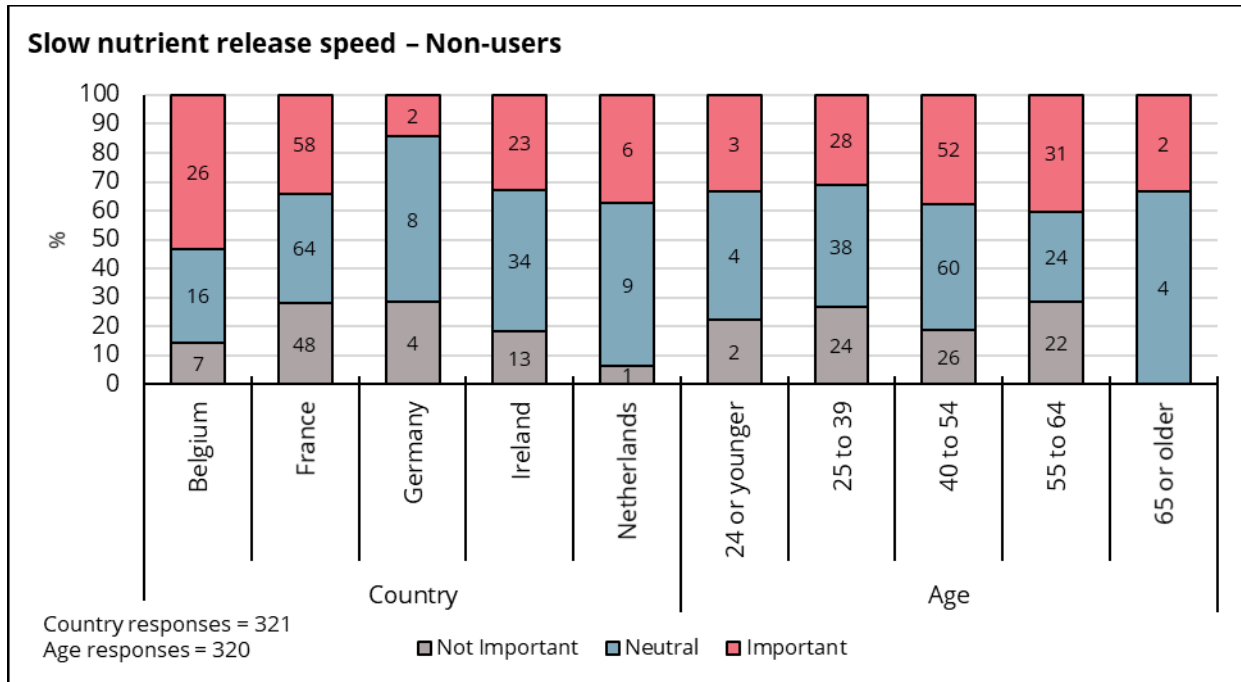
- Overall 34% of non-user and 40% of user participants found this quality to be important. This quality was rated the least important from a non-user perspective and 2nd least important from a user perspective.
- In total, 56% of users (Figure 5-16) that participated in Ireland indicated that this was an important quality in RDFs, followed by 44% of those in Belgium and France respectively. In general, 53% of non-users (Figure 5-17) in Belgium suggested that this was an important quality in RDFs, followed by 38% of non-users in the Netherlands.
- In general, 38% of users and non-users found this quality in RDFs to be of neutral importance. In particular, 60% of users and 57% of non-users in Germany suggested this quality was of neutral importance in RDFs.
- In part, 15% of users and 21% of non-users found that a slow nutrient release speed was not an important quality in RDFs.
- There was one, not important response, from non-users in Luxembourg and one important response from users in the United Kingdom.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-16: Distribution of the importance of a slow nutrient release speed as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

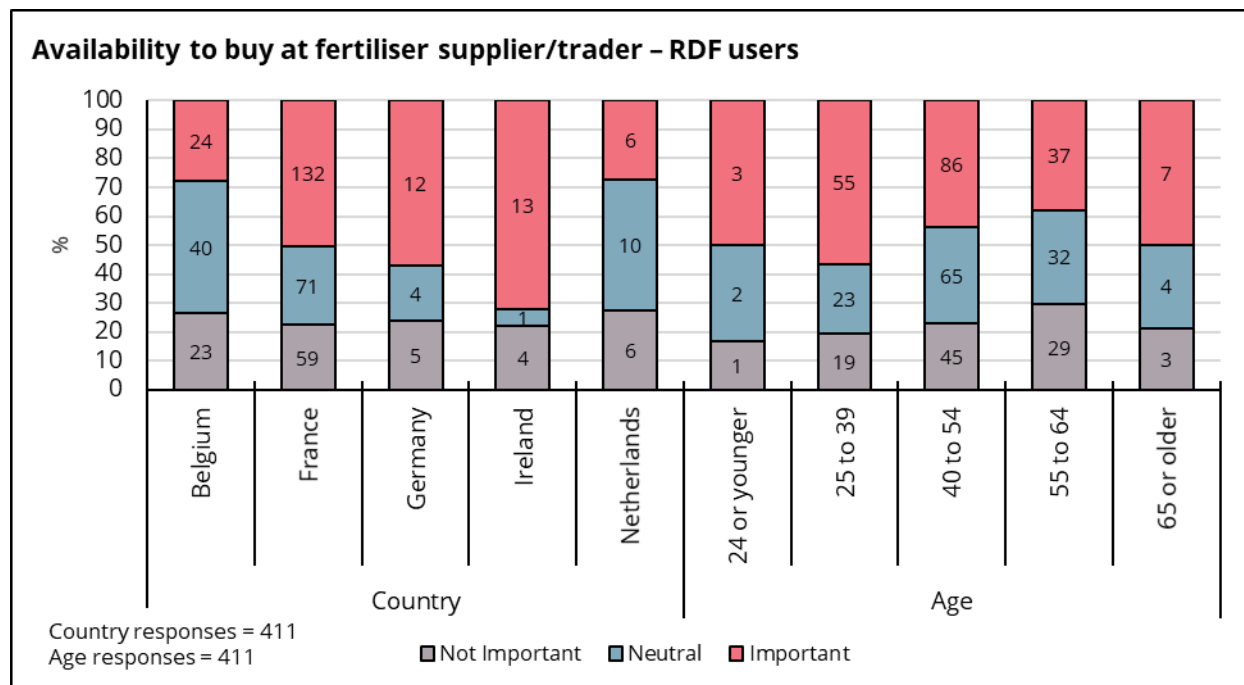
Figure 5-17: Distribution of the importance of a slow nutrient release speed as a quality in RDFs from a non-user perspective, per country and age group

Availability to buy at fertiliser supplier/trader

- Overall 60% of non-user participants and 43% of users found the availability to buy at a fertiliser supplier or traders an important quality in RDFs. This quality was rated the third least important from a user perspective, however, this quality does not feature as low from the non-user perspective.
- In total, 82% of non-users (Figure 5-19) and 72% of users (Figure 5-18) in Ireland found this quality to be important, followed by 63% of non-users in the Netherlands and 57% of users in Germany. The non-users important responses from Ireland were statistically significantly different from those from Belgium and France.
- Overall, 29% of users and 19% of non-user respondents indicated that this quality was of neutral importance in RDFs. In particular, 46% of users and 23% of non-users in Belgium found the availability to buy at a fertiliser supplier/trader was neutrally important.
- The users' important and neutral responses from Belgium were statistically significantly different from those from France and Ireland. Besides, the users' important and neutral responses from Ireland were statistically significantly different from those from the Netherlands.
- In general, 22% of users and 15% of non-user participants found that this was not an important quality.
- There was one important response from users in the United Kingdom and one neutral response from non-users in Luxembourg and the United Kingdom.

Basic pH - lime value

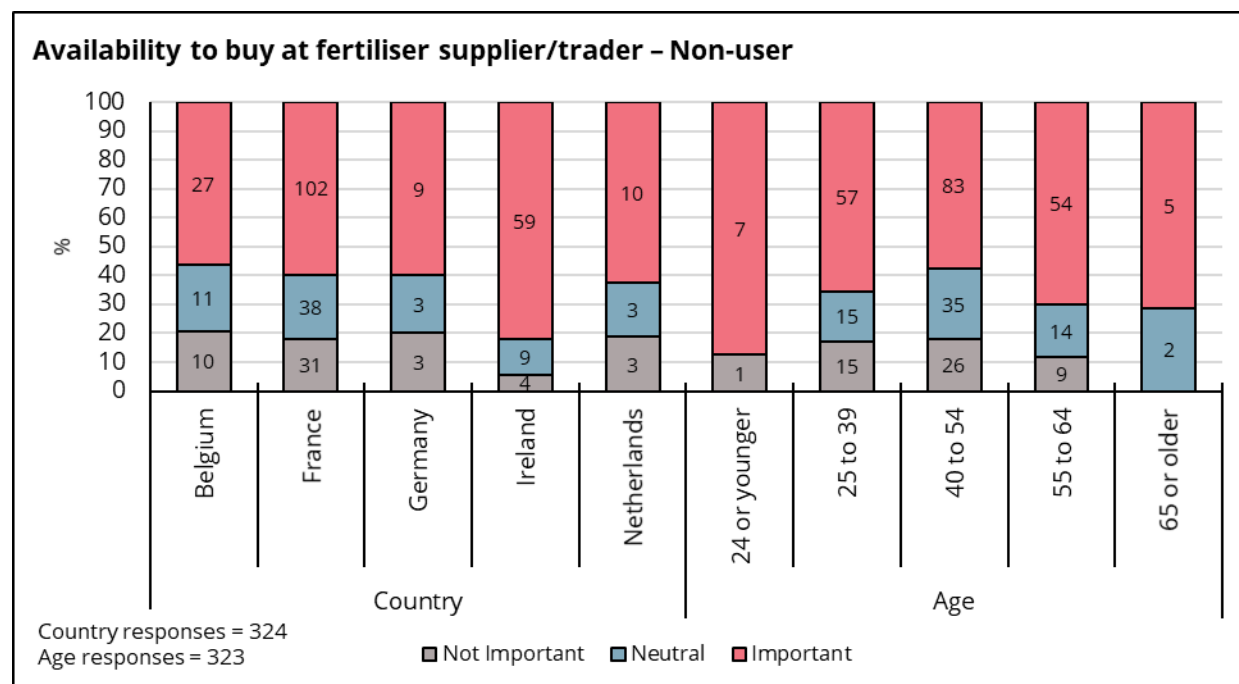
- In total, 43% of users and 55% of non-users found this quality to be important. This quality was rated the 4th least important from a user and a non-user perspective.
- Of those that participated in Ireland, 88% of users (15 responses, Figure 5-20) and 80% of non-users in Belgium (40 responses, Figure 5-21) found this quality to be important. Followed by 80% of users in Belgium (57 responses) and 78% of non-users in the Netherlands (14 responses). The users' responses from those in France were statistically significantly different from those from Belgium and Ireland. The important responses from Belgium were statistically significantly different from those from France (users and non-users), Germany (non-users) and Ireland (users). Also, the non-users important responses from France were statistically significantly different from those from Ireland and the Netherlands.
- Overall, 34% of users and 23% of non-users found this quality was of neutral importance. In particular, 43% of users (9 responses) and 47% of non-users (7 responses) in Germany found it was neutrally important. The non-users neutral responses from Germany were statistically significantly different from those from the Netherlands.
- In part, 19% of users and non-users suggested that a basic pH- lime value was not an important quality in RDFs. The participants' not important responses from Belgium were statistically significantly different from those from France (users) and Ireland (non-users).
- There was one, not important response from non-users in Luxembourg, and one important response from users and non-users in the United Kingdom.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

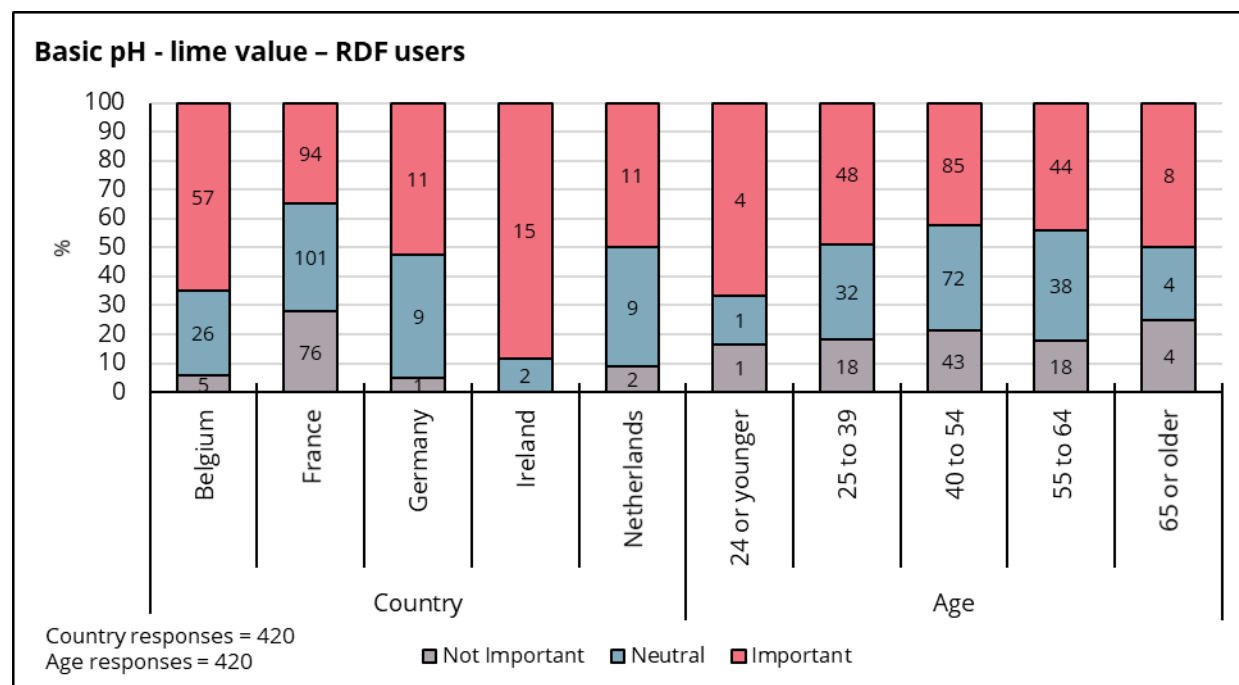
Figure 5-18: Distribution of the importance of the availability to buy RDFs at fertiliser suppliers or traders as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

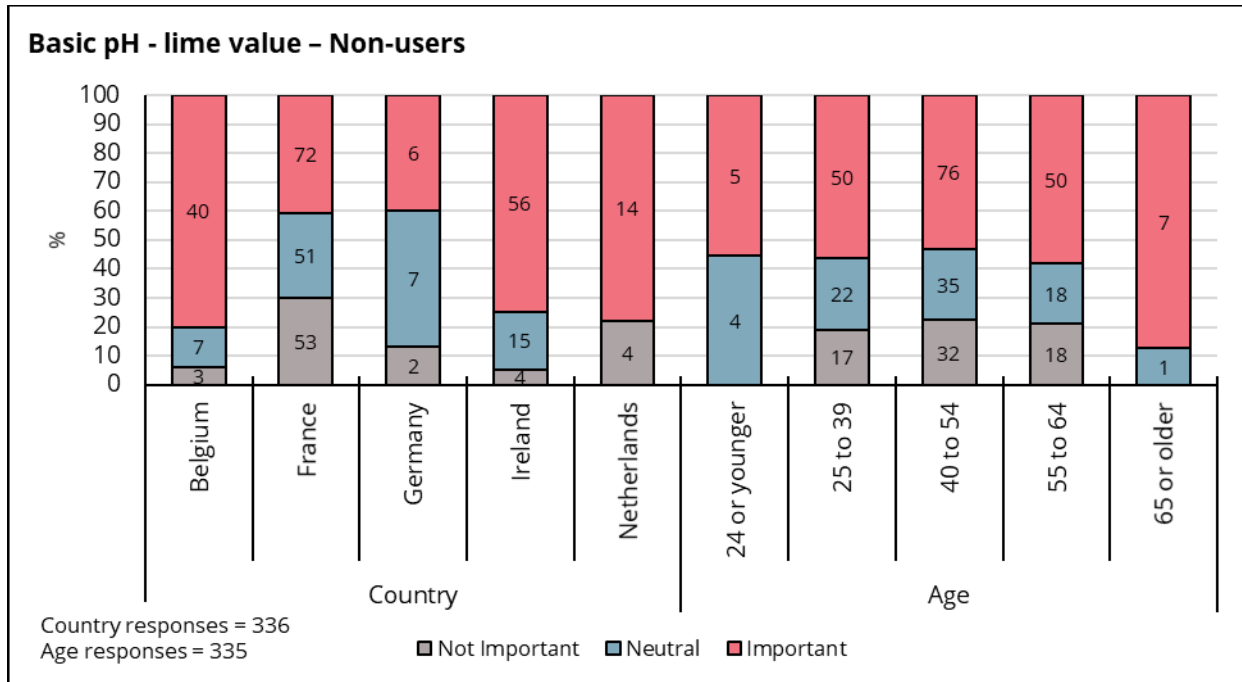
Figure 5-19: Distribution of the importance of the availability to buy RDFs at fertiliser suppliers or traders as a quality in RDFs from a non-user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-20: Distribution of the importance of a basic pH-lime value as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-21: Distribution of the importance of a basic pH-lime value as a quality in RDFs from a non-user perspective, per country and age group.

Other qualities

Stable quality over several charges

- Overall 63% of users and 68% of non-users found this to be an important quality in RDFs. This quality was rated the 6th important from a user and 7th important from a non-users perspective.
- Of those that participated in Ireland, 83% of users (15 responses, Figure A-3) and 86% of non-users in Belgium (42 responses, Figure A-4) found this to be an important quality in RDFs. This was followed by 82% of users and non-users (14 responses) in the Netherlands (18 responses).
- In general, 19% of users and non-users found this quality to be of neutral importance. In particular 21% of users in Belgium (18 responses) and 40% of non-users in Germany (6 responses).
- In part, 13% of users and 8% of non-users did not find that a stable quality over several charges was important.
- There was one important response from users in the United Kingdom, and one neutral response from non-users in Luxembourg and the United Kingdom.

Ability to use the same machinery and machine tracks

- 61% of users and 75% of non-user participants found this quality to be important. This quality was rated the 5th most important from a non-user and 7th important from a user perspective.

- 74% of users (Figure A-5) and 86% of non-users (Figure A-6) in Ireland indicated that this was an important quality in RDFs, followed by 71% of users and in Germany (15 responses) and 80% of non-users in France (141 responses). The non-users important responses from the Netherlands were statistically significantly different from those from France and Ireland. The non-users not important responses from Ireland were statistically significantly different from those from the Netherlands
- In general, 19% of users and 12% of non-users found this quality was of neutral importance in RDFs. Of those that participated in the Netherlands, 36% of users (8 responses) and 28% of non-users (5 responses) suggested that this quality was of neutral importance in RDFs. The responses from participants in Belgium were statistically significantly different from those from France.
- Overall, 17% of users and 9% of non-users found this quality was not important.
- The users' neutral and not important responses from Belgium were statistically significantly different from those from France.
- There was one, not important response from users in the United Kingdom, and one neutral response from non-users in Luxembourg and the United Kingdom.

Storage

- Overall 64% of non-users and 48% of user participants found storage to be an important quality in RDFs. This quality was rated the 8th least important from a user and a non-user perspective.
- In total, 74% of users in Ireland (14 responses, Figure A-7) and 73% of non-users in Germany (11 responses, Figure A-8) suggested that this quality was important in RDFs. Followed by 72% of non-users in Ireland and 52% of users in France.
- In general, 26% of users (30 responses) and 19% of non-users (17 responses) indicated that this quality was of neutral importance in RDFs. In particular, 35% of users and non-users in Belgium. The non-users neutral responses from Belgium were statistically significantly different from those from France.
- In part, 20% of users and 12% of non-users did not find storage an important quality in RDFs.
- There was one, not important response from users in the United Kingdom and non – users in Luxembourg, and there was one neutral response from non-users in the United Kingdom.

Fast nutrient release speed

- Overall 49% of non-users and 47% of users found the fast release of nutrients to be an important quality in RDFs. This quality was rated the 3rd least important from a non-user perspective, however, this quality does not feature as low from a user perspective.
- Of those in Ireland, 61% of users (Figure A-9) and 57% of non-users (Figure A-10) in France stated a fast nutrient release speed was an important quality in RDFs. Followed by 51% of users and 52% of non-users in Belgium. Also, 65% of users in the 25 to 39 age group suggested that this was an important quality in RDFs. The users' important responses in the 25 to 39 group were statistically significantly different from those in the 55 to 64 age group.

In total, 31 users and 16 non-users responded to the 'other (please specify)' option in the stakeholders' survey, which resulted in 211 words recorded from users and 130 words recorded from non-users. This allowed participants to rate other RDF qualities not mentioned in this question. See Table 5-1 for the breakdown of the number of users and non-users responses and words recorded per country.



The RDF users words, products (6 counts) smell (4 counts) and storage (4 counts) were the most frequently occurring words (Figure 5-22). The words cost, mineral and quality all occurred the same with three counts respectively. For the non-users, the words, important (2 counts), nutrient (2 counts) and use (2 counts) were the most frequently occurring (Figure 5-23). Other words that came up for the non-users included antibiotics, drugs, chemo and residues (1 count respectively). Also, cost, free, and price (1 count respectively). As well as

glass, heavy metals, smell, and dust (1 count respectively). Several common themes emerged from the users and non-user responses and were identified as follows:

Most important

- The most frequently occurring RDF quality for users that came up in this question referred to the product cost (7 counts), however, it does not feature as high from the non-user perspective (2 counts). The user respondents suggested that RDFs should be free of charge (2 counts) for those in the agricultural industry. This theme was rated seven (5 counts) on the rating scale which corresponds to it is extremely important, which included the comment free of charge (1 count). The non-user participants mentioned that the cost must be representative of the quality of the product including the biosecurity and environmental security aspect (1 count).
- The most frequently occurring theme highlighted by non-users referred to the environmental security aspect of RDFs (5 counts) and that they should be free from contaminants (8 counts) including heavy metals, plastic, glass, drugs, antibiotics and chemical residues (1 count respectively). It was also noted from a non-user perspective that the RDFs should have no negative impact on earthworms or soil biology (1 count).
- The 2nd commonly occurring quality indicated by RDFs users and 3rd by non-users refers to the quality (5 counts users and 4 counts non-users) of the RDFs. The users want good quality products with a very good quality/ price ratio that are contaminant-free (2 counts). The respondents rated this theme a seven (3 counts) on the rating scale which corresponds to extremely important. Non-user participants want good quality products with a very good quality/ cost ratio that guarantee environmental biosecurity (1 count). They highlighted that the products need to come from a reputable source/ origin (1 count) with food safety at the foremost of importance (1 count).
- The user participants mention RDF product smell (4 counts) and this was the 2nd most important quality for non-users and the 3rd most important quality for users in RDFs. The user respondents were concerned that the smell of the product must be acceptable to the public, both during storage and when being applied on the land (1 count). The respondents rated this theme a six (1 count) and a seven (1 count) on the rating scale which corresponds to extremely important quality. Likewise, the non-users indicated that they should not contain any dust and should have no smell (1 count respectively).



Figure 5-23: Word cloud indicating the most reoccurring words recorded by participants that highlighted important qualities in RDFs from a non-users perspective.

Other qualities

- User respondents indicated that RDF product storage (3 counts) was important as the storage areas are needed to receive RDFs the whole year (1 count) and that the product does not denature over time (1 count). In addition, the availability (2 counts) of the products is an important quality that the user participants recognised in this question and were rated a six (1 count) and a seven (1 count) on the rating scale.
- Receiving reliable information on the products (1 count) and a demonstration of the products (1 count) was also recognised by the user participants as important, and was rated a seven on the rating scale (1 count).
- Other themes that came up as important to the user respondents included that product origin is known (1 count), that the products are regulatory approved (1 count) and that the products can be spread easily (1 count). All these themes were rated a seven on the rating scale.
- Another important theme identified was the issue of the amount of paperwork associated with some of these products (1 count). This theme was also rated seven on the rating scale.
- Other themes that came up for the non-users was the importance of product regulation (1 count) and that there must be some control over the use of these products at a government level. Also, the ease of use of these products (1 count) at a practical level was an important quality in RDFs.

5.2.5 Summary of Important Qualities of RDFs

Overall from a user perspective, the most important qualities identified by users of RDF were:

- A nutrient ratio that fits with crop nutrient demand;
- High organic matter content;
- Price per unit nitrogen or other nutrients;
- Followed by certification.

In comparison, non- user perspective the following parameters were identified as the most important qualities:

- Price per unit nitrogen or other nutrients;
- Ease of use;
- Certification;
- Followed by a nutrient ratio that fits with crop nutrient demand.

What is interesting is that a high organic matter content did not feature in the top 4 from a non-user perspective while the ease of use of RDFs did not feature in the users top 4. The price of RDFs per unit nitrogen or other nutrients was the most important quality for non-users, however, it was only the 3rd most important for users. Interestingly, this quality also came up in the open-ended option of the question where the product cost was the most important quality for users, however only the 4th important for non-users.

In the open-ended responses from the non-users perspective, environmental security was the most important quality that emerged, followed by product smell and the quality of the RDF product. While from a user perspective, product cost was the most important quality followed by the quality of the product and the smell.

On the other hand, possibly mixing with other fertilisers was the least important quality for RDF users and the 2nd least important for non-users. RDFs with a slow nutrient release speed was the least important quality for non-users and 2nd least important for users. The 3rd least important quality for users was the availability to buy at a fertiliser supplier/traders, and for non-users, it was RDFs with a fast nutrient release speed.

5.3 Preferred RDF Texture

Participants were asked to identify what RDF texture was preferable for the ease of application. This question was asked separately for farmers (Figure 5-24) and advisors (Figure A-11). This was a ranking question, with five options to choose from. The choices included granules, powder, paste, liquid or a combination of liquids and solids. The participants had to rank the question between one and five. One being the most preferred and five being the least preferred. In total, 714 farmers and 32 advisor participants responded to this question. See Table 5-2, for the number of responses from both farmers and advisors.

39. For the application of recycling-derived fertilisers, which texture is preferable? (with 1 being the most preferred and 5 the least preferred)

<input type="text"/>	granules
<input type="text"/>	powder
<input type="text"/>	paste
<input type="text"/>	liquid
<input type="text"/>	combination liquid/solid

Figure 5-24: Preferred texture question, from the ReNu2Farm Stakeholders Survey, from a farmer's perspective.

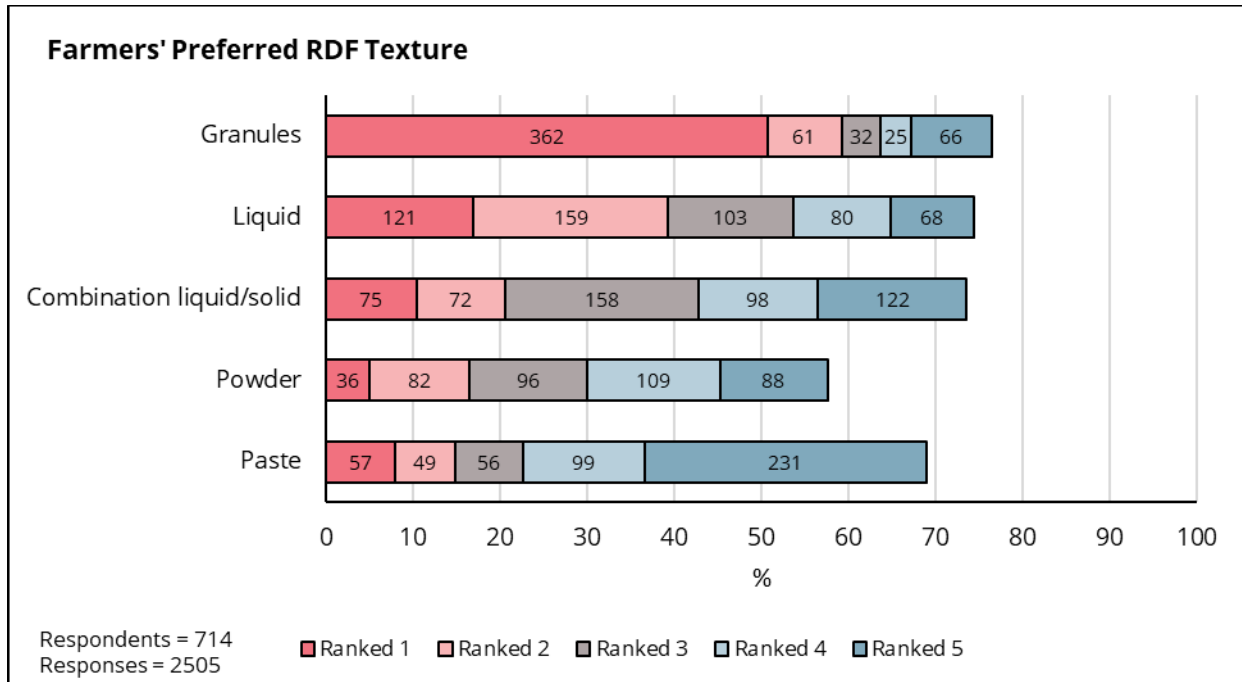
Table 5-2: Total number of respondents and responses from farmers and advisors to the preferred texture question.

	Farmers		Advisors	
	Respondents	Responses	Respondents	Responses
Total	714	2505	32	134
Belgium	128	454	9	40
France	433	1477	8	27
Germany	30	92	6	26
Ireland	85	323	7	34
Luxembourg	0	0	0	0
Netherlands	36	150	2	7
United Kingdom	2	9	0	0

5.3.1 Overall Response

Overall, the percentage ranking from farmers and advisors were graphed. The difference evident in

Figure 5-25 and Figure 5-26 between the percentage responses and 100% represents the percentage of respondents that did not engage with the options in the question.

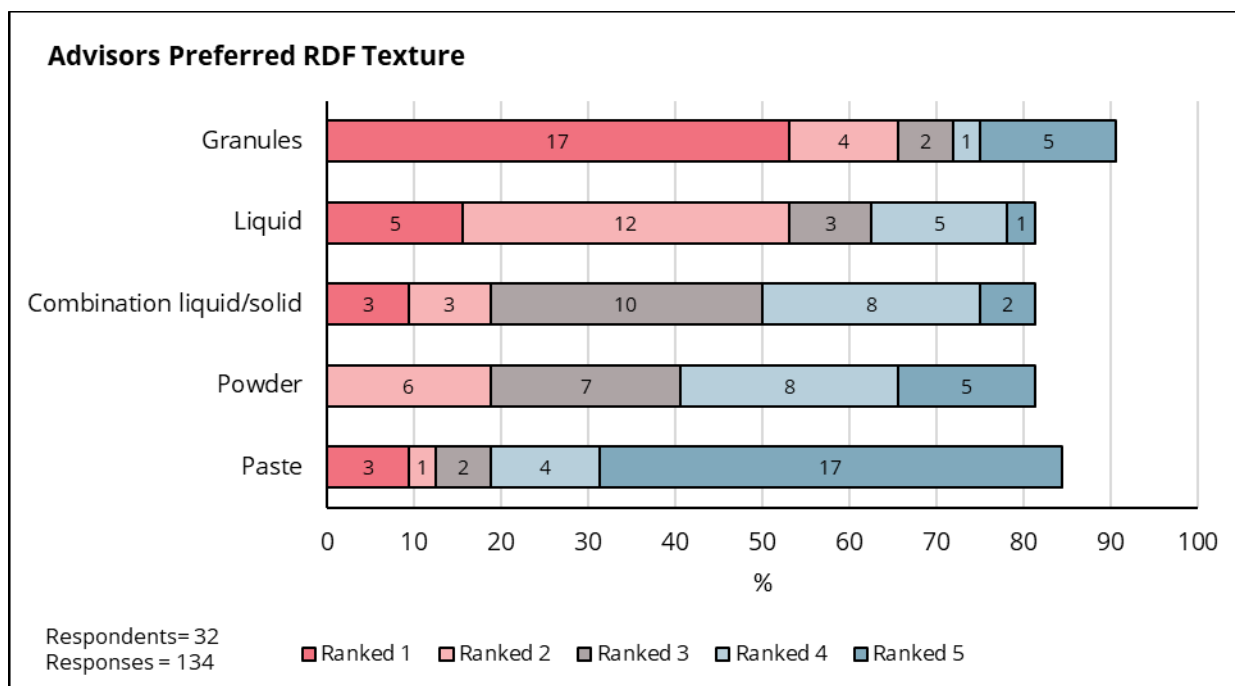


*** The number on each bar refers to the number of responses.*

Figure 5-25: Overall distribution of the farmers' preference of different RDF textures, granules, powder, paste, liquid, and a combination of a liquid and a solid.

An overview of the ranked preferences of different textures include:

- 91% of advisors (Figure 5-26) and 76% of farmers (** *The number on each bar refers to the number of responses.*)
- *Figure 5-25*) interacted with the preference of using RDFs with a granular texture. Of that, 53% of advisors and 51% of farmers ranked this texture 1st, suggesting that this was the overall preferred RDF texture.
- In total, 81% of advisors and 74% of farmers interacted with the liquid texture option. Of those that responded, 43% of advisors and 39% of farmers ranked RDFs with a liquid texture combined 1st and 2nd. Therefore overall, rating RDFs with a liquid texture in 2nd place.
- 81% advisors and 73.5% farmers interacted with the texture, a combination of solids and liquids. Of those that responded, 31% of advisors and 22% of farmers ranked this texture in 3rd place.
- In addition, 81% of advisors and 58% of farmers interacted with the powder texture question. Of those that responded, 41% of advisors and 27% of farmers ranked RDFs with a powder texture combined 4th and 5th. Overall, therefore, it was ranked in 4th place or the 2nd least preferred texture.
- Overall, 84% advisors and 69% farmers interacted with the paste option. Of those that responded to the option, 53% of advisors and 32% of farmers ranked this option in 5th place or the least preferred RDF texture.



** The number on each bar refers to the number of responses.

Figure 5-26: Overall distribution of the advisors preference to the different RDF textures, granules, powder, paste, liquid, and a combination of a liquid and a solid.

5.3.2 Texture Responses

The distribution of those that responded per country and age group to the preferred RDF texture are discussed in this section. Of the respondents that participated overall (Figure 5-25 and Figure 5-26) to each texture, their percentage ranking per country and age group is displayed as 100%.

Granules

- Both farmers and advisors ranked granules their most preferred RDF texture.
- Of the advisors (Figure 5-28) that ranked this option 1st, 100% of those in the Netherlands preferred to use granules, followed by 88% of those in Belgium and 80% of those in Germany (combined 1st and 2nd).
- On the other hand, 84% of farmers (Figure 5-27) in Ireland that ranked this option combined 1st and 2nd, preferred to use granules, followed by 79% of those in Belgium and 76% of those in France.
- There were no responses from those in Luxembourg and one response from farmers in the United Kingdom (ranked 1st).

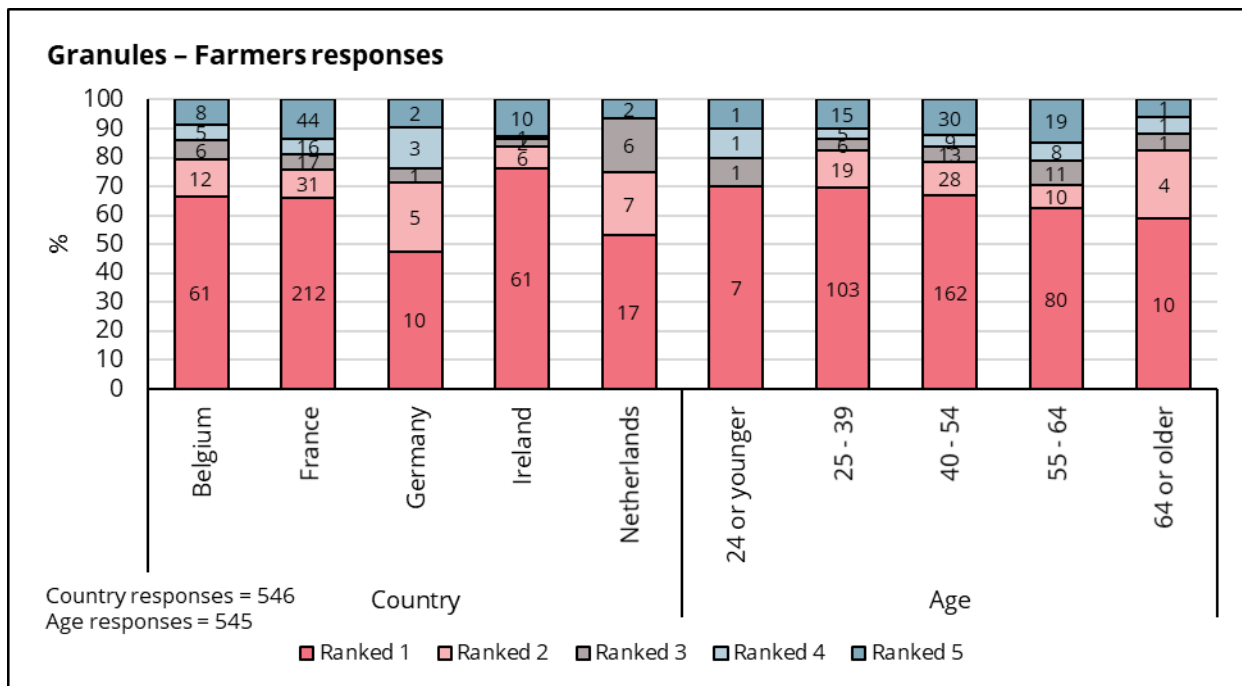
Liquid

- Farmers and advisors ranked the RDF texture liquids 2nd preferred.
- Of the advisors (Figure 5-30) that participated in the Netherlands, 100% ranked this option 2nd, followed by 83% of those in Germany (combined 1st & 2nd) and 75% of those in Belgium (combined 1st & 2nd).

- On the other hand, 68% of farmers (*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

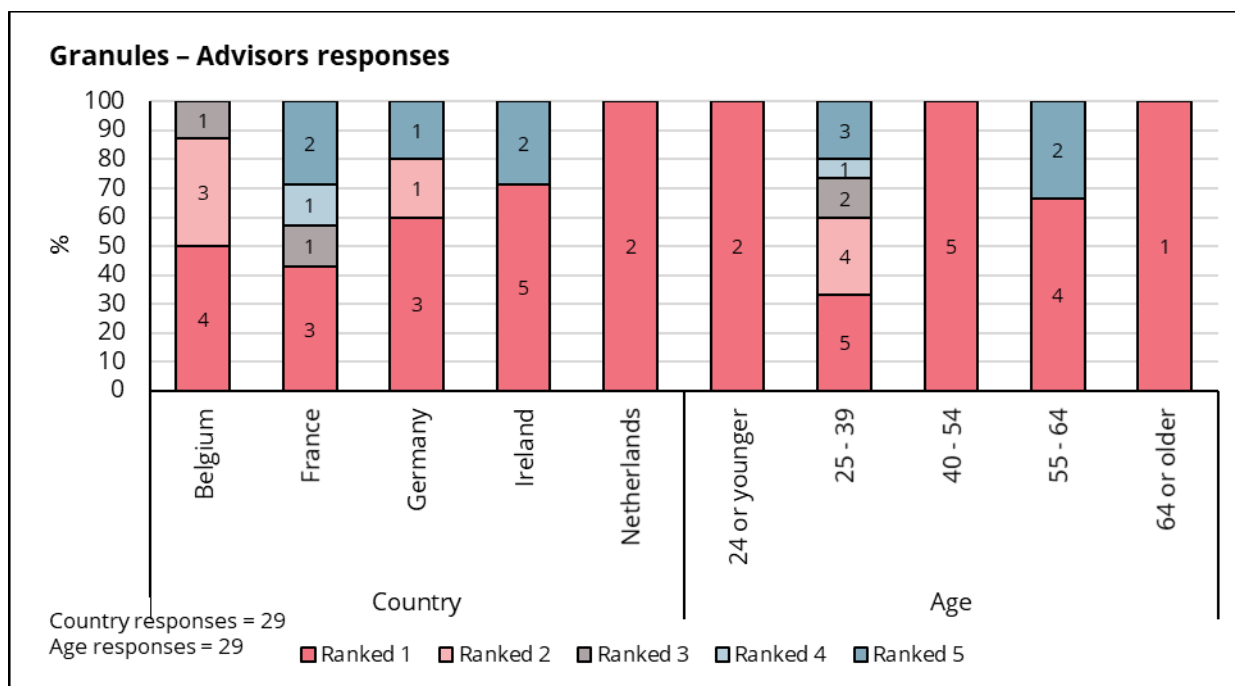
- Figure 5-29) in Belgium and the Netherlands (combined 1st & 2nd) respectively. The responses from farmers in Ireland that ranked this texture 1st were statistically significantly different to Belgium.
- There were no responses from those in Luxembourg and farmers in the United Kingdom ranked this texture 1st and 4th, with one response respectively.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

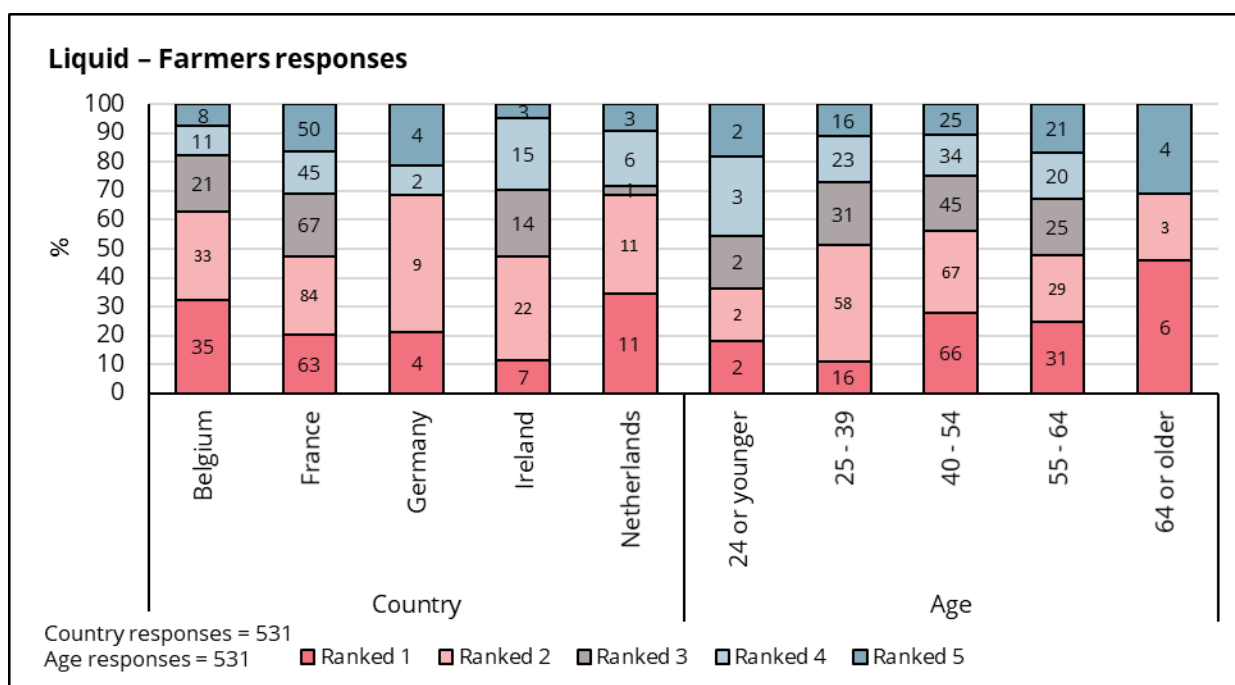
Figure 5-27: Distribution of RDF texture responses to granules per country and age group, from a farmer's perspective.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

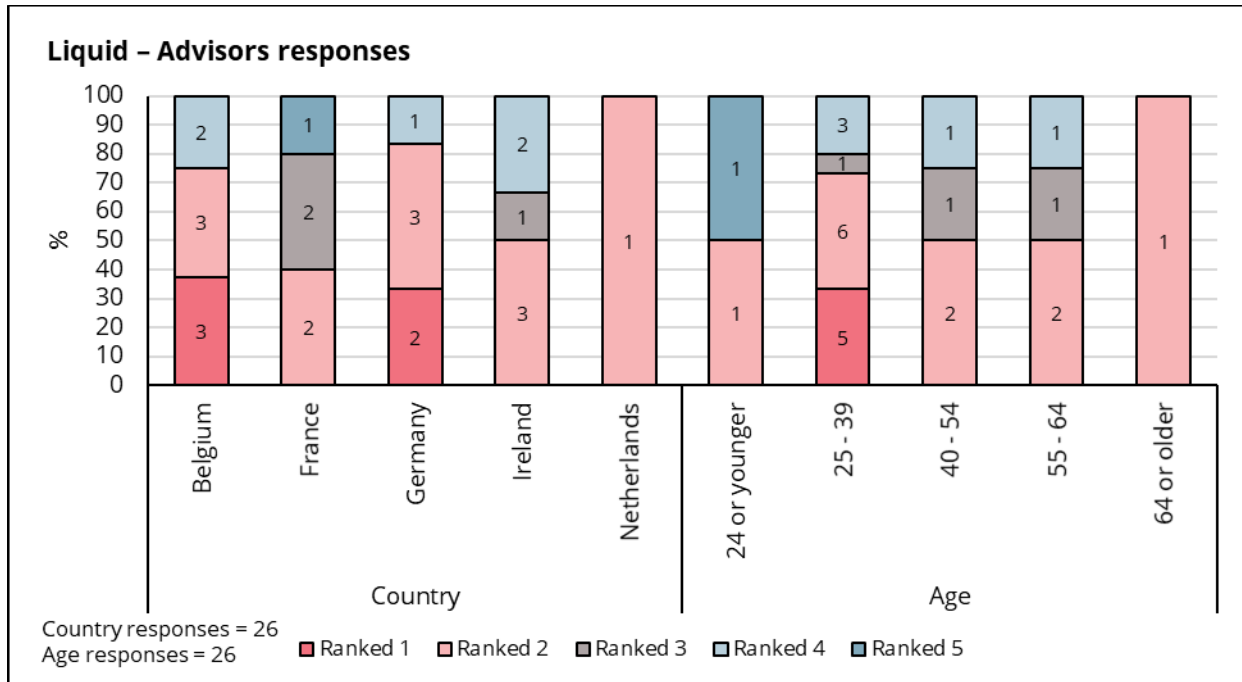
Figure 5-28: Distribution of RDF texture responses to granules per country and age group, from an advisors perspective.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure 5-29: Distribution of RDF texture responses to liquids per country and age group, from a farmer's perspective.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

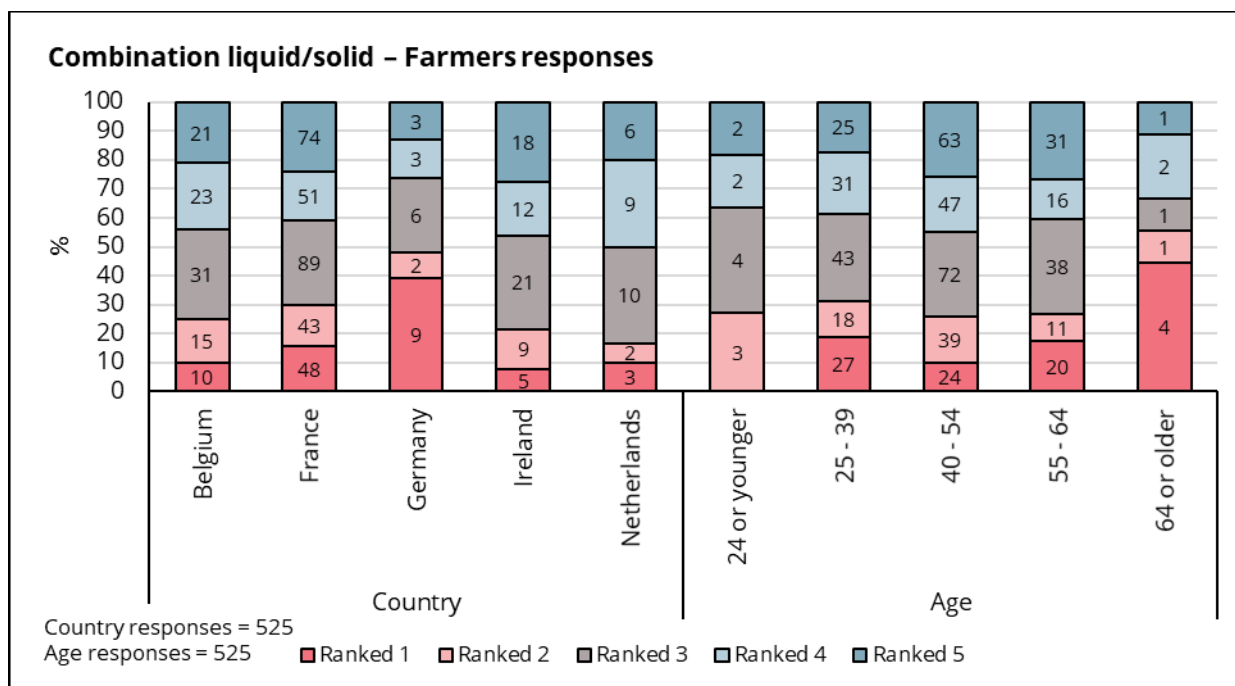
Figure 5-30: Distribution of RDF texture responses to liquids per country and age group, from an advisors perspective.

Combination liquid/solid

- Farmers and advisors ranked a combination of liquid and solid textures as their 3rd preference overall.
- 63% of farmers' (Figure 5-31) ranked a combination of the textures liquids and solids, combined 3rd and 4th in the Netherlands, followed by 51% of those in Ireland. Farmers' responses from Germany that ranked this option 1st were statistically significantly different from those in Belgium and Ireland.

Of the advisors (

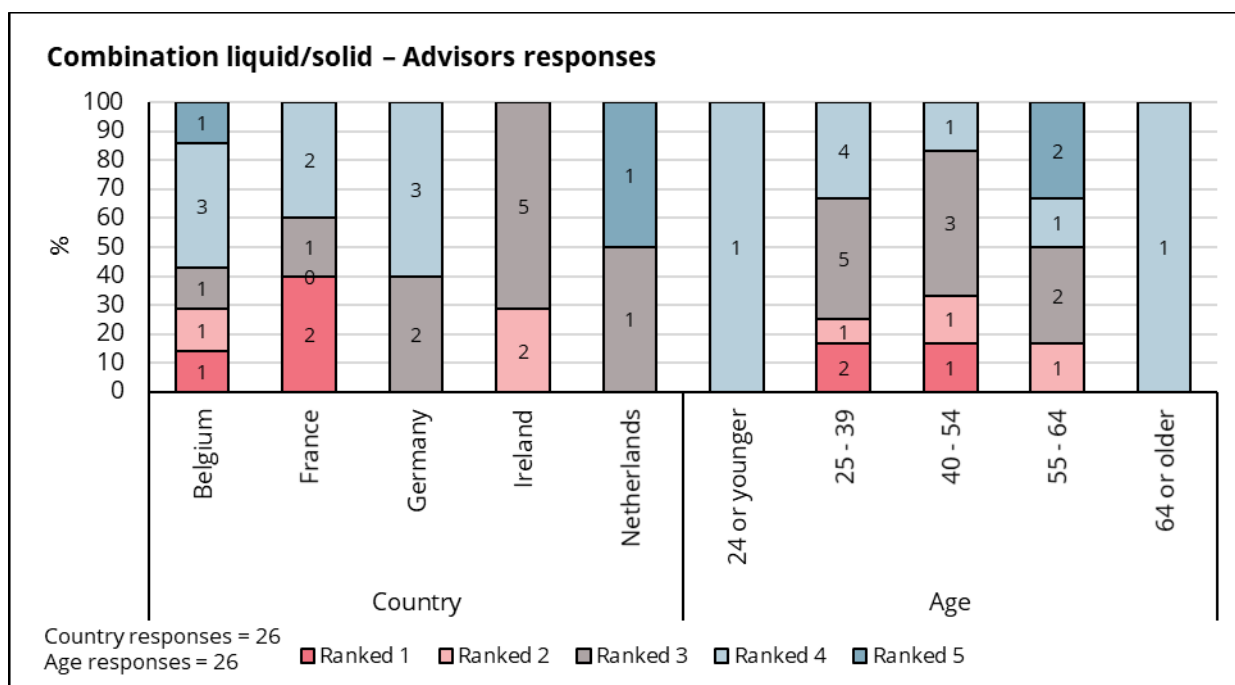
- *Figure 5-32*) that participated in Germany, 100% ranked this option 3rd and 4th combined, followed by 71% of those in Ireland that ranked it 3rd.
- There were no responses from those in Luxembourg and farmers in the United Kingdom ranked this texture 2nd and 3rd, with one response respectively.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

Figure 5-31: Distribution of RDF texture responses to a combination of liquid or solid RDFs per country and age group, from a farmer's perspective.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

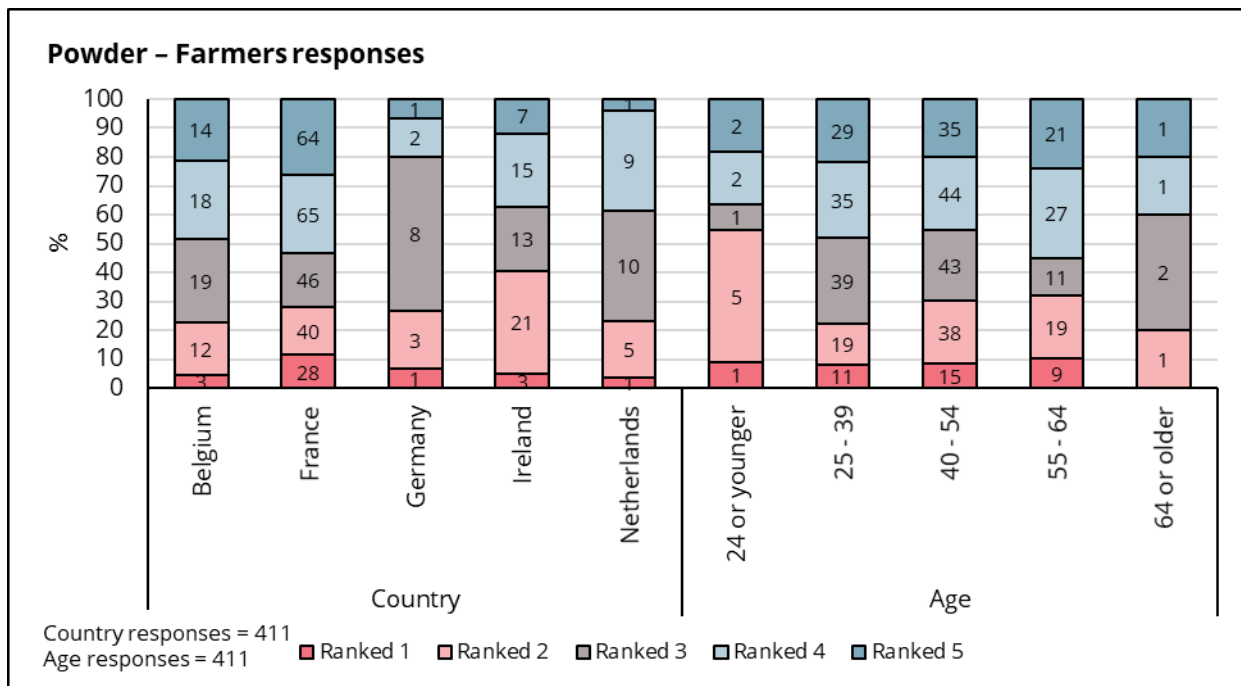
Figure 5-32: Distribution of RDF texture responses to a combination of liquid or solid RDFs per country and age group, from an advisors perspective.

Powder

- Farmers and advisors ranked the texture powder as their 2nd least preferred RDF texture.
- Of the farmers (*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

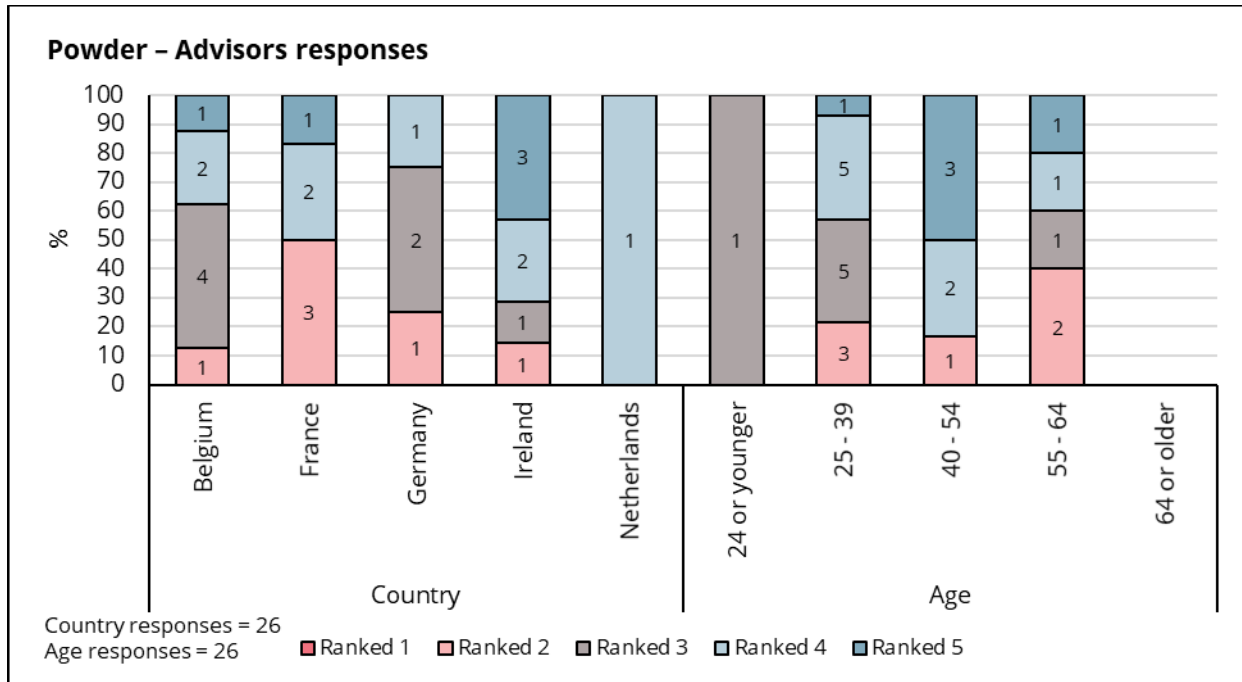
- Figure 5-33) that participated in the Netherlands, 73% (combined 3rd & 4th) 2nd least preferred RDFs with a powder texture, followed by 66% of those in Germany.
- On the other hand, 100% of advisors (Figure 5-34) in the Netherlands (ranked 4th) 2nd least preferred RDFs with a powder texture, followed by 75% of those in Belgium and Germany respectively (combined 3rd & 4th).
- There were no responses from those in Luxembourg and farmers in the United Kingdom ranked this texture in 2nd and 5th place, with one response respectively.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

Figure 5-33: Distribution of RDF texture responses to powder per country and age group, from a farmers perspective.



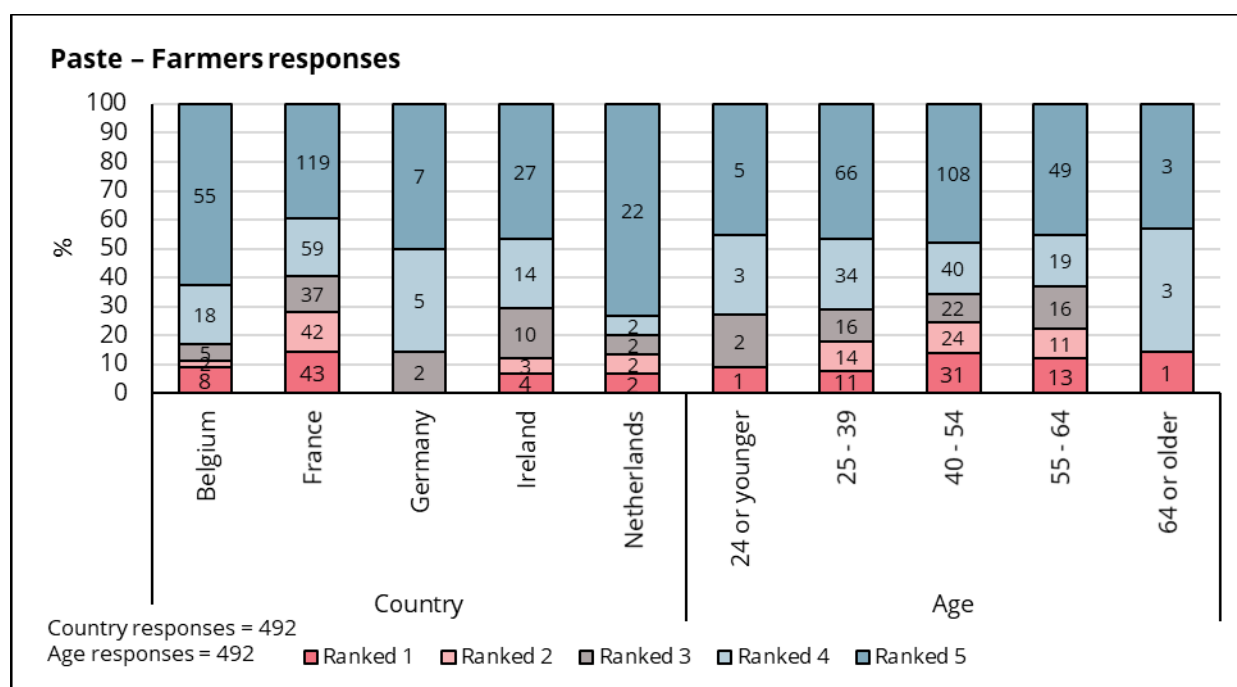
*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

Figure 5-34: Distribution of RDF texture responses to powder per country and age group, from an advisors perspective.

Paste

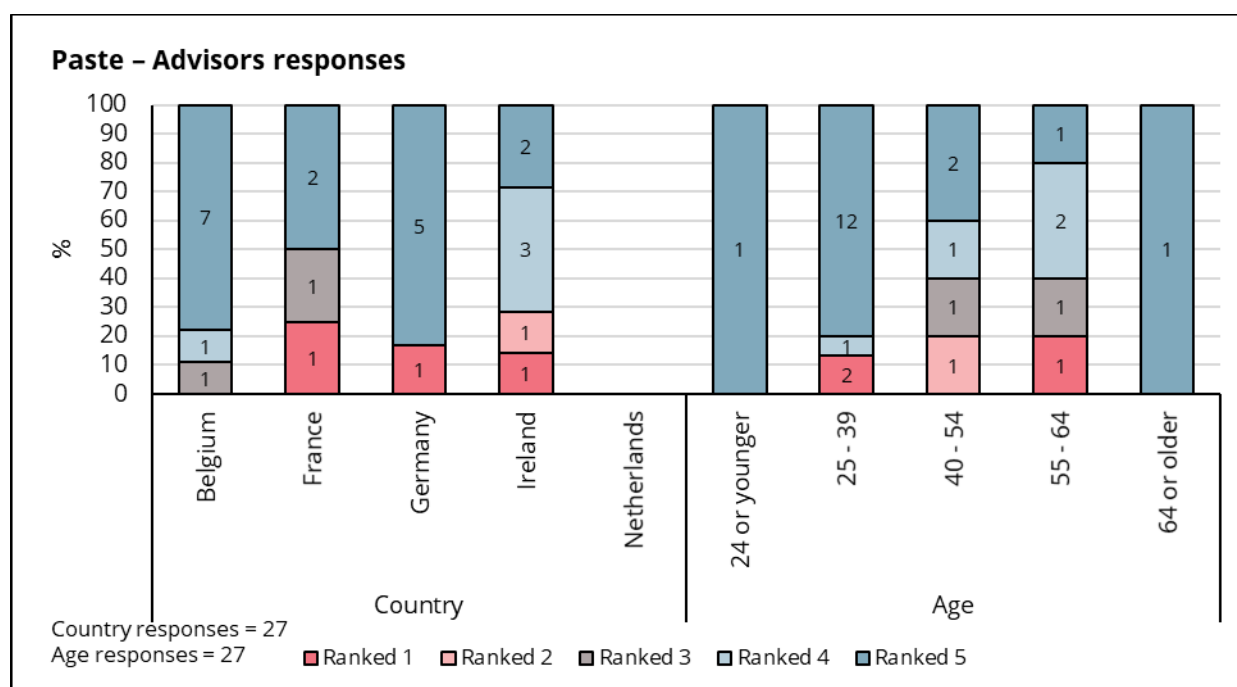
- Farmers and advisors ranked the texture paste their least preferred.
- Of the advisors (Figure 5-36) that participated in Belgium, 88% (combined 4th & 5th) least preferred RDFs with a paste texture, followed by 83% of those in Germany (ranked 5th).
- On the other hand, 86% of farmers (Figure 5-35) in Germany (combined 4th & 5th) least preferred RDFs with a paste texture, followed by 83% of those in Belgium (combined 4th & 5th).
- The responses from farmers in France that ranked this texture 5th were statistically significantly different to Belgium and the Netherlands.
- There were no responses from those in Luxembourg and farmers in the United Kingdom ranked this texture in 4th and 5th place, with one response respectively.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses.

Figure 5-35: Distribution of RDF texture responses to paste per country and age group, from a farmers perspective.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses. The dashed line refers to the overall preference of RDF texture.

Figure 5-36: Distribution of RDF texture responses to paste per country and age group, from an advisors perspective.

5.3.3 Summary of Preferred Texture

The preferred texture of RDF products, highlighted by both farmers and advisors are as follows:

1. Granules
2. Liquids
3. Combination of liquids and solids
4. Powder
5. Paste

The preferred textures could be linked to the ease of application and the availability of farm machinery to apply RDFs with these textures.

5.4 Chapter Summary

This chapter focused on how the survey participants (users and non-users), viewed the importance of specific qualities in RDFs. In addition, the farmers and advisors preferred RDF texture for the application of RDFs was also explored. Rating the important qualities of users and non-users investigated the participants' opinions, on what they thought were important qualities in RDFs. Exploring a question like this gives great insight from those that already use RDFs compared to those that do not. Therefore, it gives a sharp contrast between those that have practical experience using these products in comparison to those who have no experience. Also, it is interesting to see if, by comparing the farmers' opinion on the preferred RDF texture to the advisors, do both prefer the same texture.

From the results, RDF users, in particular in Ireland, found that a nutrient ratio that fits with crop nutrient demand is the most important quality in RDFs. Interestingly, the product cost was the most important quality for users when the open-ended question was assessed. Although in the open-ended section the users refer to the overall product cost and not per unit N or other nutrients, indicating that RDFs should be available free of charge. A high organic matter content was the 2nd most important quality for users, especially those in the Netherlands. On the other hand, RDF users found that possible mixing with other fertilisers, in particular in Ireland, was the least important quality in RDFs and a slow nutrient release speed was the 2nd least important quality in RDFs from a users perspective, especially those in Belgium and France.

In comparison, for non-users, the price per unit of N or other nutrients in particular in Ireland was the most important quality in RDFs and the ease of use was the 2nd most important quality for non-users, in particular those in Ireland. On the other hand, the non-users found that a slow nutrient release speed was the least important quality in RDFs, in particular in Belgium. The possible mixing with other fertilisers was the 2nd least important quality in RDFs from a non-users perspective, specifically in Belgium.

When the open-ended, other option, was explored the most commonly occurring words from users of RDFs were products, smell and storage. In comparison, the most commonly occurring words from non-users are important, nutrients and use. The most prominent common themes that emerged from both RDF users' and non-users included the cost of the products and the

quality of the RDFs. The other frequently occurring themes from RDF users included the smell of the products, storage of RDFs and their availability. This is interesting as these parameters are concerns for the users and come up in many other questions in this survey. On the other hand, non-users were more concerned about the environmental security aspect of RDFs. Again, suggesting that the non-users are apprehensive of the environmental repercussions of using these products and their outcomes.

The participants' were also asked to identify their preference for RDF texture. Interestingly, both farmers and advisors ranked the importance of the different RDF texture the same. RDFs with a granular texture was ranked the most preferred, those with a liquid texture were the next preferred and RDFs with a combination of liquids and solids were third preferred.

It is evident from the results that there are many similarities between users and non-users of RDFs with regards to the importance of different qualities in RDFs. However, the differences in importance between users and non-users in the open-ended questions are very interesting and representative of their knowledge of these products. The preferred responses to the product textures overall were the same for both farmers and advisors. This confirms that they both have a very clear opinion of how these products will fit in with their farming machinery and practices.

6 Willingness to Substitute Mineral Fertilisers with RDFs

6.1 Overview

The willingness to substitute mineral fertilisers with RDFs was investigated over two questions in the stakeholders' survey. These questions were situated in the future use section of the survey and included responses from farmers that were combined RDF users and non-users. These questions aimed to explore the participants' desired qualities in RDFs, by investigating which RDF qualities would encourage them to substitute mineral fertilisers with RDFs. Also, the conditions in which respondents were willing to substitute mineral fertilisers with RDFs if they had all the desired properties were determined.

6.2 Which RDF Qualities Would Encourage Mineral Fertiliser Substitution

This question explored which different RDF qualities would encourage participants to substitute mineral fertilisers with RDFs. This was a multiple choice-ranking question, with a choice of 14 different RDF qualities (see Figure 6-1). The choices included known NKP concentration, fast nutrient release speed, basic pH – lime value, ability to use the same machinery and machine tracks, and certified products. The participants had to rank the question between one and three, with one being the 1st most important quality, followed by two being the 2nd most important and three being the 3rd most important.

6.2.1 Overall Response

Overall, the percentage of responses from all participants that were ranked 1st-3rd important were graphed. The difference evident in Figure 6-2 between the percentage responses and 100% represents the percentage of respondents that did not engage with the options in the question.

In total, 681 participants answered this question. See **Error! Reference source not found.**, for the number of responses from both farmers and advisors.

In * The number on each bar refers to the number of participants' responses.

Figure 6-2, 46% (313 responses) of participants overall indicated that a known NPK was the most important reason why they would substitute mineral fertilisers. This was followed by 41% (281 responses) of those that indicated a nutrient ratio that fits with crop nutrient demand was the 2nd most important reason and 33% (224 responses) suggested a high organic matter content was the 3rd most important reason to substitute mineral fertilises with RDFs.

41. Which of the following qualities of recycling derived fertilisers would encourage you to substitute mineral fertilisers with recycling derived fertilisers? (Rank 1 to 3, with 1 being the most important quality, 2 the next important and so on)

<input type="text"/>	Known NPK concentration
<input type="text"/>	Nutrient ratio that fits with crop nutrient demand
<input type="text"/>	Other nutrients
<input type="text"/>	Fast nutrient release speed
<input type="text"/>	Slow nutrient release speed
<input type="text"/>	High (effective) organic matter content (carbon)
<input type="text"/>	Basic pH - lime value
<input type="text"/>	Stable quality over several charges
<input type="text"/>	Easy to use (practical handling: physical structure/form, mixing, ...)
<input type="text"/>	Possible mixing with other fertiliser (no extra run necessary on the field)
<input type="text"/>	Ability to use same machinery and machine tracks
<input type="text"/>	Certified products
<input type="text"/>	Logistics and handling (easy availability, storage, packaging, packaging size, bulk density, ...)
<input type="text"/>	None of the above

Figure 6-1: Which RDF qualities would encourage the substitution of mineral fertilisers from the ReNu2Farm Stakeholders Survey.

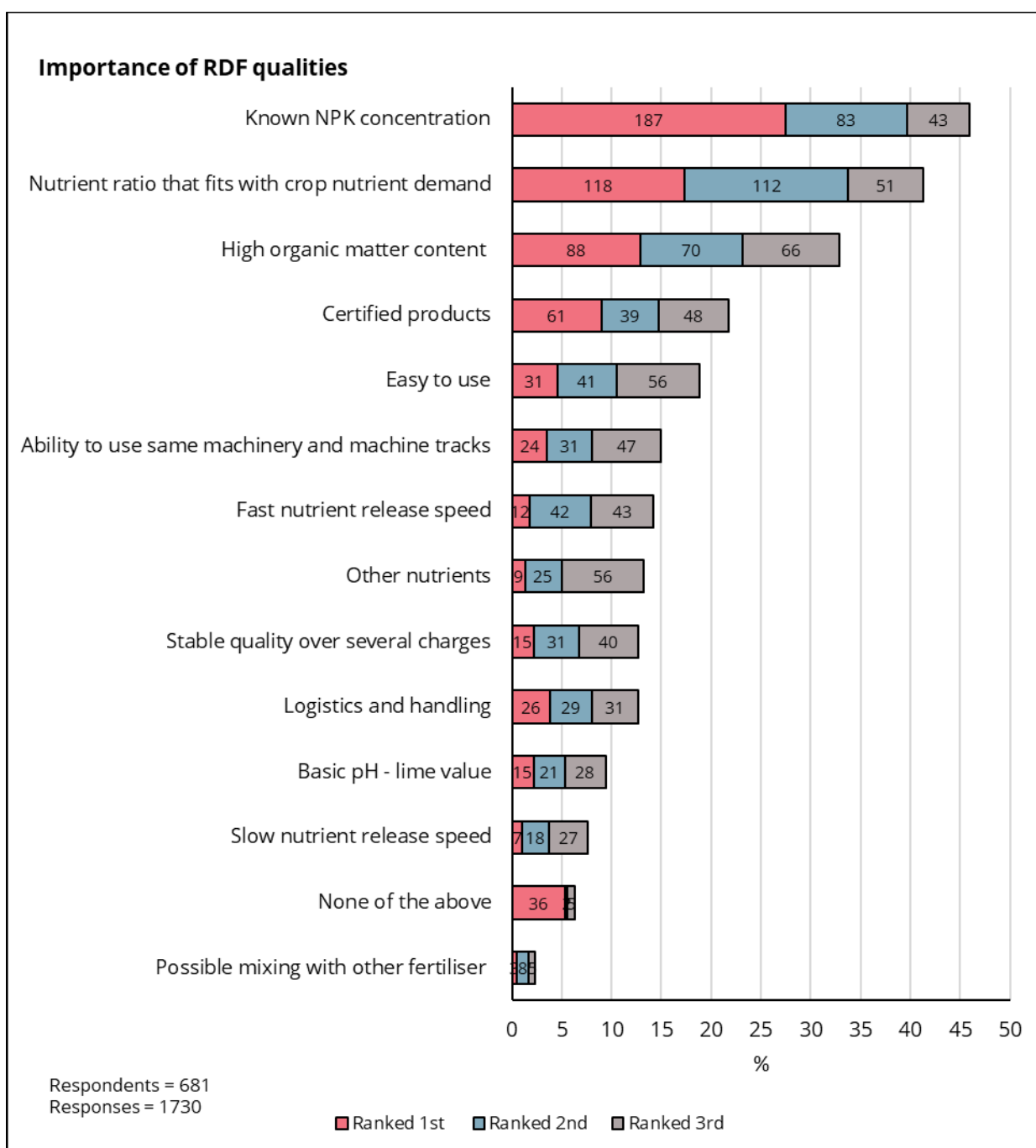
Table 6-1: Total number of respondents and responses to RDF qualities and cases that would encourage substitution.

	Qualities		Cases	
	Respondents	Responses	Respondents	Responses
Total	681	1730	671	2397
Belgium	121	316	121	420
France	413	1011	402	1410

Germany	29	76	31	109
Ireland	85	231	81	314
Luxembourg	0	0	0	0
Netherlands	34	90	34	136
United Kingdom	2	6	2	8

The quality that was highlighted as the least important reason to substitute in * The number on each bar refers to the number of participants' responses.

Figure 6-2 by participants was possible mixing with other fertilisers with 2% (16 response). This was followed by the 2nd least important reason, slow-release of nutrients with 8% (52 responses), and 3rd least important reason, basic pH –lime value with 9% (64 responses).



* The number on each bar refers to the number of participants' responses.

Figure 6-2: Overview of the importance of various qualities in RDFs that would encourage the participants to substitute mineral fertilisers.

6.2.2 RDF Qualities

The distribution of those that responded per country and age group to the importance of each RDF quality are discussed in this section. Of the respondents that participated overall (Figure 6-2) to each quality, their percentage ranking per country and age group is displayed as 100%.

Known NPK concentration

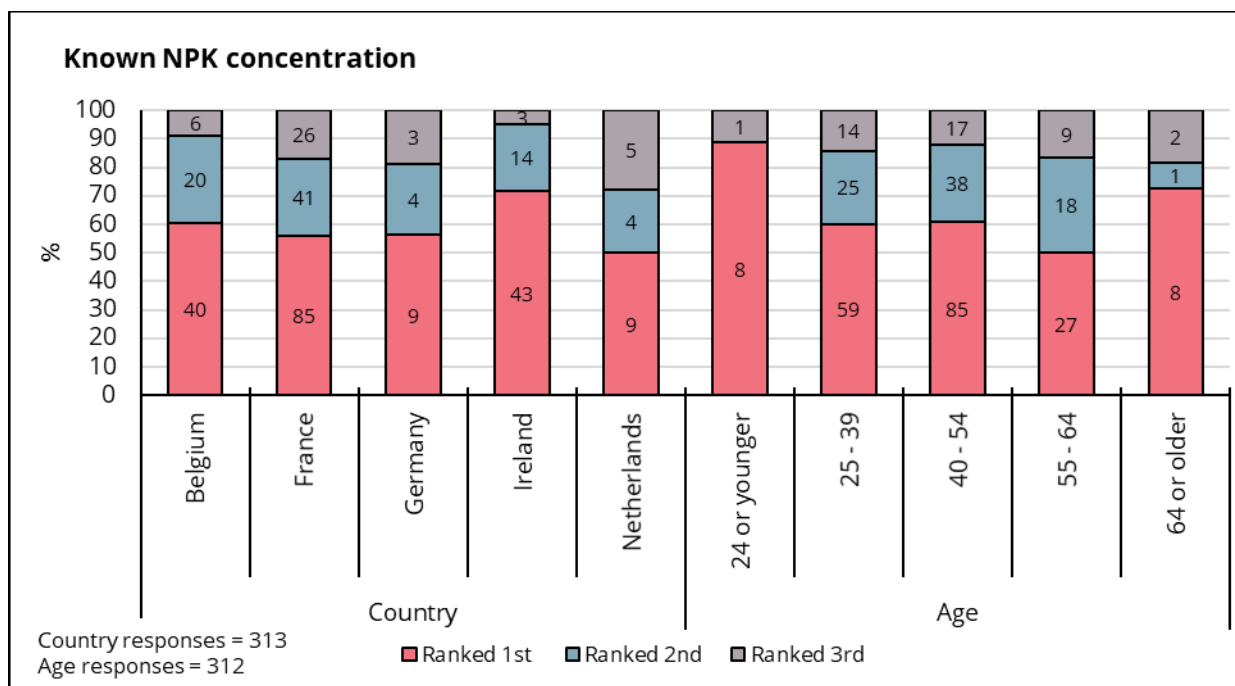
- Overall, 46% of participants indicated that this was an important quality.
- The quality was rated the most important quality to encourage substitution.

*In total, 27% of participants stated the known NPK concentration was the most important quality by ranking it 1st (**The number on each bar refers to the number of responses per importance.*

- Figure 6-3). Of those that participated in Ireland, 72% indicated that this was the most important option, followed by 61% of those in Belgium.
- 12% of participants stated that the known NPK concentration was the 2nd most important quality. 30% of those in Belgium suggest it was the 2nd most important quality that would encourage substitution.
- While 6% of participants indicated, it was the 3rd most important reason.
- There were no responses from those in Luxembourg and one 1st response from those in the United Kingdom.

Nutrient ratio that fits with crop nutrient demand

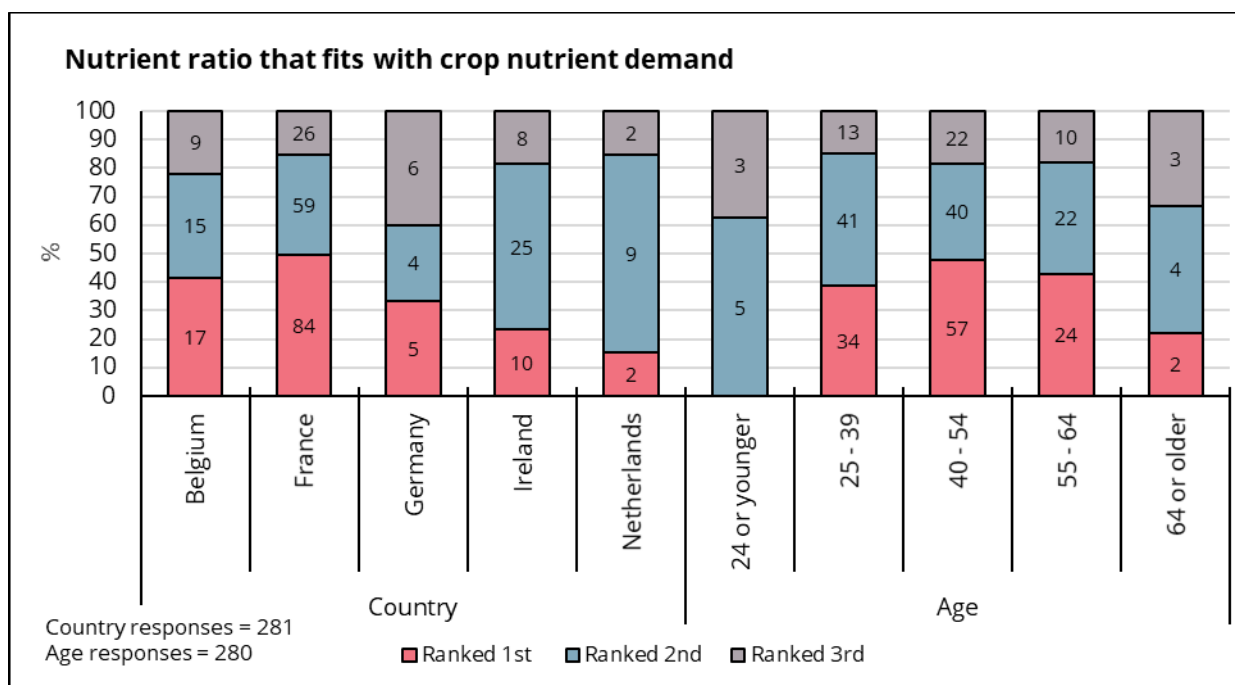
- Overall, 41% of participants had this quality in their top 3 reasons for substituting mineral fertiliser with RDFs.
- The quality was generally rated the 2nd most important quality to encourage substitution.
- Overall, 17% of respondents found that knowing the nutrient ratio that fits with crop nutrient demand, the most important RDF quality (Figure 6-4) by ranking it 1st. Of those that took part in France, 50% suggested that this quality was the most important RDF quality, followed by 41% of those in Belgium. The responses from those in France were statically significantly different from those in Ireland for this quality.
- In total, 16% of participants suggested that the nutrient ratio that fits with crop nutrient demand was the 2nd most important RDF quality. 69% of those who participated in the Netherlands suggested this was the 2nd most important quality in RDFs.
- Finally, 7% of participants indicated that this property was the 3rd most important RDF quality.
- There were no responses from those in Luxembourg the United Kingdom.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure 6-3: Distribution of responses that represent the importance of the RDF quality known NPK concentration, per country and age group.



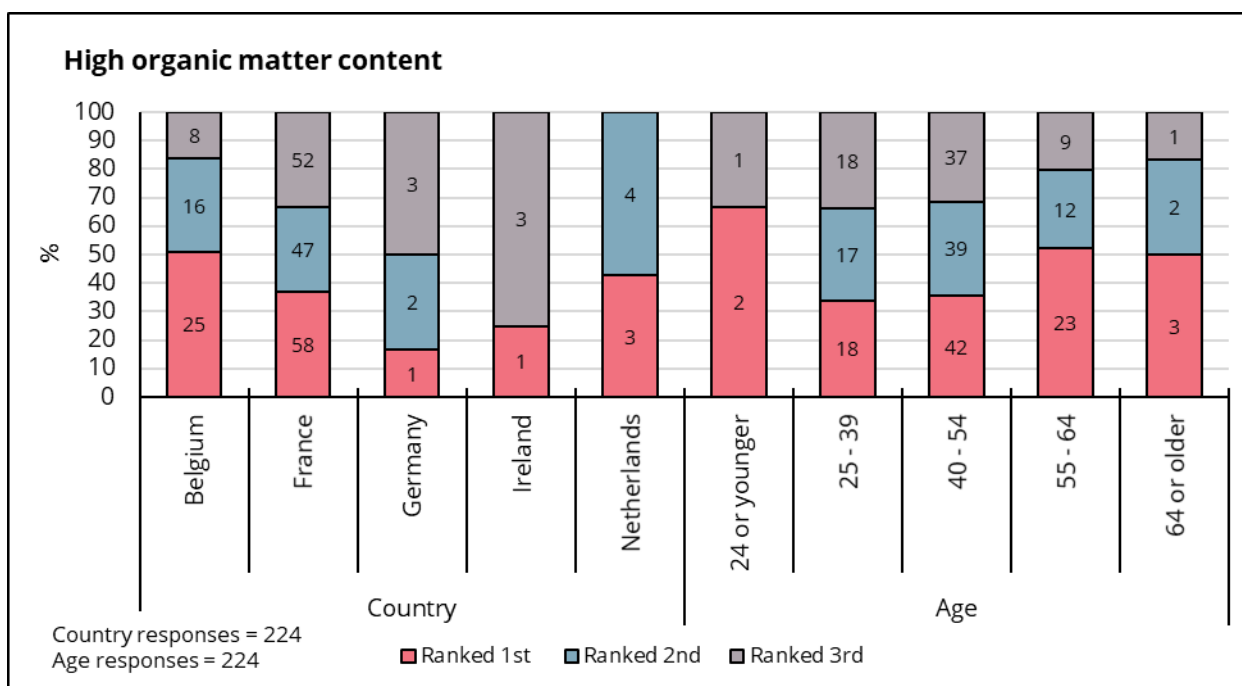
*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure 6-4: Distribution of responses that represent the importance of the RDF quality nutrient ratio that fits with crop nutrient demand, per country and age group.

High organic matter content

- Overall, 33% of participants had RDFs with a high organic matter content in their top 3 reasons for substituting mineral fertiliser with RDFs.
- This quality was generally rated the 3rd most important quality to encourage substitution.
- In total, 13% of participants stated that high organic matter content was the most important quality (Figure 6-5), ranking it 1st. Of those that took part in Belgium, 51% suggested that this quality was the most important, followed by 43% of those in the Netherlands.
- In total, 10% of participants suggested that this quality was the 2nd most important RDF quality. Of those that responded from the Netherlands, 57% suggested this was the 2nd most important quality in RDFs.
- Finally, 10% of participants indicated that a high organic matter content was the 3rd most important RDF quality.
- There were no responses from those in Luxembourg and one 2nd most important response from those in the United Kingdom.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure 6-5: Distribution of responses that represent the importance of the RDF quality a high organic matter content, per country and age group.

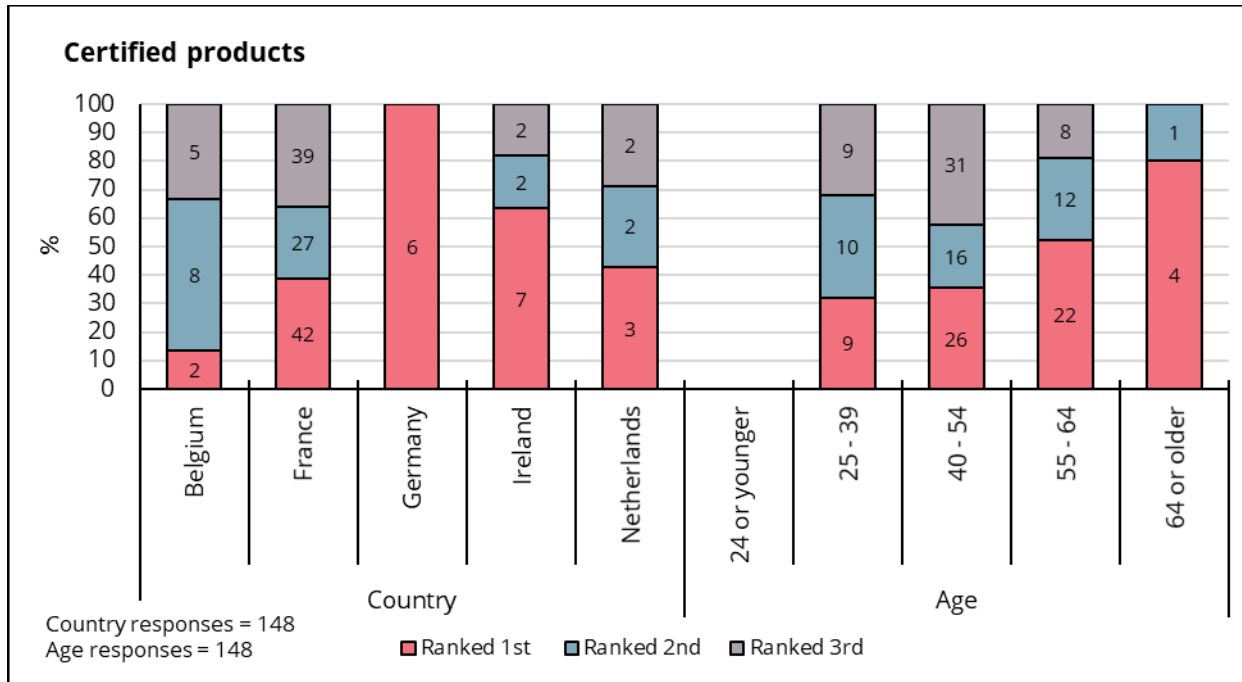
Certified products

- Overall, 22% of participants indicated that certified products were in their top 3 reasons for substituting mineral fertiliser with RDFs.
- The quality was generally rated the 4th most important quality to encourage substitution.

- In total, 9% of participants stated that certified products were the most important quality (Figure 6-6), ranking it 1st. Of those that took part in Germany, 100% suggested that this quality was the most important, followed by 64% of those in Ireland. The responses from those in Germany were statistically significantly different from those in Belgium and France for this option.
- In total, 6% of participants suggested that this quality was the 2nd most important RDF quality. Of those that responded from Belgium, 53% suggested this was the 2nd most important quality in RDFs.
- In addition, 7% of participants indicated that certified products were the 3rd most important RDF quality. Of those that responded in the 40 to 54 age group, 42% suggested that this was the 3rd most important quality. The responses from those in the 40 to 54 age group were statistically significantly different from those in the 55 to 64 age group for this option.
- There were no responses from those in Luxembourg and 1st response from those in the United Kingdom.
- There were also no responses from those in the 24 or younger age group or the 65 or older age group.

Possible mixing with other fertiliser

- Overall, only 2% of participants indicated that this quality was in their top three qualities that would encourage them to substitute mineral fertiliser with RDF.
- This quality was the least important quality to encourage farmers to switch to RDFs.
- In total, 0.4% of participants stated that possible mixing with other fertiliser was the most important quality. This was followed by 1% of participants that stated it was the next important quality and 0.7% of participants indicated that possible mixing with other fertiliser was the 3rd most important RDF quality.
- There were no responses from those in Luxembourg or the United Kingdom.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

** The number on each bar refers to the number of responses per importance.

Figure 6-6: Distribution of the importance of the RDF quality responses to the ability to certified products per country and age group.

Slow nutrient release speed

- Overall, 8% of participants indicated that this quality was in their top three qualities that would encourage them to substitute mineral fertiliser with RDF.
- This quality was the 2nd least important quality to encourage farmers to switch to RDFs.
- In total, only 1% of participants stated that slow nutrient release speed was the most important quality.
- In general, 3% of participants stated it was the next important quality. 42% of those in Belgium (5 responses) indicated that this was the 2nd most important quality to encourage substitution.
- While 4% indicated, it was their 3rd most important RDF quality. Of those that participated in Ireland (4 responses) and the Netherlands (2 responses), 66% indicated that this was the 3rd most important quality in RDFs.
- There were no responses from those in Luxembourg and one 2nd most important response from those in the United Kingdom.

Basic pH-lime value

- Overall, 9% of participants indicated that this quality was in their top three qualities that would encourage them to substitute mineral fertiliser with RDF.
- This quality was the 3rd least important quality to encourage farmers to switch to RDFs.
- This included 2% of participants stating it was the most important quality and 3% of participants stated that basic pH-lime value was the next important quality.

- While 4% of participants indicated that basic pH-lime value was the 3rd most important RDF quality to encourage participants to substitute mineral fertiliser. Participants in Belgium, with 10%, suggested that this RDF quality was the 3rd most important, followed by 9% of those in Ireland.
- There were no responses from those in Luxembourg and one 3rd most important response from those in the United Kingdom.

Other important qualities

All other qualities investigated during this question were ranked as follows:

Easy to use

- This quality was ranked 5th overall with 19% of participants putting this quality in their top 3 qualities for encouraging substitution of mineral fertiliser with RDFs.
- In total, 5% of participants stated that being easy to use was the most important quality (Figure A-12).
- While 6% of participants stated that easy to use was the next important quality. Of those that participated in Ireland, 54% (13 responses) highlighted that this was the next important quality in RDFs, followed by 35% of those in Belgium (7 responses). The responses from those in France were statistically significantly different from those in Ireland for this quality.
- Finally, 8% of participants indicated that being easy to use was the 3rd most important RDF quality. 50% of respondents in Belgium (10 responses) suggest this was the 3rd most important quality, followed by 45% of participants in France (34 responses).
- There were no responses from those in Luxembourg or the United Kingdom.

Ability to use the same machinery and machine tracks

- This quality was ranked 6th overall with 15% of participants putting this quality in their top 3 qualities for encouraging substitution of mineral fertiliser with RDFs.
- In total, 4% of participants stated that being easy to use was the most important quality (Figure A-13).
- Overall, 5% ranked the ability to use the same machinery as the 2nd most important. Of that those that participated in the Netherlands (2 responses), 67% suggested it was the 2nd most important.
- While 7% of respondents ranked it the 3rd most important parameter. In particular, 67% of those in Belgium (12 responses) and 54% of those in Ireland (7 responses) suggested it was the 3rd most important quality.
- There were no responses from those in Luxembourg or the United Kingdom.

Fast nutrient release speed

- This quality was ranked 7th overall with 14% of participants putting this quality in their top 3 qualities for encouraging substitution of mineral fertiliser with RDFs.
- In total, 2% of participants stated that RDFs with a fast nutrient release rate was the most important quality (Figure A-14).
- Overall, 6% ranked fast nutrient release as the 2nd most important. Of those that participated in Germany 60% (3 responses), suggested it was the 2nd most important.

- Equally, 6% of respondents ranked it the 3rd most important parameter. In particular, 75% of those in the Netherlands (6 responses).
- There were no responses from those in Luxembourg, the United Kingdom or the 65 or older age group.

Other nutrients

- This quality was ranked 8th overall with 13% of participants putting this quality in their top 3 qualities for encouraging substitution of mineral fertiliser with RDFs.
- In total, 1% of participants stated that RDFs with other nutrients was the most important quality Figure A-14 and 4% ranked fast nutrient release as the 2nd most important.
- Overall, 8% of respondents ranked it the 3rd most important parameter. In particular, 81% of those in Ireland (17 responses) and 69% of those in Belgium (9 responses).
- There were no responses from those in Luxembourg or the United Kingdom.

Stable quality over several charges

- This quality was ranked 9th overall with 13% of participants putting this quality in their top 3 qualities for encouraging substitution of mineral fertiliser with RDFs.
- In total, 2% of participants stated that RDFs with a stable quality over several charges was the most important quality.
- Generally, Figure A-14 5% ranked fast nutrient release as the 2nd most important. In particular 40% of those in Germany (2 responses).
- While 6% of respondents ranked it the 3rd most important parameter. 60% of those in Germany (5 responses) and 53% of those in Belgium (19 responses) stated this quality was the 3rd most important to encourage substitution.
- There were no responses from those in Luxembourg or the United Kingdom.

Logistics and handling

- The quality logistics and handling was ranked the 10th most important or the 5th least important quality to encourage the substitution of mineral fertiliser with RDF products. With 4%, 4% and 5% of participants ranking it 1st, 2nd and 3rd respectively.
- Of those who ranked it 2nd, it included 75% of those in Germany (3 responses) followed by 36% of those in Belgium (9 responses). The responses from those in Germany were statistically significantly different from those from Ireland in this option.
- 71% of those in Ireland (10 responses) and 35% of participants in France (12 responses) indicated that this was the 3rd most important quality to encourage substitution.
- There were no responses from those in Luxembourg or the United Kingdom.

None of the above

- Finally, 6% of participants indicated that none of the 13 qualities highlighted would encourage the substitution of mineral fertiliser. The breakdown of this was 5% ranked it number 1, 0.2% number 2 and 0.7% number 3.

6.2.3 Summary of RDF Qualities that would Encourage Substitution

Overall, the respondents highlighted the top three RDF qualities what would encourage them to substitute mineral fertilisers as:

1. a known NPK concentration
2. a nutrient ratio that fits with a crop nutrient demand and
3. a high organic matter content.

This suggests farmers want to know that the fertilisers they use have a good quality consistent nutrient content that is suitable for their crop requirements.

On the other hand, the participants suggested that the RDF qualities least likely to encourage them to substitute mineral fertilisers were:

1. possible mixing with other fertiliser, suggesting that no extra run would be necessary on the field,
2. a slow nutrient release speed and
3. a basic pH- lime value.

The lack of importance placed on these qualities indicates that the respondents were looking for fertilisers that were easy to use and could be applied directly.

6.3 If the RDFs had the Above-Mentioned Important Qualities, in Which Case are you Willing to Substitute Mineral Fertiliser?

6.3.1 Mineral Fertiliser Substitution Willingness, if the RDFs had Important Qualities

This question (Figure 6-7) explored the willingness of participants to substitute their mineral fertilisers for RDFs if they had the important qualities mentioned in the previous question. This was a multiple choice-ranking question, with a choice of five options. The options included, if the fertilisers are subsidised and free of charge, if the fertilisers are the same price as mineral fertilisers or if the fertilisers are slightly more expensive than mineral fertilisers. The participants had to rank the question between one and five. One is the most important and five being the least important.

42. If the recycling-derived fertilisers had the above mentioned important qualities, in which cases would you be willing to substitute your mineral fertiliser? (And rank them from 1 the most important to 5 the least important)

<input type="text"/>	If the fertilisers are subsidised and free of charge
<input type="text"/>	If the fertilisers are cheaper than mineral fertilisers
<input type="text"/>	If the fertilisers are the same price as mineral fertilisers
<input type="text"/>	If the fertilisers are slightly more expensive than mineral fertilisers
<input type="text"/>	I am not willing to substitute any mineral fertilizer by recycling- derived fertilizer

Figure 6-7: Ranking of the conditions which would encourage the substitution of mineral fertilisers for RDFs, from the ReNu2Farm Stakeholders Survey.

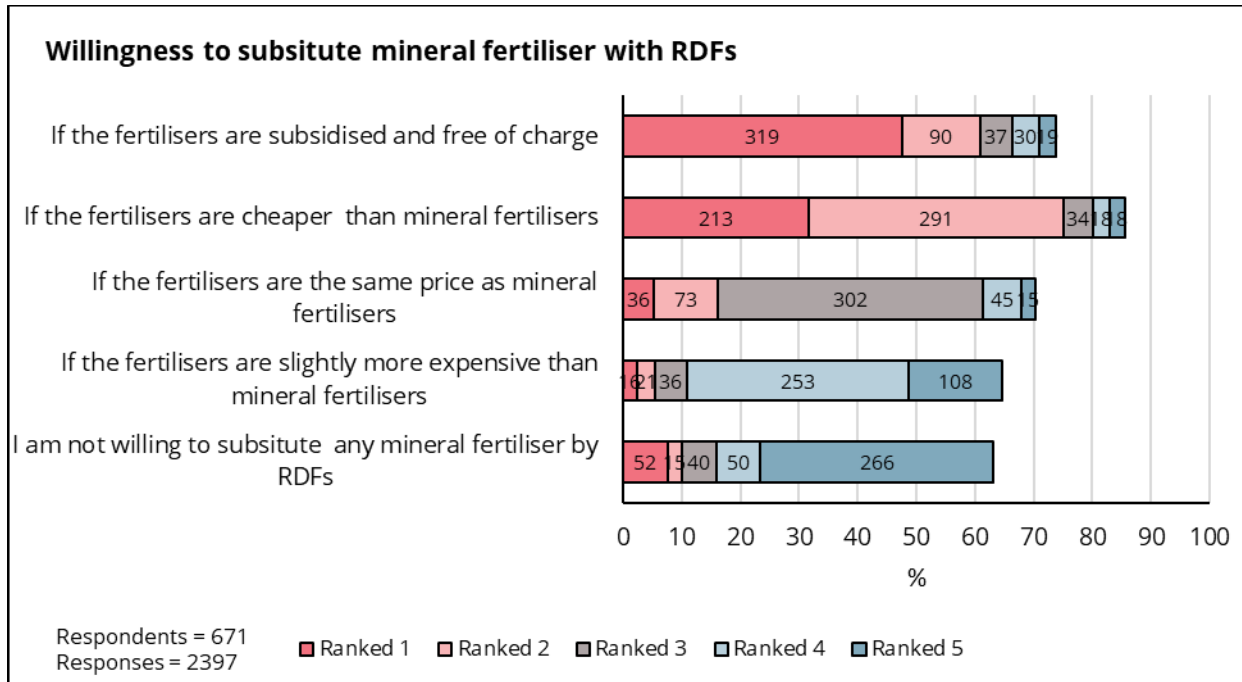
6.3.2 Overall Response

Overall, the percentage responses of ranked likeliness to substitute from participants were graphed. The difference evident in

Figure 6-8 between the percentage responses and 100% represents the percentage of respondents that did not engage with the options in the question.

In total, 671 participants answered this question. See **Error! Reference source not found.**, for the number of responses from both farmers and advisors. In general, 48% of participants indicated that they were most willing to substitute mineral fertiliser with RDFs if the fertiliser was subsidised and free of charge (Figure 6-8) by ranking it 1st. Followed by 43% of participants suggesting that they were willing to substitute if the fertilisers were cheaper than mineral fertilisers by ranking it 2nd.

In total, 45% of those who responded said they would substitute if the fertilisers were the same price as mineral fertilisers by ranking this option 3rd important. In contrast to this, 40% of respondents indicated that they were least willing to substitute any mineral fertiliser by RDFs, ranking it 5th. Therefore, 38% of the respondents were the 2nd least willing to substitute if the fertilisers were slightly more expensive than mineral fertilisers, by ranking it 4th.



*The number on each bar refers to the number of responses.

Figure 6-8: Overall distribution of respondents' willingness to substitute mineral fertilisers with RDFs.

6.3.3 Willingness to Substitute

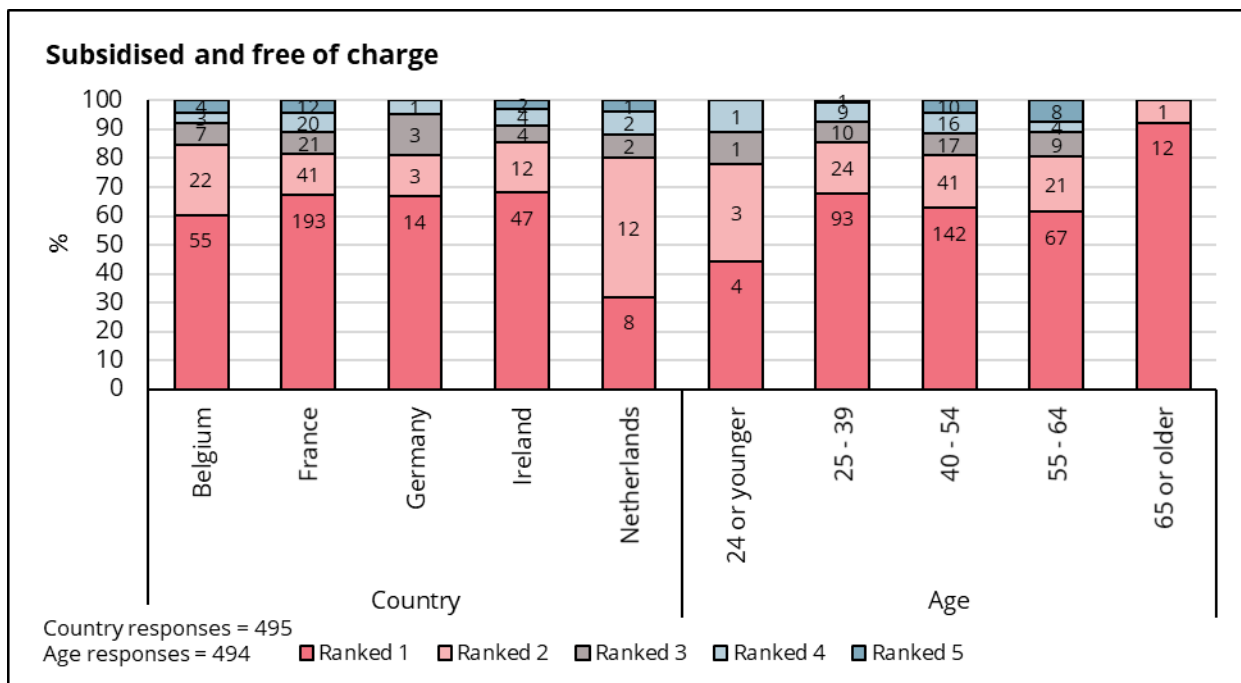
The distribution of those that responded per country and age group to the willingness to substitute mineral fertilisers with RDFs are discussed in this section. Of the respondents that participated overall (Figure 6-2) to the willingness, their percentage ranking per country and age group is displayed as 100%.

If the fertilisers are subsidised and free of charge

- This option was rated the most important quality to encourage substitution.
- In total, 48% stated they would substitute if the fertilisers were subsidised and free of charge by ranking it 1st (Figure 6-9). Of those that participated in Ireland, 68% suggested that this was the most important case, followed by 67% of those in France and Germany.
- In general, 13% of participants indicated that for them to substitute mineral fertiliser with RDFs, it was 2nd most important that the fertiliser was subsidised and free of charge. Of those that participated in the Netherlands, 48% indicated that this was an important case, followed by 24% of those in Belgium.
- Also, 6% of participants (3rd most important) suggested they would substitute if they were subsidised and free and, 3% ranked it the least and 4% ranked it the 2nd least important case.
- There were no responses from those in Luxembourg and two most important responses from those in the United Kingdom.

If the fertilisers are cheaper than mineral fertilisers

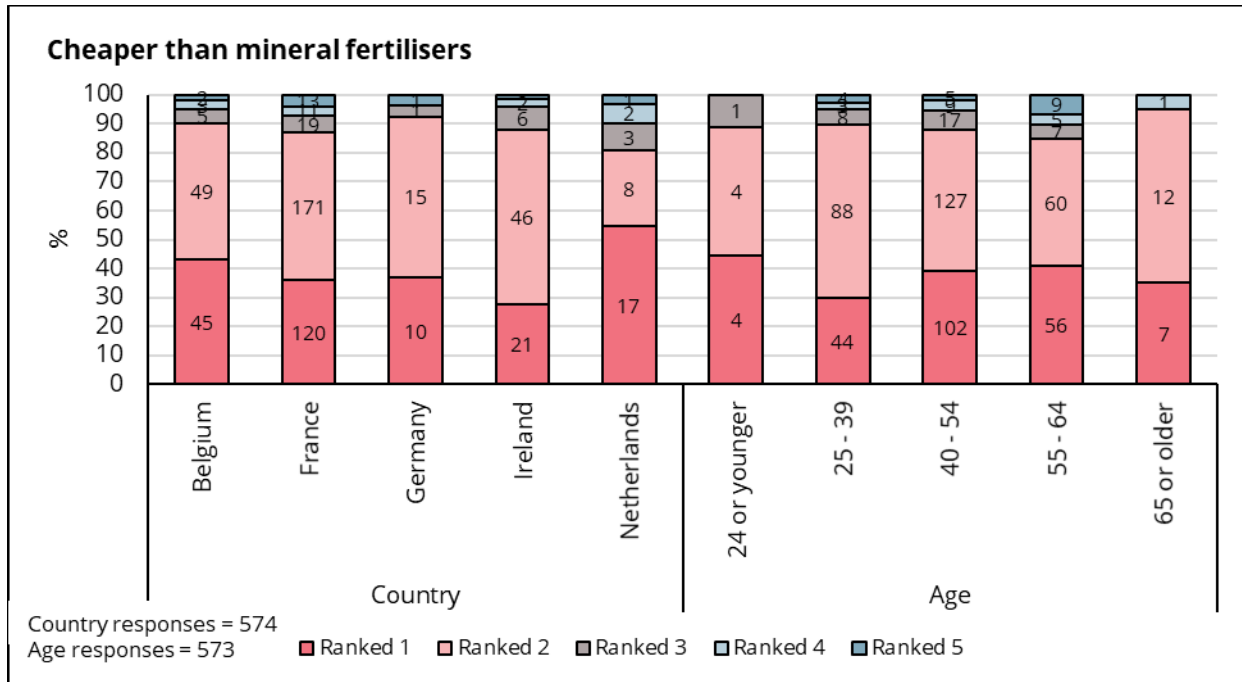
- This option was rated the 2nd most important quality to encourage substitution.
- In total, 32% stated they would substitute if the fertilisers were cheaper than mineral as the most important quality by ranking it 1st (Figure 6-10). Of those that participated in the Netherlands, 55% suggested that they were most likely to substitute if they were cheaper, followed by 43% of those in Belgium.
- In general, 43% of participants indicated that this was the 2nd most important. This included 61% of those in Ireland followed by 56% of those in Germany.
- Also, 5% of participants suggested they would substitute if they were cheaper making it the 3rd most important and 3% ranked it least and 2nd least important respectively.
- There were no responses from those in Luxembourg and two 2nd most important responses from those in the United Kingdom.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure 6-9: Importance of substituting mineral fertilisers with RDFs if they are subsidised and free of charge, per country and age group.



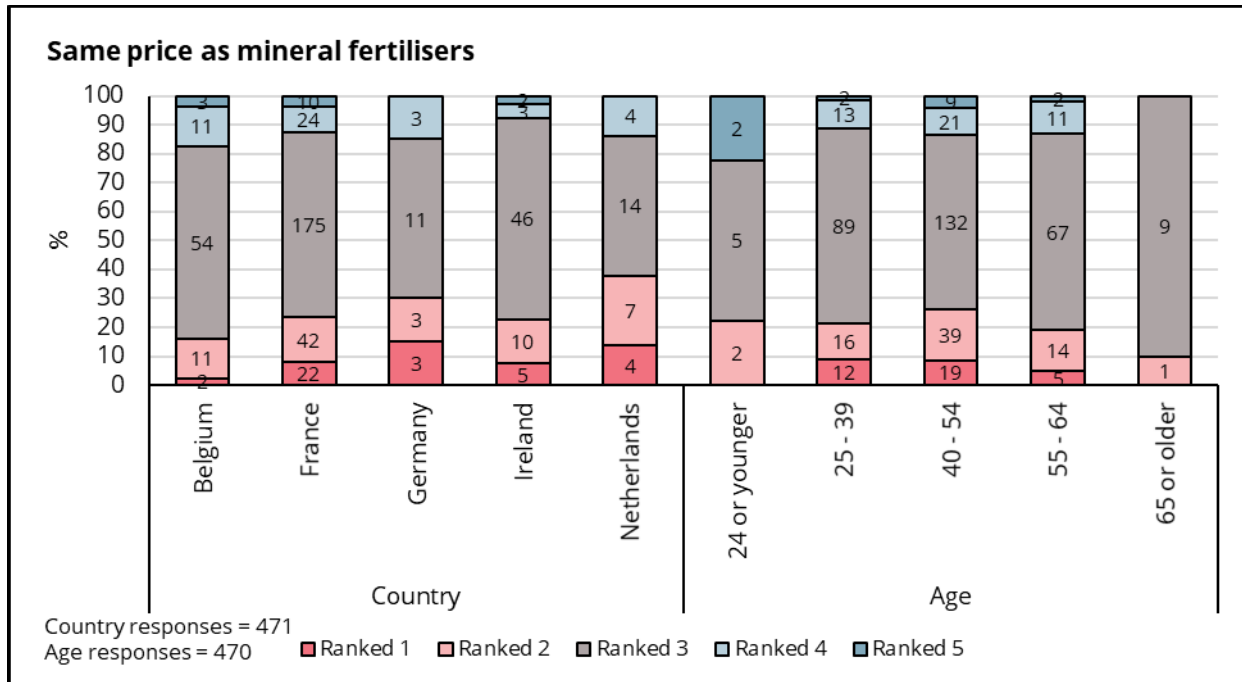
*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance

Figure 6-10: Importance of substituting mineral fertilisers with RDFs if they are cheaper than mineral fertilisers, per country and age group.

If the fertilisers are the same price as mineral fertilisers

- This option was rated the 3rd most important quality to encourage substitution.
- In total, 5% stated they would substitute if the fertilisers were the same price as mineral fertiliser as the most important quality by ranking it 1st (Figure 6-11Figure 6-10).
- In general, 11% of participants indicated that for them to substitute mineral fertiliser with RDFs, it was 2nd most important that the fertiliser was the same price as mineral fertiliser. Of those that participated in the Netherlands, 24% indicated that this was an important case, followed by 15% of those in France, Germany and Ireland respectively.
- 45% of respondents overall suggested that this was the 3rd most important case. In particular 70% of those in Ireland and 69% of respondents in Belgium.
- In addition, 2% of participants suggested they would substitute if they were the same price as mineral was the least most important case (ranked 5th) and 7% ranked it the 2nd least important case (ranked 4th).
- There were no responses from those in Luxembourg and two 3rd most important responses from those in the United Kingdom



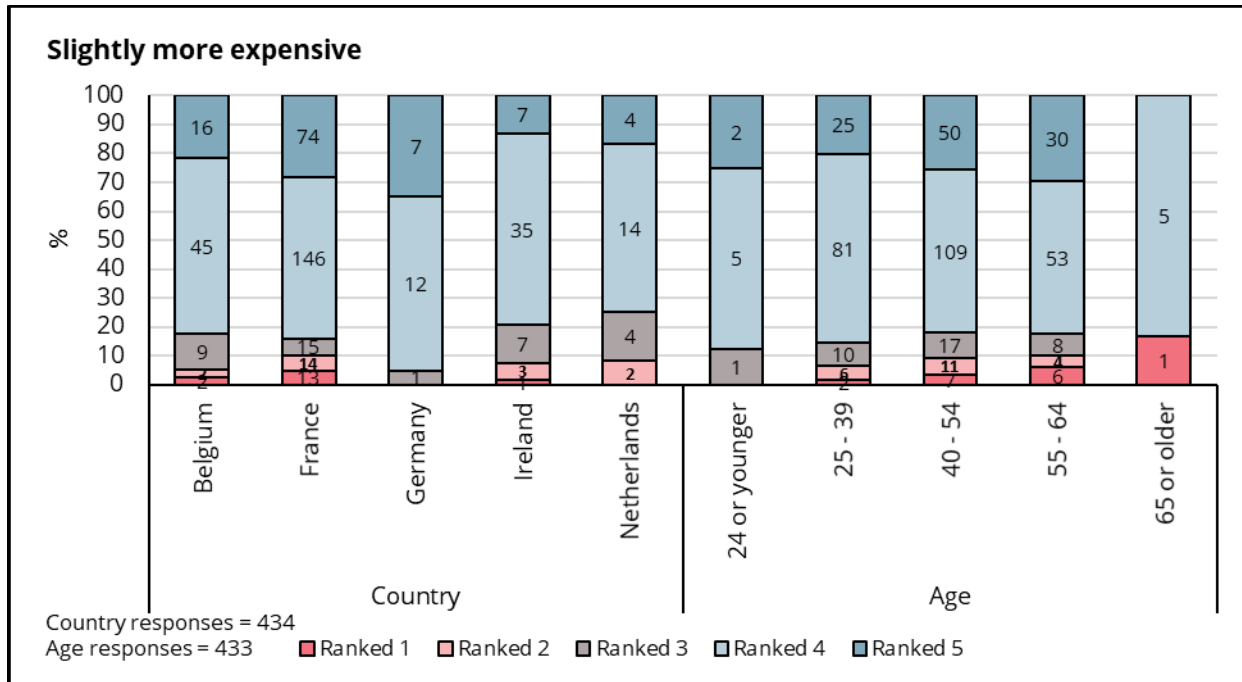
*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance

Figure 6-11: Importance of substituting mineral fertilisers with RDFs if they are the same price as mineral fertilisers, per country and age group.

If the fertilisers are slightly more expensive than mineral fertilisers

- This option was rated the 2nd least important quality to encourage substitution.
- In total, 2% stated they would substitute if the fertilisers were slightly more than mineral as the most important quality by ranking it 1st (Figure 6-12), followed by 3% ranking it 2nd and 5% ranking it 3rd.
- In general, 38% of participants indicated that for them to substitute mineral fertiliser with RDFs, it was the 4th most important case that it was slightly more expensive than mineral. Of those that participated in Ireland, 66% indicated that this was an important case, followed by 61% of those in Belgium.
- 16% of respondents overall suggested that this was the 5th most important case. In particular 35% of those in Germany and 28% of respondents in France.
- There were no responses from those in Luxembourg and one 3rd most important responses from those in the United Kingdom



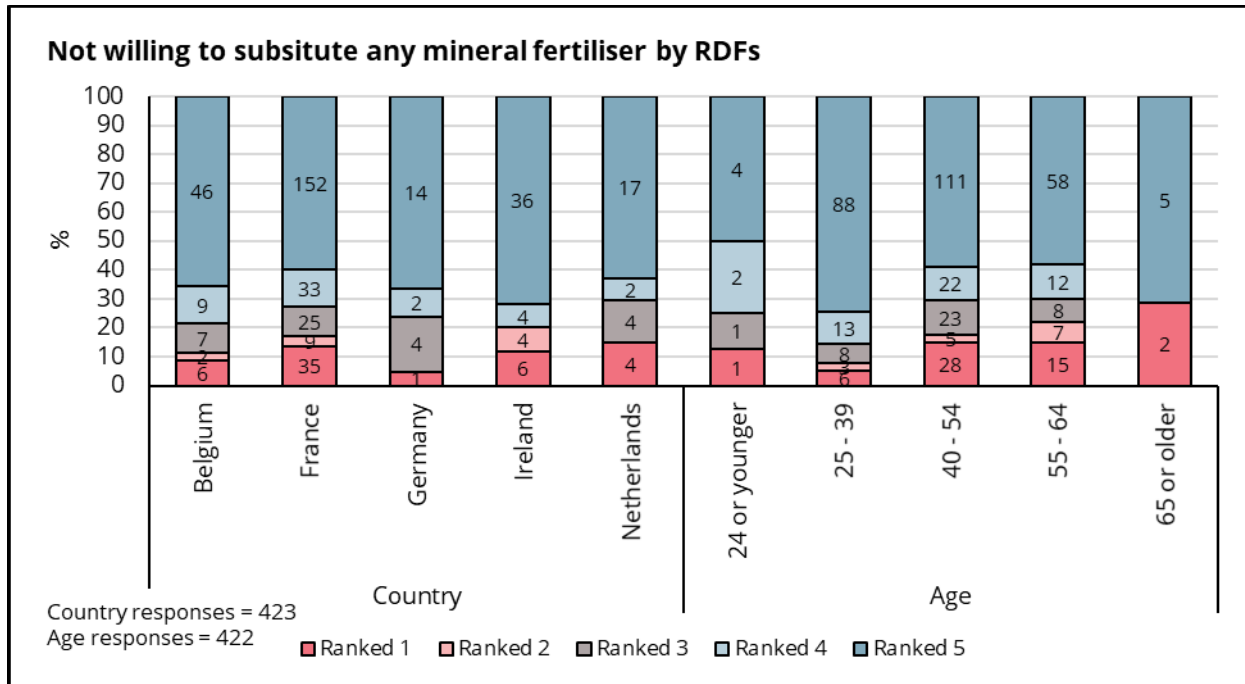
*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure 6-12: Importance of substituting mineral fertilisers with RDFs if they are slightly more expensive than mineral fertilisers, per country and age group.

I am not willing to substitute any mineral fertiliser by recycling-derived fertiliser

- This option was rated the least important quality to encourage substitution.
- In total, 8% stated they were not willing to substitute as the most important quality by ranking it 1st (**Error! Reference source not found.**Figure 6-10). Of those that responded from the Netherlands, 15% suggested it was most important, followed by 14% of those in France.
- In general, 2% of participants indicated that this option was the 2nd most important case, followed by 6% stating it was 3rd important and 7% suggesting it was the 4th most important.
- 40% of respondents overall suggested that this was the 5th most important case. In particular, 72% of respondents in Ireland, followed by 67% of those in Germany. This would suggest that 40% of respondents are open to substituting mineral fertiliser by recycling-derived fertilisers.
- There were no responses from those in Luxembourg and one 5th most important response from those in the United Kingdom.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure 6-13: Importance of those not willing to substitute any mineral fertilisers with RDFs, per country and age group.

6.3.4 Summary of Willingness to Substitute

Overall, the respondents indicated that if the fertilisers had all the important qualities mentioned in the previous question, they would be most likely to substitute:

1. if the RDFs were subsidised or free of charge
2. if they were cheaper than mineral fertilisers
3. if they were the same price as mineral fertilisers

The respondents were less likely to substitute:

4. if the RDF products were slightly more expensive than mineral fertilisers

Interestingly, the participants ranked the case, not willing to substitute, the least important, suggesting they are open to substituting mineral fertiliser with RDFs provided they fall within the top three options.

6.4 Chapter Summary

This chapter investigated the respondents, which included both users and non-users opinion, on which RDF qualities would encourage them to replace mineral fertilisers. In addition, if the fertilisers had those desired qualities, in which case regarding product cost, would they consider substituting mineral fertilisers.

The respondents indicated that for them to substitute mineral fertilisers with RDFs, the nutritional value of the fertiliser must be known (most important), particularly by those in Ireland and Belgium. They also suggested that the RDF fertilisers must fit in with their crop requirements (2nd most important), especially by those in Belgium and France. Besides, the respondents indicated the RDF fertilisers must have a high percentage of organic matter (3rd most important), specifically by those in Belgium and the Netherlands, that are certified (4th most important). The participants ranked these qualities the most important and producers must consider them to give farmers the confidence to substitute the mineral fertilisers with more sustainable RDF products.

With regards to the different age groups, those in the 24 or younger responded the most to a known NPK concentration and a high organic matter content by ranking them in 1st place. Those in the 40 to 54 group responded the most to the quality a nutrient ratio that fits with crop nutrient demand by ranking it in 1st place.

It is clear from the results that the participants were not interested in fertilisers that could be mixed with other fertilisers (least important), suggesting that they are more interested in fertilisers that are easy to use and apply. There was also a lack of importance for a fertiliser with a slow nutrient release speed (2nd least important), particularly those in Germany. Furthermore, participants did not find that fertilisers with a basic pH-lime value would encourage them to substitute (3rd least important).

In addition, the survey investigated in which case regarding product cost, would the participants be willing to substitute mineral fertiliser with RDFs if the most important qualities were met. The results suggest that it was most important the RDF fertilisers were subsidised and free of charge, especially from those in Ireland that ranked it 1st place most frequently. The respondents also found it 2nd most important that the RDFs were cheaper than mineral fertilisers, in particular, those in the Netherlands who ranked it number one most frequently.

Fertilisers that were slightly more expensive than mineral fertilisers were ranked the least important case, especially by those in the 65 or older age group (ranked 1st place). Participants also indicated that those not willing to substitute was the 2nd least important case, particularly those in the 65 or older age group (ranked 1st place). This suggests that those in the 65 or older age group are less willing to substitute mineral fertilisers with RDFs. The results also indicate that the respondents, except those in the 65 or older age group, would be most willing to substitute mineral fertilisers with RDFs if they did not cost as much as mineral fertilisers or if they were subsidised. Therefore, participants in the other age groups are willing to substitute mineral fertilisers if those requirements are met.

The qualities that encourage the participants to substitute mineral fertilisers with RDFs are very similar to the qualities in RDFs that participants found important in the previous chapter. These results indicate that if the RDFs available to the participants guaranteed to have these qualities, then they would be willing to substitute them for RDFs. Provided, however, that the RDFs were subsidised, free of charge or cheaper than mineral fertilisers.

7 Other Relevant Remarks

7.1 Overview

To complete the survey, participants were asked an open-ended question to explore any other relevant qualities, opinions or attitudes that were not covered in the other questions. This question was asked to the farmer respondents (Figure 7-1) and the advisor participants separately. The most relevant qualities from farmers that came up in this question were highlighted in this report, however, there were no qualities of interest that emerged from the advisors' responses.

44. Do you have any other remarks (about recycling-derived fertilisers)?



Figure 7-1: Any additional comments question from a farmers perspective.

7.2 Relevant Responses

In total, there were 307 farmer responses to this question which equates to 1727 words recorded. This question allowed participants to include any other comments they found relevant with regards to the desired properties of RDFs. See Table 4-1 for the breakdown of the number of farmers' responses and words recorded per country.

Table 7-1: Total number of respondents and word counts from farmers and advisors.

	Farmers	
	Respondents	Word count
Total	307	1727
Belgium	54	226
France	183	979
Germany	5	5
Ireland	42	283
Luxembourg	0	0
Netherlands	22	233
United Kingdom	1	1

7.2.1 Themes

The farmers most frequently occurring words, as displayed in Figure 4-2, were use (62 counts), fertiliser (13 counts), spreading (9 counts) and waste (9 counts). The next frequently occurring words included farmers (8 counts), price (8 counts) and soil (8 counts). Some other words that occurred frequently included cost (7 counts), farm (7 counts) and products (7 counts). Additional words included, information (6 counts), recycling (5 counts) and certified

(4 counts). Some of the most frequently occurring themes that emerged from the farmers and advisors responses were identified as follows:

Cost

Product cost was the most frequently occurring quality in this question (21 counts). Participants remarked that RDFs were too expensive (2 counts) to buy, or too expensive to spread (1 count). Some indicated that they should be free (3 counts) of charge because of the risks, the farmers are taking (1 count). Another suggested that they should be priced according to manure regulation (1 count). Another stated that the cost should be low (1 count) and some suggest it should be less than mineral (2 counts) or the cost should not be compared to mineral fertilisers (2 counts) at all. Another participant suggested that the farmers should be paid to spread the recycled products (1 count) or at least they should be subsidised (1 count).

Application

The participants remarked on the application of RDFs (9 counts) as the 2nd most frequently occurring comment. This applied in particular to the spreading (6 counts) of RDFs, as spreading width can be an obstacle for use on crops (1 count). While one was looking for a spreading solution for liquid digestate (1 count), another indicated that they could not spread them themselves (1 count).

Availability

The availability (7 counts) of these recycled products was joint 3rd most frequently occurring comment in this question. One farmer suggested that there should be a fixed supply of the products (1 count) with a regular annual quantity (1 count). Another indicated that they are difficult to source (1 count) and that they should be promoted more (1 count).

Certification

The parameter of product certification (7 counts) was joint 3rd most commonly occurring in this question. Some participants remarked that this parameter was a concern for them, highlighting that products must be standardised and certified (1 count), they must be certified to guarantee the absence of any possible pollutants (1 count). In addition, it was highlighted that these products must be guaranteed that they will not have any harmful effects on soil life and plant health (1 count) and they must certify the nutrient concentration in the products (1 count).



Figure 7-2: Word cloud indicating the most reoccurring words recorded by participants that had other remarks about RDFs.

Other qualities

Participants mentioned that the nutrient content (3 counts) was important including that N management is more difficult in this type of fertilizer (1 count), the RDFs agronomic and economic performance (3 counts) was mentioned and RDFs safety (2 counts) was also remarked on.

7.3 Summary

The most important RDF qualities that participants further highlighted in this open-ended question included the product cost, the application of the products, product availability and certification of the products. The respondents' opinions on the product cost were divided between being free of charge, less than mineral or that they shouldn't be compared to mineral fertilisers at all. However, there were no suggestions from participants that indicated their willingness to pay the same for RDFs as mineral fertilisers or slightly more than mineral fertilisers.

Spreading cost was also highlighted as an issue along with the application and spreading of the different products on the land. Their availability to buy and the reliability of having these

products on demand were suggested obstacles for farmers that are willing to use these products. Product certification was an important parameter that was emphasised in this question as farmers are concerned about the addition of contaminants to the soil that would affect the soil health, which also highlighted the aspect of product safety.

Considering this question gave the participants the freedom to share and voice their concerns and opinions about RDFs, it is interesting to see that some of the same qualities, parameters and properties in previous questions reoccurred. Because of this, one is inclined to think that these are serious concerns that respondents have, as they were willing to share and reiterate these issues. Therefore, it is important to take these responses seriously to develop RDF products with desired properties from an end-user perspective.

8 Conclusions and Recommendations

Overall, through the analysis of both the closed and open-ended questions of the survey, we know that the survey captured the desired stakeholders, which were predominantly farmers. In particular, they were mainly conventional farmers involved with arable, dairy cow and beef cattle farming. There was also a good distribution of participants from various age groups, with the 40 to 54 age group represented the most.

In general, there was excellent participant engagement with the stakeholder's survey, which gave a great insight into the respondents' desired properties of RDFs. On assessing the national desired properties from an end-user perspective, this report suggests there are many different desired qualities, properties and parameters in RDF products that participants find important. However, many of these desired properties were alike among the participating countries, between RDF users and non-users, and farmers and advisors. Therefore, this report identified several similarities among the participants' responses to the desired properties of RDFs from an end-user perspective.

- Both farmers and advisors indicated that a known fertiliser nutrient content and composition was the most important parameter to know when selecting fertilisers, followed by product cost (farmers) and the ease of use/ application (advisors).
- In comparison, both farmers and advisors suggested nutrient efficiency with regards to the nutrient release/ uptake speed was one of the least important properties when selecting a fertiliser.
- Although product cost came up as an important parameter when choosing fertilisers for the farmers; this, however, was not reflected among the advisors. On the other hand, advisors indicated that product safety was an important parameter when selecting fertilisers; however, this was not the case among the farmers.
- RDF users found that a nutrient ratio that fits with a crop nutrient demand was the most important quality in RDFs. However, non-users indicated the price per unit N or other nutrients was the most important. In addition, RDF users found a high organic matter content was the next most important quality in RDFs and non-users placed the ease of use 2nd important.
- On the other hand, RDF users found that possible mixing with other fertilisers was the least important quality in RDFs and non-users rated it 2nd least important. The non-users suggested RDFs with a slow nutrient release speed was the least important quality and users found it was the 2nd least important quality in RDFs.
- The themes that emerged in the open-ended section that were common to both RDF users' and non-users were, product cost and the quality of the RDFs, these qualities were both rated important in RDFs. However, the other themes highlighted by RDF users included the smell of the products, storage of RDFs and their availability. Then again, non-users were more concerned about the environmental security aspect of the RDFs.
- In terms of the preferred texture of RDFs, both farmers and advisors ranked granules the most preferred RDF texture, followed by liquid and a combination of liquid and solids.

- A known NPK concentration, a nutrient ratio that fits with crop nutrient demand and RDFs with a high organic matter content were identified as the most important and next important qualities in RDFs that would encourage respondents to substitute mineral fertilisers.
- In comparison, possibly mixing with other fertilisers was the least important quality in RDFs that would encourage substitution, followed by a slow nutrient release speed and a basic pH- lime value.
- Respondents found it was most important that RDF fertilisers were subsidised and free of charge, and cheaper than mineral fertilisers. Respondents that were not willing to substitute were ranked the least important quality to encourage substitution.

The final survey question proposed to both farmers and advisors explored if the participants had any other remarks. The most frequently occurring property that emerged from the farmers' responses was product cost, however, their opinions were divided between, preferring the RDFs were free of charge or that they were less than mineral. The respondents highlighted that their availability to buy and the reliability of having these products on demand were seen as obstacles for farmers that are willing to use these products. To increase the farmers' uptake of these products, their availability must be assured. They also stressed that certification was an important parameter as this would give them a guarantee that these products were free from contaminants and were safe to use.

The potential success and uptake of RDFs are dependent on acknowledging and meeting the requirements that farmers and advisors, RDF users and non-users have highlighted in this survey. It is important to gain their trust and build on their confidence in these recycled products. To do this the developers, producers and advisors must acknowledge the qualities, properties and parameters that the consumers have highlighted as important. Assuring the consumers of the product safety will encourage them to get on board with using these recycled products, and actively contribute to the circular economy.

A Annex

46. What parameters/properties are important to know when selecting a fertiliser?

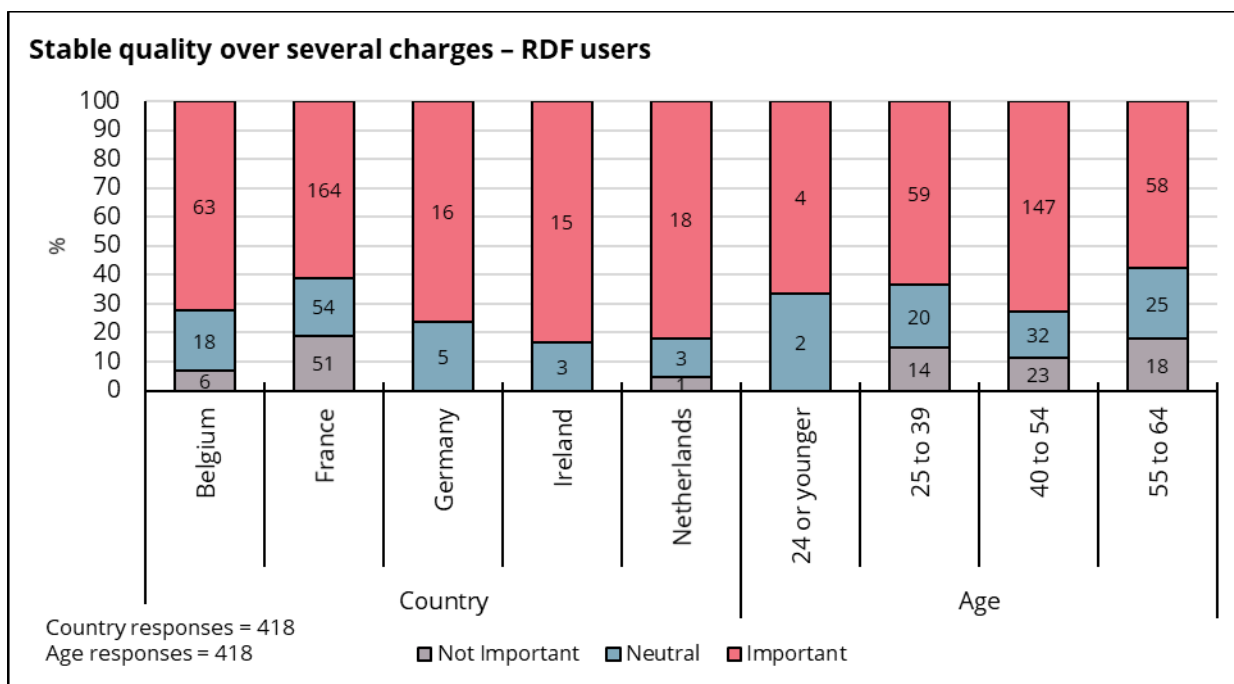
Figure A-1: Important parameter/properties question to advisers, from the ReNu2Farm Stakeholders Survey.

35. On a scale from 0 (not important at all) to 7 (extremely important), how would you rate the importance of the following qualities in recycling-derived fertilisers?

	0	1	2	3	4	5	6	7
Nutrient ratio that fits with crop nutrient demand	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fast nutrient release speed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Slow nutrient release speed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
High organic matter content	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Basic pH - lime value	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Stable quality over several charges	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ease of use (practical handling: physical structure/form, mixing, ...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Price per unit Nitrogen or other nutrient	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Possible mixing with other fertiliser (no extra fertiliser run necessary on the field)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Ability to use same machinery and machine tracks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Availability to buy at fertiliser supplier/trader	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Certification	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Storage (packaging, packaging size, ...)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other, namely:	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Other (please specify)

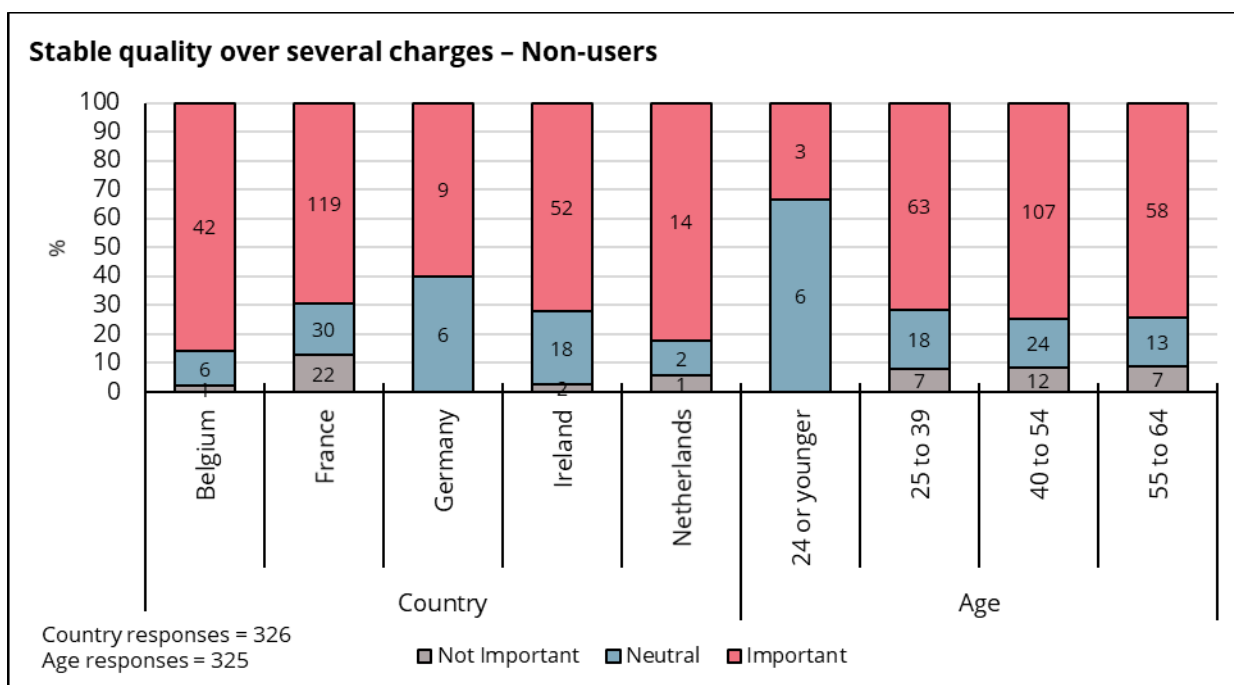
Figure A-2: Rating the importance of various qualities of RDFs from a non-user perspective, taken from the ReNu2Farm Stakeholders Survey.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

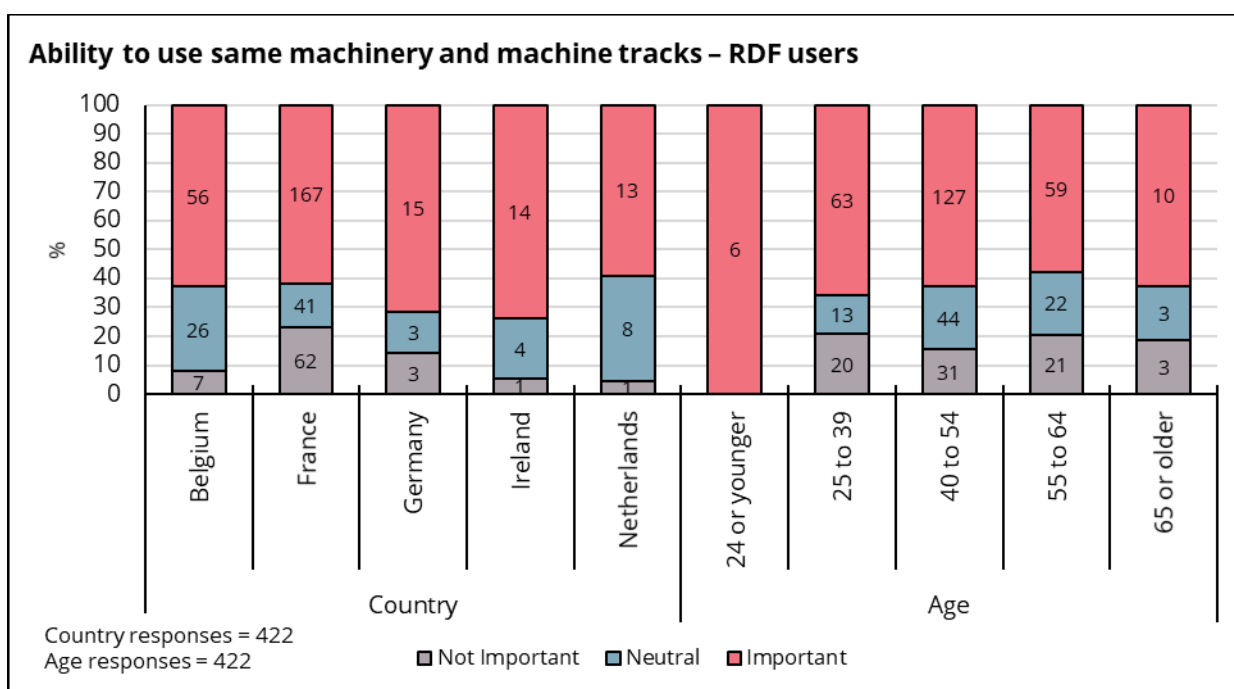
Figure A-3: Distribution of the importance of a stable quality over several charges as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

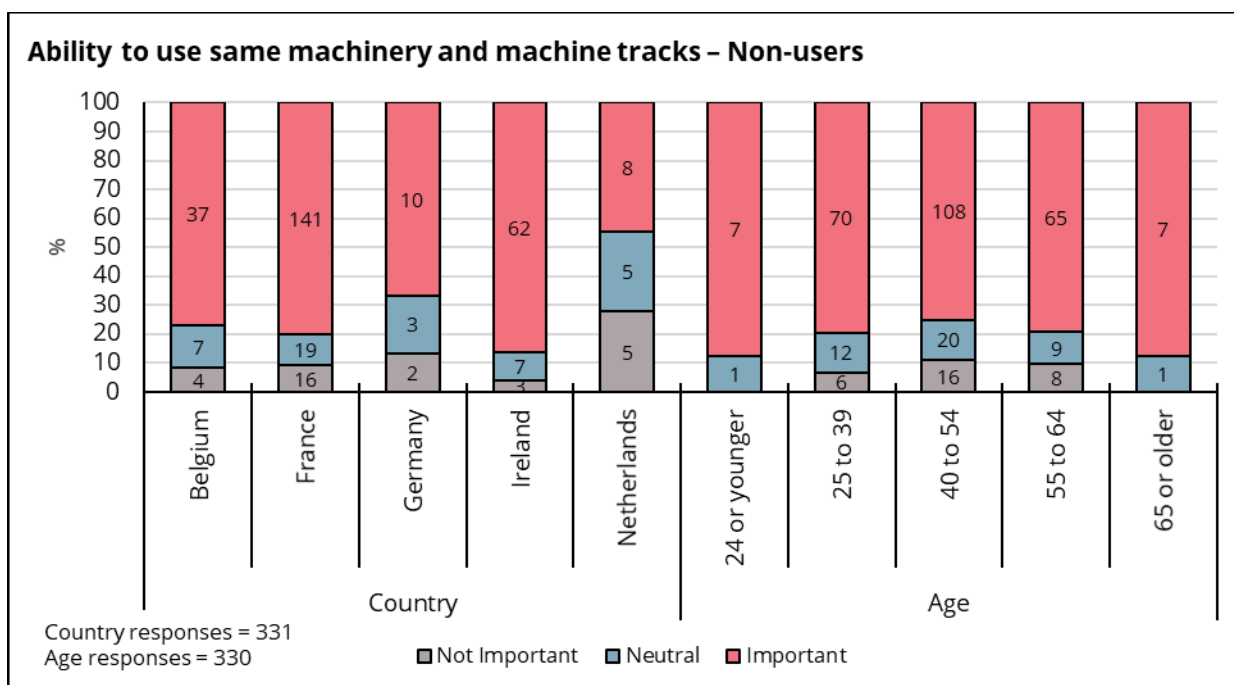
Figure A-4: Distribution of the importance of a stable quality over several charges as a quality in RDFs from a non-user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

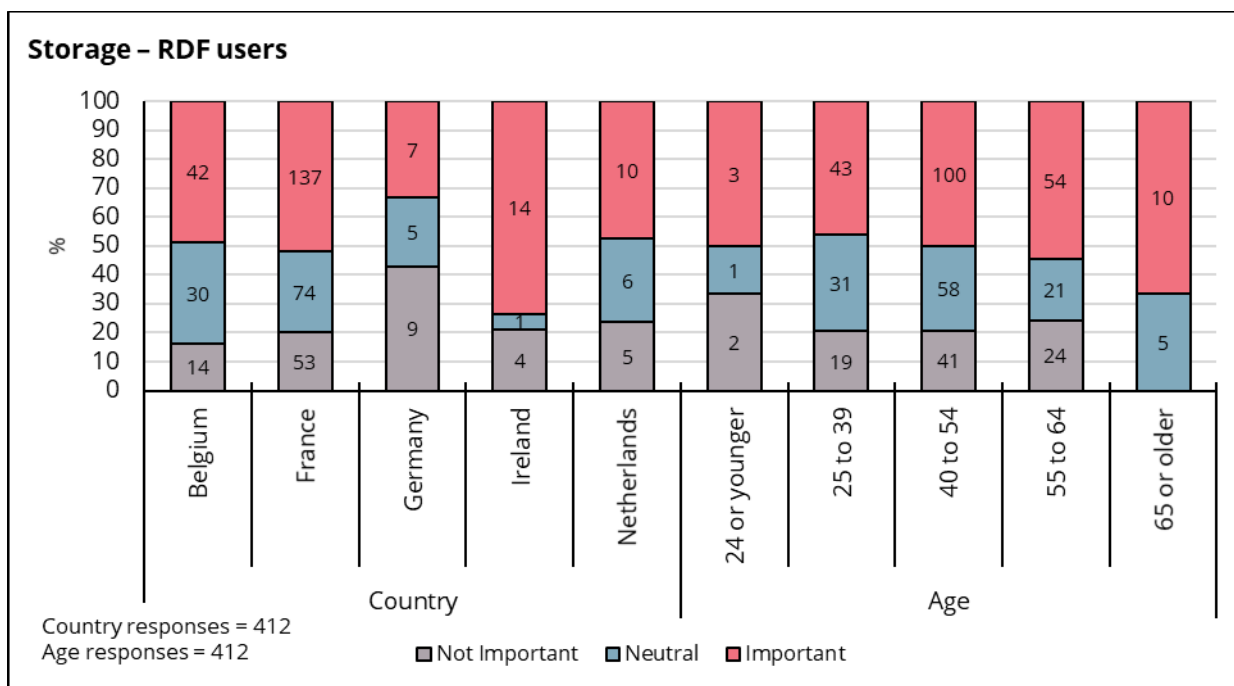
Figure A-5: Distribution of the important ability to use the same machinery and machine tracks as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

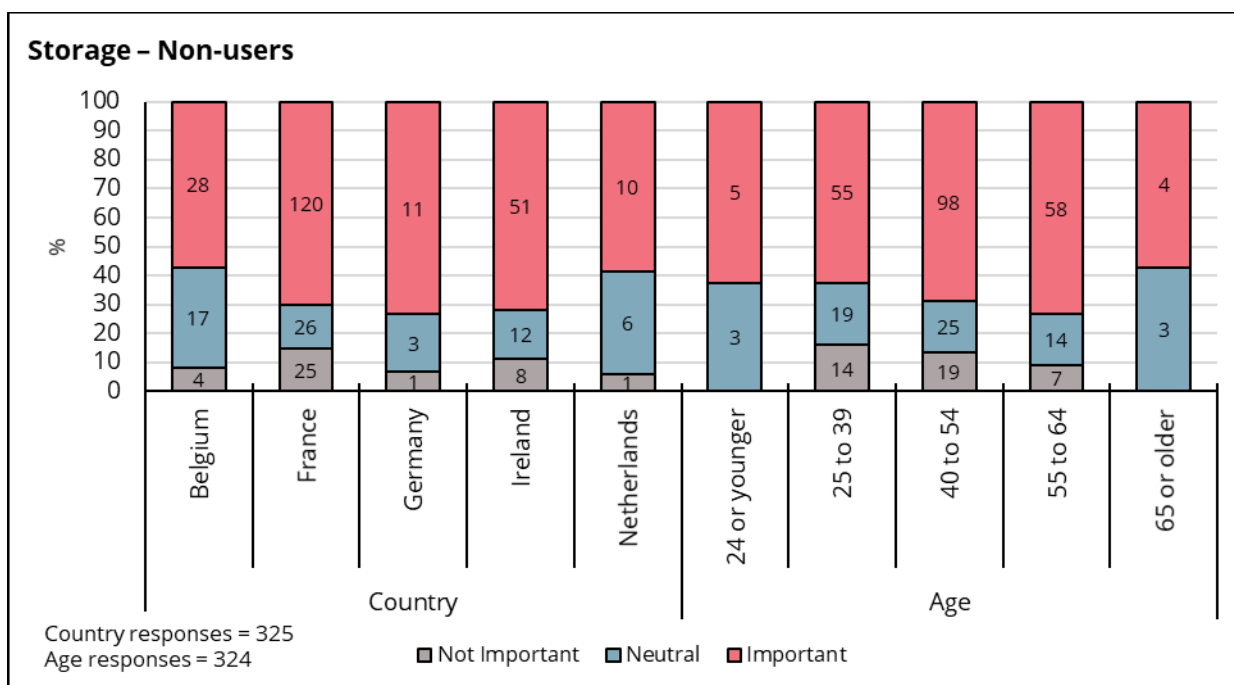
Figure A-6: Distribution of the important ability to use the same machinery and machine tracks as a quality in RDFs from a non-user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

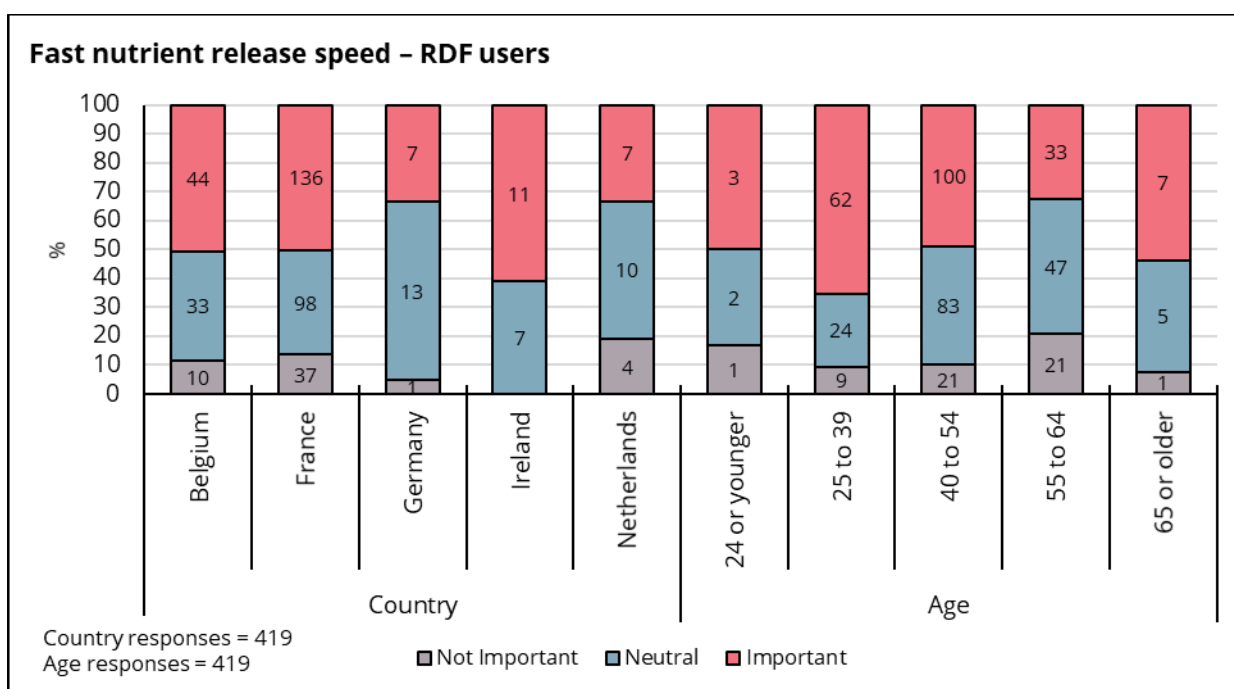
Figure A-7: Distribution of the importance of storage as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

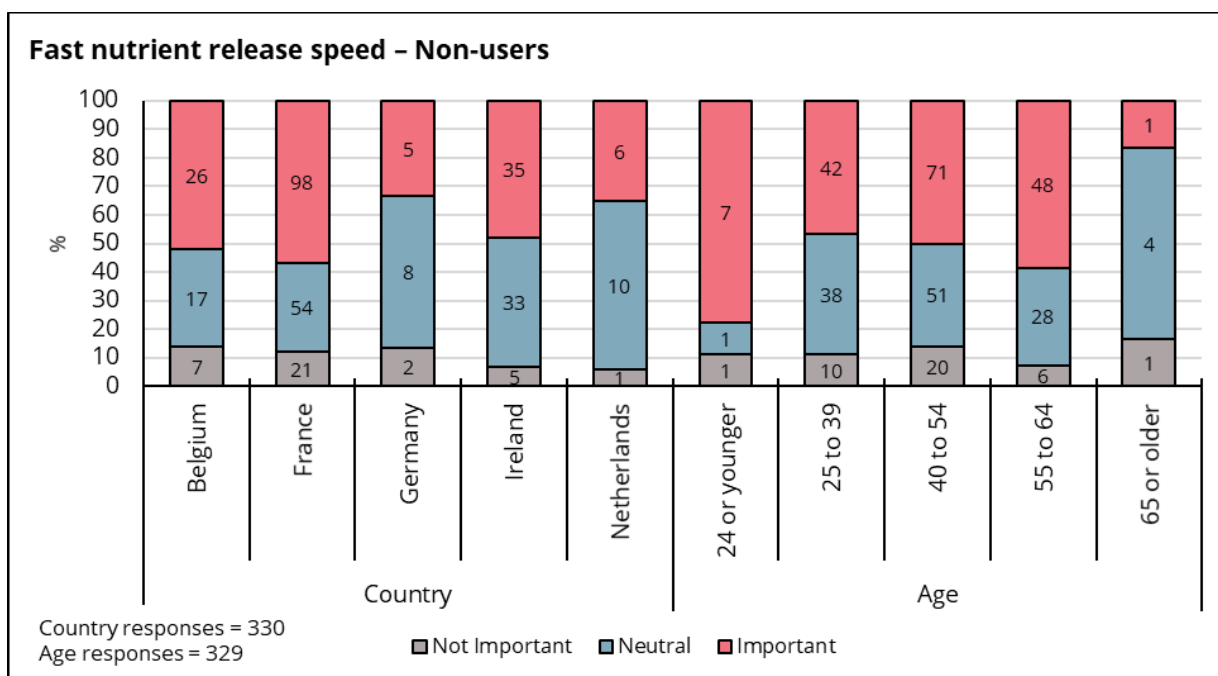
Figure A-8: Distribution of the importance of storage as a quality in RDFs from a non-user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses.

Figure A-9: Distribution of the importance of fast nutrient release speed as a quality in RDFs from a user perspective, per country and age group.



*Luxembourg and the United Kingdom were not included in the graph due to a low response rate.

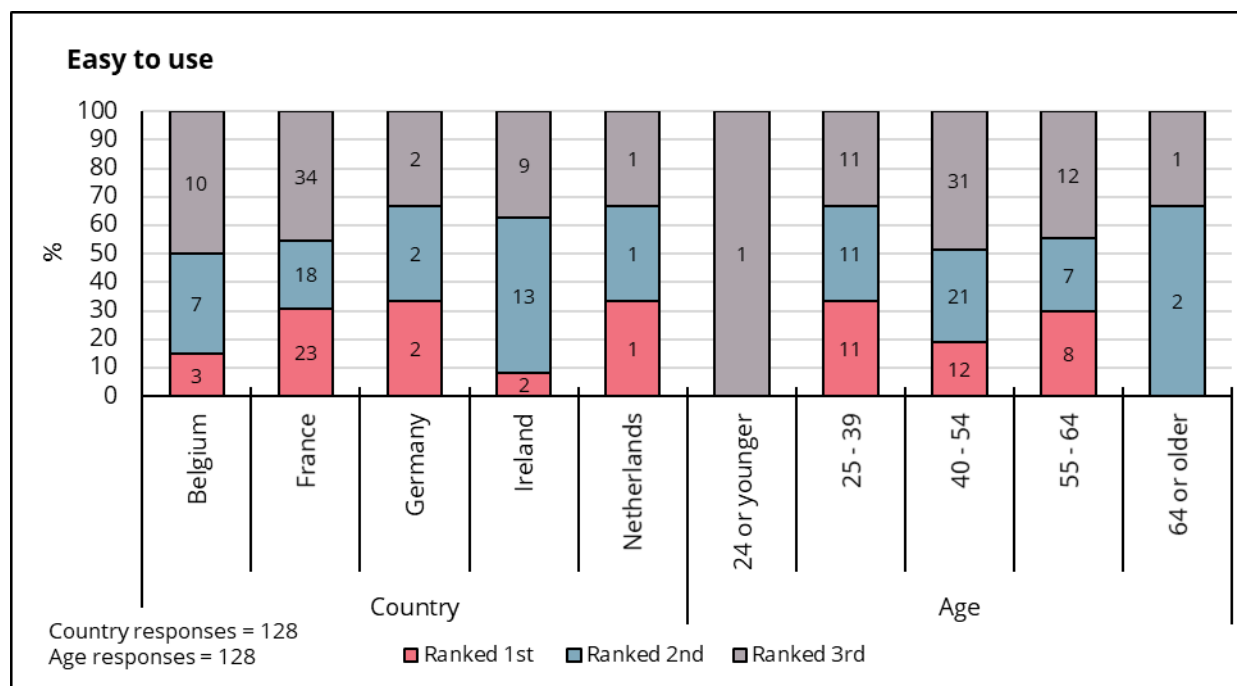
**The number on each bar refers to the number of responses.

Figure A-10: Distribution of the importance of fast nutrient release speed as a quality in RDFs from a non-user perspective, per country and age group.

52. For the application of recycling-derived fertilisers, which texture is preferable? (with 1 being the most preferred and 5 the least preferred)

<input type="text"/>	granules
<input type="text"/>	powder
<input type="text"/>	paste
<input type="text"/>	liquid
<input type="text"/>	combination liquid/solid

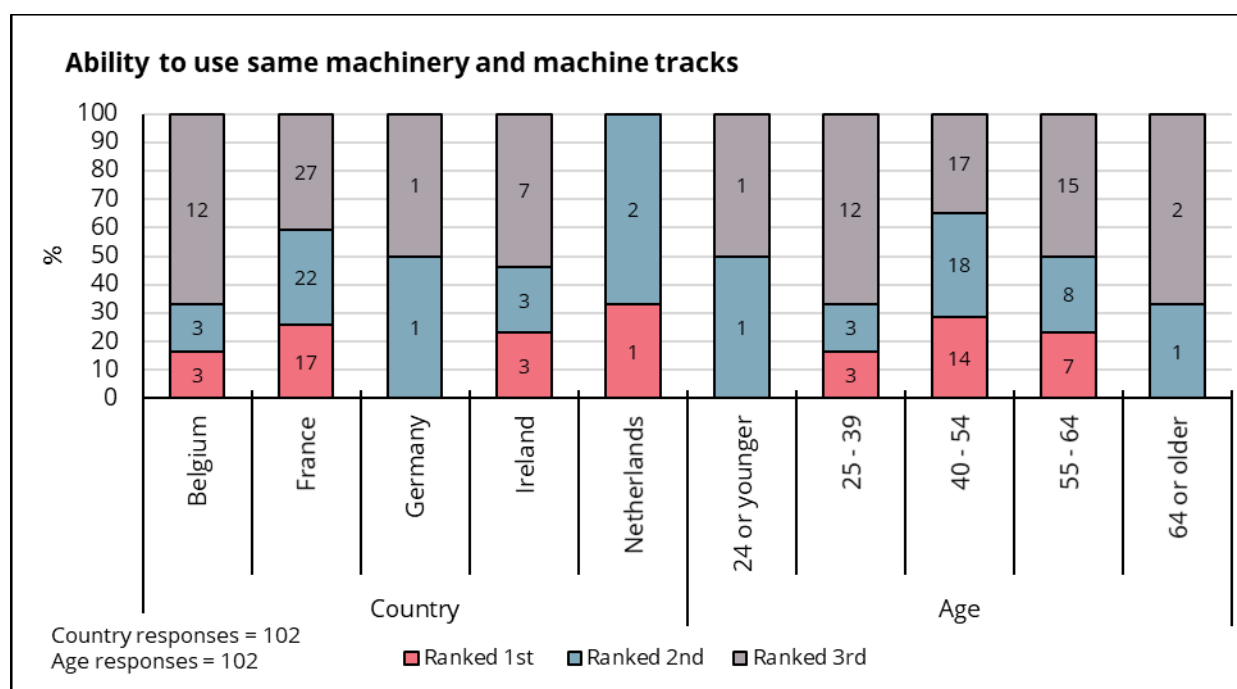
Figure A-11: Preferred texture question, from the ReNu2Farm Stakeholders Survey, from an advisors perspective.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

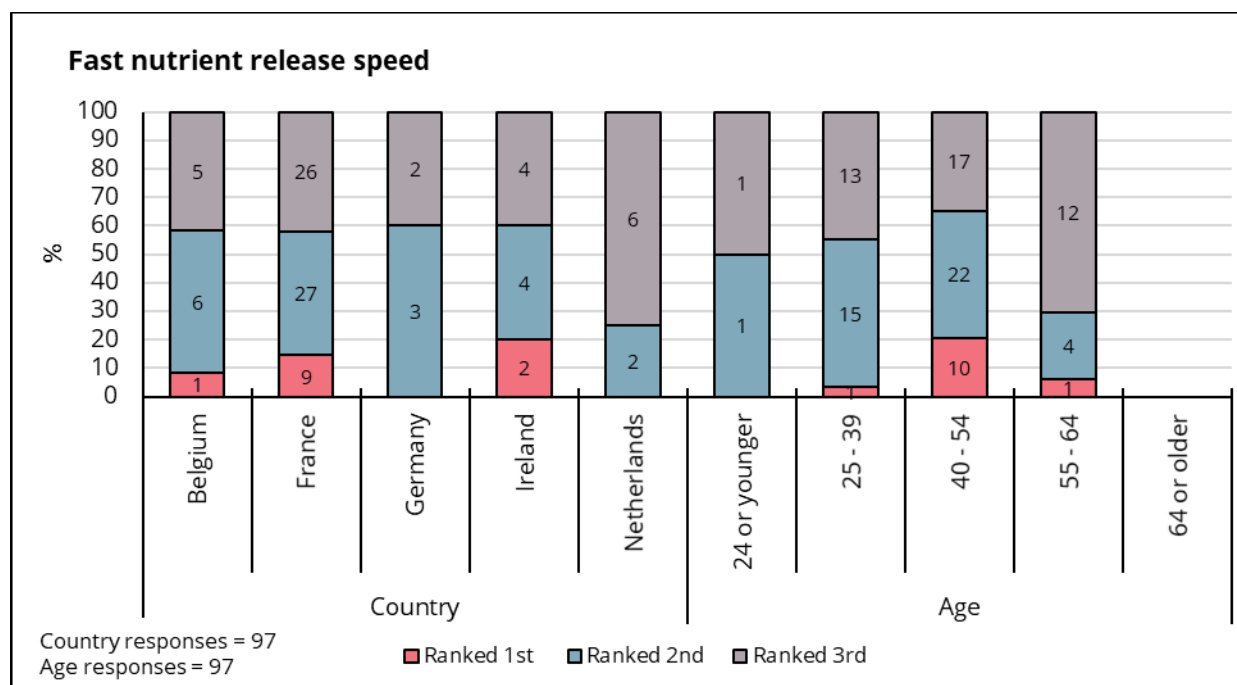
Figure A-12: Distribution of responses that represent the importance of the RDF quality easy to use, per country and age group.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure A-13: Distribution of responses that represent the importance of the RDF quality ability to use the same machinery and machine tracks, per country and age group.



*Luxembourg and the United Kingdom not included in the graph due to a low response rate.

**The number on each bar refers to the number of responses per importance.

Figure A-14: Distribution of responses that represent the importance of the RDF quality fast nutrient release speed, per country and age group.